Superconductivity (E/A) - Supercond

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

Module	**Elective Advanced Lectures: BCGS Courses**
Module No.	physics70d

Course	**Superconductivity (E/A)**
Course No.	Supercond

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Elective	Lecture	English	2	3	ST

Requirements for Participation:

Preparation: Basic knowledge in condensed matter physics

Form of Testing and Examination: Oral examination

Length of Course: 1 semester

Aims of the Course: Understanding of the fundamental aspects of superconductivity.

Contents of the Course:

The lecture provides an overview of the fundamental aspects of superconductivity, theoretical description and technological applications, including the following topics:

Basic experimental facts and critical parameters

Phenomenological description: London equations

Ginzburg-Landau theory

Magnetic flux quantization

Type I and type II superconductors, characteristic length scales, vortices

Microscopic description: BSC theory

Electron-phonon interaction, Cooper pairs

Josephson effects

Applications of superconductivity in science, transport, and medicine

Brief introduction to unconventional superconductivity with recent examples

Recommended Literature:

J. F. Annett: Superconductivity, Superfluids and Condensates (2004)

M. Tinkham: Introduction to Superconductivity (1996)

V. V. Schmidt: The Physics of Superconductors (1997)

J. R. Waldram: Superconductivity of Metals and Cuprates (1996)