

Course title:	Quantum Mechanics
Institute (Faculty)	Institute of Physics (Faculty of Materials Engineering and Physics)
Number of contact hours:	60 hours
Course duration:	1 semester
ECTS Credits:	4 ECTS

Course Description:

Course goals include providing students with an advanced theoretical knowledge on modern quantum description of matter at the atomic level together with some practical methods in computer modelling of quantum systems. Some prior knowledge and skills related to undergraduate courses in science or engineering will be beneficial, although graduates wishing to specialise in a new area or wishing to convert to a new discipline may also consider taking this course.

The course comprises lectures and tutorials with in-class discussion, substantial element of project-work and self-study.

Learning outcomes will include extensive and advanced knowledge of quantum mechanics of atoms, molecules and condensed matter. The course topics will focus on modern applications of quantum theory in engineering and materials science. Skills gained upon successful completion of the course will include ability to generate and evaluate scientific and engineering evidence and explanations within the scope of quantum mechanics. The students will learn practical and effective methods of modelling physical systems showing quantum behavior. In order to achieve that goal, a variety of computer methods and a choice of programming languages for numerical simulations and visualisation will be used (including C/C++, Fortran, MATLAB, Python, Mathematica, COMSOL Multiphysics).

Literature:

R. Shankar, *Principles of Quantum Mechanics*, Plenum Press (1994).

G. Auletta, M. Fortunato and G. Parisi, *Quantum Mechanics*, Cambridge University Press (2009).

Course type:	Lectures (30 h), Tutorials (30 h)
Assessment methods:	Attendance, Mid-term tests, Projects, Exam
Prerequisites:	undergraduate Maths, Physics and Computer Science courses
Intended for:	full-time MSc programme at the postgraduate level
Lecturer:	Dr Robert Gębarowski
Contact person:	Dr Robert Gębarowski (rgebarowski@pk.edu.pl)

The course is offered for Academic Year 2020/2021(version 6.05.2020)