KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI
Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego
UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title

Physical implementations of quantum information

ECTS code

13.2.0426

Name of unit administrating study

null

Studies

faculty	field of study		
Faculty of Mathematics, Physics and Informatics	Quantum Information Technology	type	all
		form	all
		specialty	all
		specialization	all

Teaching staff

prof. UG, Łukasz Rudnicki

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classes outside UG premises, classroom instruction, online classes

Number of hours

Lecture: 15 hours

ECTS credits

2
2 ECTS

The academic cycle

2022/2023 summer semester

Type of course

obligatory

Language of instruction

english

Teaching methods

- Lectures by the coordinator and workshops with world class specialists.
  Irregular meetings (schedule fixed within first two weeks of the semester)
- problem-focused lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

(mid-term / end-term) test

The basic criteria for evaluation

Assessment of the essay, presence at the workshops.
The essay (max 5 pages, without bibliography) shall be comprehensive (50%), well-written (30%), omitting most of technical details and to the point (20%)

Method of verifying required learning outcomes

established effect of education	essay
W01	+

Required courses and introductory requirements

A. Formal requirements

B. Prerequisites

Advanced knowledge of quantum information. Basic knowledge of physics and mathematics.

Aims of education

To familiarize the students with experimental platforms relevant for implementations of quantum information techniques.

Course contents

Implementations with quantum optics
Implementations with ions and neutral cold atoms
Implementations with spins in semiconductor quantum dots, NV centers and molecules

Bibliography of literature

Quantum computation and quantum information, Michael A. Nielsen & Isaac L. Chuang, Cambridge : Cambridge University Press, 2000 676 S. ISBN 0-521-63235-8

Selected review articles (depending on the exact program and external speakers)

The learning outcomes (for the field of study and specialization)

K_W01
Student has extensive knowledge of general physics and advanced knowledge in the area of quantum information theory; knows the history of the development of quantum information theory and its importance for the progress of science, cognition of the world and social development

K_W03
Student knows advanced experimental, observational and numerical techniques allowing to plan and perform a complex physical experiment or computer simulation

Knowledge

W01:
The students know (in a helicopter view) how one designs, constructs and operates physical systems for the purpose of quantum information processing (K_W01, K_W03)

Skills

Social competence

Contact

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