COURSE DESCRIPTION CARD - SYLLABUS

Course name
Pre-graduate seminar [S1FT1>SPD]

Course

Field of study
Technical Physics

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other (e.g. online)
0

Tutorials
30

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge of experimental physics and basic knowledge of nanotechnology and functional materials as well as knowledge of the principles of engineering graphics in terms of learning outcomes / program content implemented in semesters 1-5 in the field of Technical Physics. the ability to solve physical problems based on the possessed knowledge, the ability to obtain information from the indicated sources, the ability to present and analyze the obtained research results. Understanding the need to expand your competences, readiness to cooperate within the team.

Course objective

- Provide students with detailed knowledge in the field of nanotechnology of inorganic, organic and functional materials; familiarization with the principle of operation of specialized equipment for the characterization of nanostructures, ultra-thin layers. functional, single crystals and methods of analysis of experimental results - Developing the ability of students to analyze the results, prepare research reports and publicly present the results based on the results and their discussion in the forum - Developing teamwork skills in students.

Course-related learning outcomes

Knowledge:
as a result of the course the student:
1. has ordered knowledge of physical phenomena in the field of nanotechnology and functional materials and physical phenomena in the field of classical experimental physics - [k1_w08]
2. knows the state of knowledge in the field of specialties: nanotechnologies and functional materials and is aware of the latest trends in this topic - [k1_w12, k1_w13, k1_w19]

Skills:
as a result of the course, the student should demonstrate skills in the following areas (the student will be able to):
1. can, on the basis of literature, independently make a preliminary analysis of the results of laboratory measurements and draw conclusions - [k1_u02, k1_u03, k1_u11, k1_u14, k1_u17]
2. is able to independently and efficiently present an oral presentation in polish with well-documented and interpreted measurement results - [k1_u04, k1_u06, k1_u13, k1_u11, k1_u23]

Social competences:
completing the course means that:
1. is able to work independently and in a team on a given task, shows responsibility in this work - [k1_k02, k1_k07]
2. understands the need and knows the possibilities of continuous training and understands the importance of non-technical aspects and effects of engineering activities - [k1_k03, k1_k06]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
- evaluation of the substantive content of the presentation
3 50.1% -70.0%
4 70.1% -90.0%
5 from 90.1%
- evaluation of the substantive content of the presentation and the manner of public presentation
3 50.1% -70.0%
4 70.1% -90.0%
5 from 90.1%
- evaluation of activity in the discussion at the seminar and commitment during the preparation of the presentation
3 50.1% -70.0%
4 70.1% -90.0%
5 from 90.1%

Programme content

-To acquaint students with modern methods and experimental techniques in the field of nanotechnology, solid state physics and solid state spectroscopy used for the characterization and research of physical processes occurring in materials and physical structures.

Teaching methods

Presentation in the form of a seminar of selected methods and experimental techniques used in research as part of the prepared thesis.

Bibliography

Basic
1. A.Oleś, Metody eksperymentalne fizyki ciała stałego? Warszawa, WNT 1998.
2. Spektroskopia Ciała Stałego, wyd. II popr. I uzup., pod red. M. Drozdowski, Wyd. Politechniki Poznańskiej 2001
3. Z. Kęcki, Podstawy spektroskopii molekularnej, Warszawa, PWN 1992
4. H.Barańska, A.Łabuzińska, J.Trepiński, Laserowa spektrometria laserowa - zastosowania analityczne, Warszawa PWN 1981
5. C. Kittel, Wstęp do fizyki ciała stałego, Warszawa, PWN 1976

6. J.I. Pankowe, Zjawiska optyczne w półprzewodnikach, Warszawa, PWN 1974
7. J.Stankowski, B.Czyżak, Nadprzewodnictwo, Warszawa, WNT 1994
8. H.J. Guntherodt, R. Wiesendanger (Eds.), Scanning Tunneling Microscopy I, II and III, Berlin Springer-Verlag 1992
9. B. Ziętek, Optoelektronika, Wyd. UMK Toruń 2005
Additional
1. D.Wróbel, Podstawy fotonowych procesów molekularnych, Wydawnictwo Politechniki Poznańskiej 1998
2. Mikroskopia elektronowa, pod. red. A. Barbackiego Rozdz. VI pt.Mikroskopia sond skanujących, Wyd. Politechniki Poznańskiej, Wydanie III, 2007
3. E Meyer, H.J.Hug, R. Bennewitz, ScanningProbeMicroscopy.The Lab on a Tip,Springer Verlag, Berlin

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	32	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00