COURSE DESCRIPTION CARD - SYLLABUS

Course name
Pre-diploma Seminar [S1FT2>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
0

Projects/seminars
15

Number of credit points

2,00

Coordinators

dr hab. Mirosław Szybowicz prof. PP
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Lecturers

Prerequisites

Good knowledge of experimental physics and basic knowledge in the field of nanotechnology and functional materials, as well as principles of engineering graphics. Ability to solve physical problems based on the knowledge acquired, ability to gather information from indicated sources, and to present and analyze obtained research results. Understanding the necessity of expanding one's competencies and readiness for teamwork.

Course objective

To provide students with detailed knowledge in the field of nanotechnology of inorganic, organic, and functional materials; introduce the operation principle of specialized equipment for the characterization of nanostructures, ultra-thin functional layers, monocrystals, and methods for experimental result analysis. To develop students' skills in analyzing results, preparing research reports, and public presentation of findings based on conducted research and its discussion in a forum. To encourage students to work as a team.

Course-related learning outcomes

Knowledge:
As a result of the course, the student:

Has organized knowledge about basic physical phenomena in the field of nanotechnology and functional materials, as well as phenomena in classical experimental physics
Knows the current state of knowledge in the area of expertise: nanotechnologies and functional materials, and is aware of the latest trends in this topic

Skills:
As a result of the course, the student should demonstrate the ability to:
Independently perform preliminary analysis of laboratory measurement results based on literature and draw conclusions
Independently and efficiently prepare and present an oral presentation in Polish with well-documented and interpreted measurement results

Social competences:
As a result of the course, the student will acquire the competencies to:
Show responsibility for the accuracy of obtained results
Understand the need and identify opportunities for continuous self-education, as well as understand the importance of non-technical aspects and consequences of engineering activities

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of the content of the presentation:
Grade 3 for 50.1%-70.0%
Grade 4 for 70.1%-90.0%
Grade 5 from 90.1%
Assessment of the presentation content and public presentation method: As above.
Assessment of activity in the seminar discussion and engagement in preparing the presentation: As above.

Programme content

Introducing students to modern experimental methods and techniques in nanotechnology, solid-state physics, and solid-state spectroscopy used for characterization and investigation of physical processes in materials and physical structures.

Course topics

none

Teaching methods

Seminar presentation of selected experimental methods and techniques used in research within the preparation of the 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	50	2,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,50