



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Advanced measuring systems

Course

Field of study

Mechatronics

Area of study (specialization)

Automation and supervision of production systems

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Ph.D. Michał Jakubowicz

email: michal.jakubowicz@put.poznan.pl

tel. 616653568

Faculty of Mechanical Engineering

st. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Students beginning this subject should have knowledge of mathematical analysis and statistics, technical drawing and machine parts.

Course objective

Familiarize students with advanced modern measuring systems used for the measurement of geometrical quantities.

Course-related learning outcomes

Knowledge

1. Student should characterize advanced measurement systems.
2. Student should characterize the devices included in the advanced measurement systems.



Skills

1. Student is able to select a measuring device for a measuring task.
2. Student is able to develop a measurement strategy in the basic scope.
3. Student is able to develop and analyze measurement data.
4. Student is able to determine the sources of measurement errors and can eliminate them.

Social competences

1. Student is able to work in a group.
2. Student is aware of the role of modern, advanced measurement systems in the modern economy.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Zaliczenie na podstawie kolokwium pisemnego.

Laboratory: Passed on the basis of a written answer in the scope of content. Performed the laboratory exercises according to the program established by the teacher with a positive grade of the reports on the exercises prepared according to the subject matter. In order to get a credit for the laboratories, all exercises must be passed.

Programme content

Lecture:

1. Definition, structure and tasks of measurement programs.
2. Advanced measuring systems in metrology of geometric quantities.
3. Introduction to the problem of non-contact measurements of the surface layer.
4. Advanced measurement systems used to carry out measurement tasks in the field of metrology of geometric quantities.
5. Classification, measurement capabilities and programming of modern measuring devices.
6. Basics and application of the coordinate measuring technique in the measurement of machine parts.
7. Optical measuring systems.
8. Measurements of surface stereometry.
9. Measurements of form deviations.
10. Measurement systems used in the field of nanometrology.

Lab:

1. Measurements on a specialized device to control shape deviations.



2. Measurements on a coordinate measuring machine.
3. Measurements on the 3D optical coordinate scanner.
4. Measurements on the optical coordinate machine.
5. Measurements of surface topography.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board.
2. Laboratory exercises: performing the tasks given by the teacher - practical exercises.

Bibliography

Basic

1. Adamczak S., Pomiary geometryczne powierzchni: zarysy kształtu, falistość i chropowatość, WNT, Warszawa, 2008.
2. Biały S., Humienny Z., Kiszka K., Metrologia z podstawami specyfikacji geometrii wyrobów (GPS), Wyd. OWPW, Warszawa, 2014.
3. Jakubiec W., Malinowski J., Metrologia wielkości geometrycznych, WNT, Warszawa, 2020.
4. Jakubiec W., Zator S., Majda P., Metrologia, PWE, Warszawa, 2014.
5. Ratajczyk E., Woźniak A., Współrzędnościowe systemy pomiarowe, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2016.
6. Zawada J., Metrologia wielkości geometrycznych, Wyd. Politechniki Łódzkiej, Łódź, 2011.

Additional

1. S. Tumański, Technika pomiarowa. WNT, Warszawa 2007.
2. Zięba A., Analiza danych pomiarowych w naukach ścisłych i technice, Wyd. PWN. Warszawa, 2014..

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2
Classes requiring direct contact with the teacher	30	1
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	20	1

¹ delete or add other activities as appropriate