POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
3D scanning and signal processing

Course

Field of study	Year/Semester
Mechanical Engineering	1/1
Area of study (specialization)	Profile of study
Virtual Design Engineering	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Michał Rychlik

email: michal.rychlik@put.poznan.pl

tel. 665 2167

Wydział Inżynierii Mechanicznej

ul Jana Pawła II 24, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge: It has a basic knowledge of the following methods: computer aided design - CAD, solid

POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

modelling of construction in CAD systems, the basic measurement methods in the field of geometric metrology

Skills: He can plan and carry out measurements, computer simulations and interpreted the results

Social competencies: He can interact and work in a group.

Course objective

Acquiring knowledge of Reverse Engineering (RE), its importance in the design and manufacturing. Get to know the three-dimensional scanning methods and the data processing and analysis.

Course-related learning outcomes

Knowledge

Knows the modern methods of engineering computer graphics and the theoretical foundations of engineering calculations using the finite element method.

Has general knowledge about the types of tests and methods of testing working machines using modern measuring techniques and data acquisition.

Skills

Is able to carry out basic measurements of mechanical quantities on the tested working machine using modern measuring systems.

Social competences

Is ready to critically assess knowledge and received content.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of individual work related to the operation of various scanning systems (methods: laser, structured light, contact), measurements and reconstruction of geometry in specialized software for Reverse Engineering (Reverse Engineering).

Practical tests of the tasks set before the student regarding the ability to work with a given type of 3D scanner - conducted every second week of lectures.

The final exam in theoretical knowledge - written and supplementary oral. The exam is conducted after a whole series of lectures and laboratory classes. It includes a minimum of three questions after one of the knowledge: basic definitions of Reverse Engineering, construction and operation principles of the selected spatial scanner (due to the measurement method), methods of 3D geometry reconstruction based on data from spatial scanners.

Programme content

Presentation of the basic knowledge and definitions in the field of Reverse Engineering. Presentation of the division and types of 3D scanners due to the measuring method, operating range and special purpose. Discussion of the structure and operation of 3D scanners: contact, laser, structured light, as well as photogrammetric methods. Acquainting with measurement techniques at laboratory stands

POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

equipped with 3D scanners: contact, laser and structured light. To introduce students to the process of reconstruction of the geometry of scanned objects depending on the type of data obtained. Acquainting with methods of geometry reconstruction and data processing from the point cloud to the surface type NURBS.

Teaching methods

1. Lecture with multimedia presentation.

2. Laboratory exercises: multimedia presentation, performance of tasks given by the teacher using 3D scanners and specialized software for Reverse Engineering, implementation of individual measurement tasks indicated by the teacher of 3D objects.

Bibliography

Basic

1. Chlebus. E.: Techniki komputerowe CAx w inżynierii produkcji, WNT Warszawa 2000

2. Jakubiec W., Malinowski J.: Metrologia wielkości geometrycznych, WNT Warszawa 2007

3. Butowtt J., Kaczyński R.: Fotogrametria, Wojskowa Akademia Techniczna 2003

Additional

Lecture materials and other thematic articles provided by the lecturer.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

---

[1] delete or add other activities as appropriate