
Course title: Fundamentals of Machine Design 3

ECTS credit allocation (and other scores): 4

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 30

Course coordinator/ Department and e-mail: Bartosz Moczulak, Department of Mechanics and Fundamentals of Machine Design, bartosz.moczulak@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: The laboratory exercises involve testing machine components and assemblies using laboratory test rigs. During the sessions, students familiarize themselves with the construction, operating principles, and evaluation methods of selected mechanical components and systems. They measure fundamental physical quantities and operational parameters using appropriate instrumentation and test stands.

PROJECT: Design exercises – A single design project focusing on a mechanical assembly featuring a gear drive system (or similar) – carried out in project teams. The scope of the project includes: defining design specifications for the technical system; developing general and detailed design concepts; selecting the optimal concept and determining design features for the product and its components; creating technical sketches; producing assembly drawings of the drive system and the designed gearbox; preparing detail drawings as specified by the instructor; and performing strength calculations and analyses using CAE systems.

Learning purpose: Developing the student's ability to independently solve design and engineering problems.

On completion of the study programme the graduate will gain:

Knowledge: The student possesses the knowledge required to design the structures of complex machines.

Skills: The student possesses the ability to formulate assumptions, select computational models, and seek optimal solutions in the design of machines and equipment.

Social Competencies: The student is able to independently and collaboratively conduct design, development, and experimental work.

Basic literature: Fundamentals of machine design, Karaszewski Waldemar, 2011, The teaching of the fundamentals of machine design, Zahradnik, Oton; Bauer, Konrad (konstrukcja maszyn).; Gasparski, Wojciech (1936-2022).; Międzynarodowe Seminarium Nauki Konstrukcji (1972 ; Warszawa) 1972

Supplementary literature: Engineering design of harmonic drive gearings towards quality criteria, Ostapski, Wiesław Autor; Instytut Podstaw Budowy Maszyn (Politechnika Warszawska) Instytucja sprawcza; Wydawnictwo MET Mieczysław Pękalak. Wydawca

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 30

Student's independent work: 60