Title	Code
Fundamentals of Optimal Design	**10102522110102102316**
Field: **Mechanical Engineering ? graduate studies (II degree)**	Year / Semester: **1 / 1**
Specialty: **-**	Course: **core**
Hours: Lectures: **1** Classes: **-** Laboratory: **1** Projects / seminars: **-**	Number of credits: **2**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

- The core course for graduate studies in the field of Mechanical Engineering at the Faculty of Mechanical Engineering and Management.

Assumptions and objectives of the course:

- The course introduces the fundamental concepts and practical applications of modern structural optimal design. Students are introduced to optimization procedures and their practical applica-tion.

Contents of the course (course description):

- Introduction to design of engineering systems (multidisciplinary, mechatronic design) using ex-amples and ?lessons from nature?. Basis of optimal design of mechanical structures. Importance and meaning of the optimization in design.
  Basic optimization concepts and terms (objective function, design variables, constraints). Classification of optimization problems. Method of scalar optimization without constraints and with constraints with penalty functions. Genetic algo-rithms as the example of applying the ?lesson from nature?. Mathematic fundamentals for multicriteria optimization. Introduction to the Pareto concept of optimality. Survey of the modern optimization procedures. Choosing the efficient optimization procedures for practical engineering problems.

Introductory courses and the required pre-knowledge:

- Fundamentals of mathematics, mechanics, strength of materials and machine elements. Basic knowledge of computer programming.

Courses form and teaching methods:

- Lectures supported by slides and computer presentations. Computer laboratory classes

Form and terms of complete the course - requirements and assessment methods:

- Written tests from lectures and laboratory.

Basic Bibliography:

Additional Bibliography: