Title	Code
(Metody komputerowe i numeryczne wspomaganie projektowania)	**1010115131010110149**
Field **Civil Engineering Extramural Second-cycle Studies**	Year / Semester **2 / 3**
Specialty **Structural Engineering**	Course **core**
Hours Lectures: **3** Classes: **-** Laboratory: **1** Projects / seminars: **-**	Number of credits **4**
	Language **polish**

Lecturer:

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Status of the course in the study program:

Computer methods and computer aided design

Assumptions and objectives of the course:

To be familiar with the basics and applications of numerical methods and computational analysis of structures as well as to be critical in accordance to the results of computations

Contents of the course (course description):

The course is focused on the following topics:

1. Modeling in structural analysis (the real structure and its numerical model). Matrix formulation of continuum mechanics.
2. Finite Element Method (FEM). Approximation of displacement field; shape functions; stiffness matrices for bar and beam elements.
3. The basic steps of FEM linear problems. The transformations of stiffness matrices and vectors; local and global systems of axis; Computational environment.
4. Examples of using FEM in civil and mechanical engineering; the programs that support the computations and structural design.
5. Plane stress and plane strain problems. Natural coordinates; Isoparametric formulations; Numerical integration (Gauss method); selected FE-s for 2-D problems
6. Plate and shell elements; 3-D elements; Selected problems in dynamics and stability
7. |Elements of optimal design

Introductory courses and the required pre-knowledge:

Basic courses from the firt level of the study (strength of materials, structural mechanics, numerical methods)

Courses form and teaching methods:

Lectures and lab exercises (individual computers)

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

Solving the problems during lab exercises; homeworks and passing the oral final exam.

Basic Bibliography:

Additional Bibliography: