



FACULTY: ENVIRONMENTAL ENGINEERING AND ENERGY

COURSE TITLE: Computational Structural Analysis

Number of contact hours: 60

Duration: 1 semester (fall / spring)

ECTS credits: 6

Programme description: This course introduces the development of fundamental topics in strength of materials and heat transfer methods. The class will introduce theoretical foundations of the finite element method (FEM), the application of FEM to the solution of steady-state and transient thermal and thermal-strength problems. In computer labs, students will perform analytical and numerical calculations of basic problems in the operation and design of power machinery and equipment.

Specific problems discussed during lectures and computer labs will cover:

- the nature of loads of working machines and power equipment.
- the basics of finite element method
- performing strength calculations in pressure equipment
- solving simple engineering problems using the finite element method in the field of heat transfer and structural mechanics.

The class will be conducted in the ANSYS Mechanical environment.

Course type: lectures (15), computer labs (45)

Literature:

1. Daryl L. Logan — A First Course in the Finite Element Method, Stamford, USA, Cengage Learning, Inc. (2011)
2. Huei-Huang Lee - Finite Element Simulations with ANSYS Workbench 2021-SDC Publications (2021)
3. Jawad, Maan H - Stress in ASME pressure vessels, boiler and nuclear components-John Wiley & Sons (2018)
4. Perumal Nithiarasu, Roland W. Lewis etc. - Fundamentals of the Finite Element Method for Heat and Mass Transfer, Wiley (2016)

Assessment method: written assessment and reports from computer simulation and laboratory

Lecturer: Piotr Dzierwa

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