Nazwa w języku polskim: *Naprężenia termiczne i mechaniczne*
Nazwa w jęz. angielskim: *Thermal and Mechanical Stress*

Dane dotyczące zajęć:
Information on course:

Jednostka oferująca: *Wydział Inżynierii Środowiska i Energetyki // prowadzący prof. dr hab. inż. Grzegorz Nowak*
Course offered by: *Faculty of Energy and Environmental Engineering // teacher prof. Grzegorz Nowak, PhD, DSc.*

Język wykładowy:

Language:

English

Strona WWW:
Course homepage:

Skrócony opis:

Short description:

The course covers the fundamentals of stress description in solid bodies and their relationship to strains under mechanical loads and temperature changes. It discusses the sources of mechanical stresses (external forces, constraints) and thermal stresses (non-uniform temperature fields, thermal expansion), as well as their combined effects in structural components. Students become familiar with the three-dimensional state of stress, strength criteria, examples of stresses in shells and machine elements, and the basics of using numerical methods (FEM) to analyze coupled thermo–mechanical fields.

Opis:

Description:

Lecture

- Definition and Origin of Mechanical and Thermal Stresses
- Selected Issues of Bending
- Spatial Stress State
- Stresses in Pressure Vessels
- Stresses in Rotating Elements
- Design Under Thermal and Mechanical Loads
- Parameters Influencing Thermal Stress
- Thermal Shock Parameters
- Thermal Stresses in Bars and Stress Reduction Methods
- Thermal Bending
- Thermal Stresses in Shells
- Thermal Stresses in Discs and Shafts
- Basics of FEM Stress Analysis

Lecture:

- **full-time studies: 30 h**

Number of ECTS credits: 2

Literatura:

Bibliography:

- Barron R., Barron B., Design for Thermal Stresses, Wiley and Sons, 2012
- Meriam J.L., Kraige L.G., Mechanics of Materials, Wiley and Sons, 2011
- Hibbeler R., Mechanics of Materials, Prentice Hall, 2016
- Naprężenia cieplne, prac. pod red. Zbigniewa Orłosia, PWN, 1991
- Noda N., Thermal Stresses, CRC Press, 2002

Efekty uczenia się:

Learning outcomes:

Knowledge: knows and understands the basic problems of modern civilization in relation to the achievements of science and technology
Skills: is able to independently plan and implement his own lifelong learning
Social competence: is ready to critically evaluate the knowledge he possesses and the content he receives, to recognize the importance of knowledge in solving cognitive and practical problems, and to consult experts in case of difficulties in solving the problem independently.

Metody i kryteria oceniania:

Assessment methods and assessment criteria:

Lecture
Course is passed on the basis of a written test. To pass the course, a minimum of 60% of the total points is required. *The final grade is calculated according to an algorithm.:*
60-67% - 3.0
68-76% - 3.5
77-85% - 4.0
86-93% - 4.5
94-100% - 5.0

Dodatkowe informacje
Element of course groups in various terms:

Opis zajęć Course group description	
elective courses full-time degree - any field of study - any semester – any	
cykl	2025/2026