Nazwa w jęz. angielskim: Mechanics
Nazwa w języku polskim: Mechanika

Dane dotyczące zajęć:
Information on course:

Jednostka oferująca: Wydział Budownictwa // dr inż. Halina Witek
Course offered by: Faculty of Civil Engineering // dr inż. Halina Witek

Język wykładowy:
angielski
Language:
English
Strona WWW: **Course homepage:**
Skrócony opis:
Short description:
1) Basic information on cross-section geometry.
2) Fundamentals of statics of statically determinate two dimensional structures - calculation of support reactions.
3) Internal forces in two dimensional structures - drawing diagrams of internal forces.
Opis:
Description:
LECTURES: 30h
Centroids of areas. Rectangular and polar moment of inertia. Products of inertia. Transfer and rotation of axes. Principal (maximum and minimum) moments of inertia and principal axes of inertia. Fundamental concepts and principles of statics. Vector operations. Resultant of several concurrent forces. Resolution of a force into components. Unit vectors. Equilibrium of a particle. External and internal forces. Moment of a force about a point. Rectangular components of the moment of a force. Moment of a couple. Resolution of a given force into a force at 0 and a couple. Reduction of a system of forces to one force and one couple. Reactions at supports and connections for a two-dimensional structure. Equilibrium of rigid bodies. Analysis of trusses by the method of joints and by the method of sections. Internal forces at section. Various types of loading and support. Distributed loads on a beam. Shear and bending-moment diagrams. Relations among load, shear and bending moment.
CLASSES: 15h
Determination the location of the centroid, the principal axes and value of principal moment of inertia. Determination the reactions at supports for beams, trusses and frames. Analysis of trusses. Drawing the shear and bending moment diagrams for beams and frames.
PROJECT: 15h
There are three project to perform: Project No 1 – Determination the location of the centroid, the principal axes and value of principal moment of inertia.; Project No 2 – Drawing the axial forces, shear and bending moment diagrams for beams. Project No 3 – Drawing the axial forces, shear and bending moment diagrams for frames
Number of ECTS credits: 6
Literatura:
Bibliography:
[1] Beer F.P., Johnston E.R. Jr.: Vector Mechanics for Engineers, McGraw-Hill 1984.

[2] Meriam J.L., Kraige L.G.: Engineering Mechanics. Statics, John Wiley & Sons 1987.

[3] Witek H.: Selected Issues of Mechanics Exemples and Tasks of Plane Figures Geometry, Wydawnictwo Politechniki Sląskiej 2023

Efekty uczenia się:

Learning outcomes:

KNOWLEDGE:

(1) Knows the principles of modeling and analysis of bar structures in the statics - [the learning outcome K1A_W04]

SKILLS:

(2) Can perform calculations in the field of geometry of figure masses flat - [the learning outcome K1A_U03]

(3) Can calculate the values of support reactions for plane statically determinate systems - [the learning outcome K1A_U03]

(4) Is able to determine the internal forces for members of trusses -the learning outcome K1A_U03]

(5) Is able to analytically determine functions of internal forces for statically determinate complex beams and draw corresponding graphs - [the learning outcome K1A_U03, K1A_U12]

(6) Can draw diagrams of internal forces for statically determinate plane frames - [the learning outcome K1A_U03, K1A_U12]

Metody i kryteria oceniania:

Assessment methods and assessment criteria:

Knowledge from the lectures will be checked at the test or at theoretical part of the exam. Completing the lecture based on obtaining at least 4 out of 8 points from 2 tests written during the semester or during the exam.

During the semester a student is required to pass the exercises' tasks from 4 basic units:

☐ Cross-sectional geometry.

☐ Calculation of internal forces in the truss.

☐ Calculation of internal forces for multi-span beams.

☐ Calculation of internal forces for frames.

This assessment takes place during the tests or during the exam (at least 5 out of 10 points per each exercises' task).

The student is obliged to prepare reports from 3 project tasks in accordance with the teacher's guidelines. Credits in the project assignments are obtained according to the schedule presented by the teacher. The positive grade from each project is required to get credits for this course (at least 1 out of 5 points per each report).

Przynależność do grup przedmiotów w cyklach:
Element of course groups in various terms:

Opis grupy przedmiotów Course group description	Cykl pocz. First term	Cykl kon. Last term
przedmioty obieralne studia stacjonarne stopień studiów – dowolny kierunek studiów – dowolny, semestr dowolny	2024/2025	