

# Computer Aided Engineering Work - opis przedmiotu

| Informacje ogólne   |                                     |
|---------------------|-------------------------------------|
| Nazwa przedmiotu    | Computer Aided Engineering Work     |
| Kod przedmiotu      | 06.9-WM-ER-ZiIP-22_18               |
| Wydział             | <a href="#">Wydział Mechaniczny</a> |
| Kierunek            | WM - oferta ERASMUS                 |
| Profil              | -                                   |
| Rodzaj studiów      | Program Erasmus                     |
| Semestr rozpoczęcia | semestr zimowy 2020/2021            |

| Informacje o przedmiocie        |                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------|
| Semestr                         | 1                                                                                                          |
| Liczba punktów ECTS do zdobycia | 3                                                                                                          |
| Typ przedmiotu                  | obowiązkowy                                                                                                |
| Język nauczania                 | angielski                                                                                                  |
| Sylabus opracował               | <ul style="list-style-type: none"><li>prof. dr hab. Taras Nahirnyy</li><li>dr inż. Tomasz Belica</li></ul> |

| Formy zajęć |                                            |                                           |                                               |                                              |                     |
|-------------|--------------------------------------------|-------------------------------------------|-----------------------------------------------|----------------------------------------------|---------------------|
| Forma zajęć | Liczba godzin w semestrze<br>(stacjonarne) | Liczba godzin w tygodniu<br>(stacjonarne) | Liczba godzin w semestrze<br>(niestacjonarne) | Liczba godzin w tygodniu<br>(niestacjonarne) | Forma zaliczenia    |
| Wykład      | 15                                         | 1                                         | -                                             | -                                            | Zaliczenie na ocenę |
| Projekt     | 30                                         | 2                                         | -                                             | -                                            | Zaliczenie na ocenę |

## Cel przedmiotu

Transfer of basic knowledge and acquisition of skills and competences in the field of computer-aided engineering works, in particular, engineering calculations which will be used in the further education process and will prove useful in future professional work.

## Wymagania wstępne

Technical mechanics, Strength of materials, 2D engineering graphics, 3D engineering graphics, Fundamentals of engineering design.

## Zakres tematyczny

### Lecture

Overview of computer aided engineering programmes: Mathcad, Matlab, Ansys, AutoCAD Mechanical. Introduction to computer computational methods. Numerical solving of systems of algebraic equations. Interpolation polynomials and numerical integration. Basics of the finite difference method. Selected single-dimensional and two-dimensional issues. Basics of Finite Element Method. Selected single-dimensional and two-dimensional issues.

### Project

Introduction to AutoCAD Mechanical and Autodesk Inventor, discussion of selected computing modules supporting the work of an engineer - in particular, the MES module. Adaptation of a real model to the calculation model (simplifications, boundary conditions, etc.). Factors affecting the accuracy of calculations. Examples of projects planned for implementation, as part of the course:

- MES in the strength analysis of the lever,
- application of MES to the selected element / assembly - own project,
- calculation of statically determined beams in AutoCAD Mechanical.

## Metody kształcenia

Conventional lecture.

Project - individual and group work of students using the literature and notes from lectures.

## Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

| Opis efektu                                                                                               | Symbole efektów | Metody weryfikacji                                                                                                                                | Forma zajęć                                                            |
|-----------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| The student has a thoroughly extensive knowledge of the application of computer aided, numerical methods. |                 | <ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>projekt</li><li>zaliczenie - ustne, opisowe, testowe i inne</li></ul> | <ul style="list-style-type: none"><li>Wykład</li><li>Projekt</li></ul> |

| Opis efektu                                                                                                                                                           | Symbole efektów | Metody weryfikacji                                                                                                                                                                  | Forma zajęć                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| The student is able to both choose -and use- appropriate computer applications for calculating, simulating, designing and also verifying solutions (CAD/CAE systems). |                 | <ul style="list-style-type: none"> <li>• obserwacje i ocena umiejętności praktycznych studenta</li> <li>• projekt</li> <li>• zaliczenie - ustne, opisowe, testowe i inne</li> </ul> | <ul style="list-style-type: none"> <li>• Wykład</li> <li>• Projekt</li> </ul> |
| The student has detailed knowledge of selected issues of the Computer Aided Engineering, associated with Production Engineering.                                      |                 | <ul style="list-style-type: none"> <li>• bieżąca kontrola na zajęciach</li> <li>• praca pisemna</li> <li>• zaliczenie - ustne, opisowe, testowe i inne</li> </ul>                   | <ul style="list-style-type: none"> <li>• Wykład</li> <li>• Projekt</li> </ul> |
| The student is able to think and act both creatively and entrepreneurially.                                                                                           |                 | <ul style="list-style-type: none"> <li>• bieżąca kontrola na zajęciach</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>• Projekt</li> </ul>                   |
| The student is able to design, calculate and redesign (according to the given specification) a simple element with the use of computer aided engineering methods.     |                 | <ul style="list-style-type: none"> <li>• obserwacje i ocena umiejętności praktycznych studenta</li> <li>• projekt</li> </ul>                                                        | <ul style="list-style-type: none"> <li>• Projekt</li> </ul>                   |
| The student is able to interact and work in a group accepting various roles.                                                                                          |                 | <ul style="list-style-type: none"> <li>• obserwacje i ocena umiejętności praktycznych studenta</li> <li>• projekt</li> </ul>                                                        | <ul style="list-style-type: none"> <li>• Projekt</li> </ul>                   |

## Warunki zaliczenia

*Lecture:* Credit can be obtained as a pass in the exam.

*Project:* The condition for passing is to obtain positive grades from the projects developed, including the ability to use CAD/CAE software, in order to solve a specific case, according to the content of project issues and project analysis. The following evaluation criteria are also taken into account: the student's co-operation in a team, performing a project task and his / her creativity during its solution.

*Final rating:* the arithmetical mean of grades from individual classes.

## Literatura podstawowa

1. Chang K. H., Design Theory and Methods using CAD/CAE, Elsevier Inc., 2014.
2. Chang K. H., Product Design Modeling using CAD/CAE, Academic Press, 2014.
3. Vitor Dias da Silva, Mechanics and Strength of Materials, Springer Science & Business Media, 2005.
4. Riley W. F., Sturges L. D., Morris D. H., Statics and Mechanics of Materials: An Integrated Approach, Wiley, 2002.
5. Ugural A. C., Fenster S. K., Advanced Mechanics of Materials and Applied Elasticity, Pearson Education, 2011.

## Literatura uzupełniająca

1. Malinowski M., Słasiadek M., Materiały pomocnicze z podstaw systemu CAD/CAE, Uniwersytet Zielonogórski, Zielona Góra 2002 (in Polish).

## Uwagi

Zmodyfikowane przez dr inż. Tomasz Belica (ostatnia modyfikacja: 02-05-2020 17:00)

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