

Faculty of Technical Sciences

Course title: COMPUTATIONAL FLUID DYNAMICS

ECTS credit allocation (and other scores): 2

Semester: spring

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Wojciech Sobieski / Department of Mechanical Engineering and the Fundamentals of Machine Design / wojciech.sobieski@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Introduction to the ANSYS computing package (SpaceClaim, Mesh, Fluent modules). Modeling selected issues in the field of fluid mechanics.

LECTURES: Wprowadzenie do modelowania numerycznego, Proces modelowania numerycznego, Modelowanie geometrii, Siatki numeryczne, Metoda objętości skończonych, Modelowanie turbulencji, Przepływy wielofazowe, Problem zamknięcia.

Learning purpose: Introduction to the basics of Computational Fluid Dynamics, familiarization with the fundamentals of operating selected modules of the ANSYS package, and understanding the principles of creating a typical simulation model in the field of fluid mechanics.

On completion of the study programme the graduate will gain:

- Knowledge: Basic knowledge of numerical modelling principles. Fundamental understanding of the finite volume method, turbulence modelling, and multiphase flow modelling.
- Skills: Ability to develop a simple simulation model in the field of fluid dynamics using the ANSYS package (SpaceClaim, Mesh, Fluent modules).
- Social Competencies: Creativity in problem-solving, teamwork communication, proficiency in data analysis and presenting results, fostering an interdisciplinary approach to engineering problems, adaptability.

Basic literature:

1. Sobieski W.: Lectures [on-line]. URL: <http://pracownicy.uwm.edu.pl/wojsob/>
2. Anderson J.D., Computational Fluid Dynamics – the basics with applications. McGraw-Hill.
3. Blazek J.: Computational Fluid Dynamics: Principles and Applications. Elsevier.

Supplementary literature:

1. Versteeg H.K., Malalasekera W.: An Introduction to Computational Fluid dynamics. Pearson Education 2007.
2. Petrova R.: Finite Volume Method – Powerfull Means of Engineering design, Intech 2012.

The allocated number of ECTS points consists of: 2

Contact hours with an academic teacher: 46

Student's independent work: 4