



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Numerical methods and programming (Advanced computational tools in MathCad)

Course

Field of study

Year/Semester

Chemical and process engineering

2/3

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

elective

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Andrzej Rybicki

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of algebra and matrix calculus and knowledge of basic operations in MathCad. Classes are conducted after a semester lecture in this subject.

Course objective

Learning and improving the skills of using numerical methods to solve chemical and process engineering issues.

Course-related learning outcomes

Knowledge

1. Has knowledge of mathematics to the extent that allows the use of mathematical methods to describe chemical processes and perform calculations needed in engineering practice - K_W01

2. Has knowledge in the field of electrical engineering, electronics, automation and computer science to the extent needed to formulate and solve simple computational and design tasks related to chemical technology - K_W06



Skills

1. Is able to obtain information from literature, databases and other sources related to chemical and process engineering, also in a foreign language, integrate it, interpret it and draw conclusions and form opinions - K_U01
2. Has the ability to self-study - K_U05
3. Uses computer programs to support the implementation of tasks typical of chemical and process engineering - K_U06
4. Is able to formulate and solve engineering issues typical of chemical and process engineering using both analytical, simulation and experimental methods - K_U07

Social competences

1. Understands the need for further training and raising their professional and personal competences - K_K01
2. Is able to think and act in a creative and entrepreneurial way - K_K05

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Activity during classes, final project prepared in small teams .

Programme content

1. Basics of writing programs in MathCad.
2. Basic constructions of numerical program.
3. Solving simple tasks with the MonteCarlo method
4. Computer support for solving one-dimensional heat conductivity tasks.
5. Two-dimensional tasks of heat conductivity for steady and transient states in MathCad.

Teaching methods

Design classes at computers.

Bibliography

Basic

1. Jankowscy, J. i M., Przegląd metod i algorytmów numerycznych. Część 1. WNT, Warszawa, 1981.
2. Dryja, M., Jankowscy J. i M., Przegląd metod i algorytmów numerycznych. Część 2. WNT, Warszawa, 1982.



Additional

1. Fausett, L., Numerical Methods Using MathCad, Prentice Hall, Upper Saddle River, new Jersey, USA, 2002.
2. Fortuna, Z., Macukow, B., Wącowski, J., Metody numeryczne, Seria Podręczniki Akademickie: Elektronika, Informatyka Telekomunikacja, Wyd. IV, WNT, Warszawa, 1998.

Breakdown of average student's workload

| | Hours | ECTS |
|--|-------|------|
| Total workload | 75 | 3,0 |
| Classes requiring direct contact with the teacher | 40 | 1,6 |
| Student's own work (literature studies, preparation for classes, project preparation) ¹ | 35 | 1,4 |

¹ delete or add other activities as appropriate