COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer aided in materials engineering [S2IMat1>KWwIM]

Course

Field of study
Materials Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of materials science, metal science and strength of materials. Logical thinking, use of library and internet information, operation of basic computer software. Understanding the necessity to learn and to acquire a new knowledge.

Course objective

Students become familiar with theoretical and practical issues related to computer aided in materials engineering.

Course-related learning outcomes

Knowledge:
student should describe the basic areas of application of computer aided technique in materials engineering.
student have a knowledge of development trends and the most important new achievements in materials engineering, thanks to which can describe computer-aided techniques.

Skills:

1student is able to acquire information about materials engineering from various sources
student is able to use computer aided techniques in engineering and research activities.

Social competences:
student understands the need for continuous search for information about development trends in computer aided.
student can work in a creative way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: Written test at the end of the semester consisting of: open questions, test questions or test on the e-learning platform.
Grading scale: <51% 2.0; 51% -62% 3.0; 63% -72% 3.5; 73% -83% 4.0; 84% -94% 4.5; > 95% 5.0
Classes: On the basis of a written tests and written reports on the content of the program during exercises. In order to pass the exercises, a written tests and all papers must be counted as positive.

Programme content

Lecture:
1. Informatic Engineering Databases. Sources of information about engineering materials, their properties and applications. Informative bibliographic databases.
2. Computer aided design and manufacturing CAD/CAM. Computer Aided Materials Design (CAMD) and Computer Aided Materials Selection (CAMS).
3. Modeling, selecting and constructing of a process model. Mathematical and physical modeling.
4. Practical applications of modeling in processes, which shaping the structure and properties of materials: assessment of hardenability of steel, modeling of thermo-chemical processing (carburizing, nitriding), modeling of chemical composition, phase composition and properties of diffusion layers, modeling of dimensional changes after heat treatment and thermochemical treatment.
5. Computer Aided Materials Testing: analysis of metallographic images, analysis of wear resistance and contact resistance of diffusion layers.
6. Computer aiding in technological processes, which shaping the properties of materials.
7. Application of neural networks in computer aided in materials engineering.
Classes:
1. Computer aided assessment of steel hardenability
2. Computer aided for carbon steel hardening process
3. Computer aided testing for evaluation of wear resistance and resistance to contact fatigue
4. Computer aided of technological processes shaping the properties of materials
5. Computer aided analysis of microstructure, chemical and phase composition of diffusion layers
6. Computer aided materials selection and technological processes selection

Teaching methods

Lecture: multimedia presentation.
Tutorials: practical exercises, discussion, problem solving.

Bibliography

Basic
1. Dobrzański L.A., Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Politechniki Śląskiej, 2006
2. Miecielica M., Wiśniewski W., Komputerowe wspomaganie projektowania procesów technologicznych, Wydawnictwo Naukowe PWN, 2005
Additional
1. Kula P., Inżynieria warstwy wierzchniej, Wyd. Politechniki Łódzkiej, 2000.
2. Burakowski T., Wierzchoń T., Inżynieria powierzchni metali, WNT, Warszawa, 1995

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	3,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,50