COURSE DESCRIPTION CARD - SYLLABUS

Course name
Connection technology [N1MiBM2>TeP]

Course

Field of study
Mechanical Engineering

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
8

Laboratory classes
16

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

The already acquired knowledge of engineering graphics, mechanics and materials science. The ability to use information obtained from literature and the Internet as well as the ability to think logically and apply the acquired knowledge in practice. The ability to independently solve problems, acquire and improve knowledge and skills, and understands the need to learn.

Course objective

The aim is to learn the basic technologies of separable and non-separable connections. In addition, familiarizing students with the principles of selection of technology for joining materials, technological parameters, advantages and disadvantages resulting from the use of specific technologies and quality control of connections.

Course-related learning outcomes

Knowledge:
1. The student has knowledge of the basic technologies of joining materials and knows th eir scope of application for various materials.
2. The student has knowledge about the types of connections (welded, braz ed, soldered, riveted, keyed , bolted, threaded, adhesive).

Skills:
1. The student is able to choose the technology for joining specific materials in order to obtain the appropriate mechanical properties
2. The student is able to distinguish and search for tools for making material connections.
3. The student is able to use standards and catalogs of standardized machine parts.
4. The student is able to operate devices for welding, soldering and riveting.
5. The student is able to make basic assembly connections.

Social competences:
1. The student is able to work in a group.
2. The student is aware of the role of material joining processes in the modern economy and for society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: credit on the basis of a written test on the issues discussed during the lectures, which is carried out at the end of the semester.
Evaluation criteria: 3.0 = 50 ÷ 60%, 3.5 = 61 ÷ 69%, 4.0 = 70 ÷ 79%, 4.5 = 80 ÷ 89%, 5.0 = 90 ÷ 100%
Laboratory: the credit is based on an oral or written answer in the scope of the content of each performed topic of the laboratory exercise and a report according to the instructor's indications.
Evaluation criteria: 3.0 = 50 ÷ 60%, 3.5 = 61 ÷ 69%, 4.0 = 70 ÷ 79%, 4.5 = 80 ÷ 89%, 5.0 = 90 ÷ 100%
In order to pass the laboratory, all exercises must be passed (positive grade from answers and reports).

Programme content

Lecture
1. Classifications of materials joining technology.
2. Characteristics of the technology of inseparable joints: welded, soldered, brazed, adhesive, plastically deformed - indirectly (riveted) and directly.
3. Characteristics of the technology of separable joints: push-in, threaded, toothed, plug-in.
4. Technologies of direct and indirect connections - classification and characteristics of mounting fasteners.
5. Selection criteria for technology for joining specific materials and obtaining the required mechanical properties.
Labolatories
1. Welding with an oxy-acetylene torch
2. Electrode welding
3. Gas shielded electric welding - MIG/MAG and TIG methods
4. Electric resistance welding
5. Soldering and brazing
6. Riveting
7. Gluing, adhesive technology
8. Technology of threaded connections
9. Pin and clevis connection technology
10. Technology of key and spline connections

Course topics

none

Teaching methods

Lectures illustrated with a multimedia presentation containing the discussed program content.
Laboratory in the form of practical exercises.

Bibliography

Basic:
1. Totten G.E., Howes M. A. H.: Steel Heat Treatment Handbook; Marcel Dekker, Inc. 1997
2. Praca zbiorowa pod. red. Burakowskiego T.: Obróbka cieplna metali.,SIMP-IMP,Warszawa 1987, tom 1÷7

3. Mizerski J.: Spawanie. Wiadomości podstawowe. Wydawnictwo REA, Warszawa 2005
4. Adamiec P. i inni: Poradnik inżyniera. Spawalnictwo. Tom 1, Pod redakcją Jana Pilarczyka, Wyd. Naukowo-Techniczne, Warszawa, 2003
5. Adamiec P. i inni: Poradnik inżyniera. Spawalnictwo. Tom 2, Pod redakcją Jana Pilarczyka, Wyd. Naukowo-Techniczne, Warszawa, 2005
6. Erbel J. (red.): Encyklopedia technik wytwarzania w przemyśle maszynowym tom II. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001
7. Zawora J.: Montaż maszyn i urządzeń. Wydawnistwo WSIP, Warszawa 2014.

Additional:
1. Klimpel A., Mazur M.: Podręcznik spawalnictwa. Wydawnictwo Politechniki Śląskiej, Gliwice 2004
2. Nowacki J., Chudziński M., Zmitrowicz P.: Lutowanie w budowie maszyn, Wyd. Naukowo-Techniczne, Warszawa, 2007
3. Ferenc K.: Spawalnictwo, Wyd. Naukowo-Techniczne, Warszawa, 2007
4. Sobolewski J.Z. (red.): Projektowanie technologii maszyn. Oficyna Wydawnicza Politechniki Warszawskiej, Wydział Samochodów i Maszyn Roboczych, Warszawa 2007.
5. Zawora J.: Podstawy technologii maszyn. Wydawnictwo WSIP, Warszawa 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	24	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	51	2,00