Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering			**Institute of Mechanical Engineering and Technology** **Department of Materials Technology**
Lecture name and Neptun code: Welding technologies I. **BAXHAE1MNF Credits: 5** **Course type:** Full-time **Period:** 2024/25 1st semester			
Master course: Mechanical Engineering			
Subject leader:	Dr Tünde Kovács associate professor		**Lecturers:** Dr Tünde Anna Kovács, Dr Réka Fábián **Practice:** Levente Mészáros
Number of sessions/week/term: Weekly	Lecture: 3	Practise:1	
Exam/ course assignment: Exam		**Language:** English	

Course objective

Goal of the course: Introduction to the fundamentals, systems and technological features of bulk welding processes. Overview of applicable welding equipment, tools, mechanisation and automation options.

Thematics: Introduction. Classification of bulk welding and allied processes. Bulk welding physical and material properties fundamentals. Metallurgical and thermal relationships of fusion welding. Self-shielded (surfaced, powdered, powder overlay) arc welding.
Gas shielded (wire-arc, tungsten-arc) arc welding. Flame welding. Laser beam welding. Electron beam welding. Other bulk welding and allied processes. Bulk welding equipment and devices. Machining and automation and technical solutions.

	Subjects	
Weeks	**Lectures**	**Practices**
1	Introduction. Classification of bulk welding and allied processes	
2	Physical and structural principles of fusion welding. Metallurgical and thermal relationships of fusion welding	Welding laboratory safety and security
3	Shielded metal arc welding (SMAW)	
4	Flux-cored arc welding (FCAW)	Shielded metal arc welding (SMAW)
5	Metal inert gas welding (MIG), metal active gas welding (MAG)	
6	1st TEST	Metal inert gas welding (MIG), metal active gas welding (MAG)
7	Tungsten inert gas welding (TIG), wolfram active gas welding (TAG)	
8	Oxy-fuel welding and cutting	Tungsten inert gas welding (TIG), wolfram active gas welding (TAG)
9	Laser beam welding, Electron beam welding	
10	Other fusion welding processes	Oxy-fuel welding and cutting
11	Other allied processes	
12	Fusion welding equipment and tools	Laser beam welding

13	2nd TEST	
14	Mechanisation and automation options and technical solutions for welding	Replacement of the missed practice

Semester week	**Test**
6th	First test
13th	Second test
14th	Repeated test (over time)

Course assessments (Mid-term assignment and exam):
Mid term assignement: Participation in the practices and lectures is required. Test evaluation happens by scoring. The tasks are theoretical and practical. If you can fulfil the requirements of the tests in writing in the 6th and 13th weeks (both tests need to be minimum pass marks) and you participate in lecture and practice classes your mid-term assignment is successful.
Test: Intervals of the grade:
under 50%: 1 (unsatisfying)
50-62,5 %: 2 (pass mark)
62,5-75 %: 3 (satisfactory mark)
75-87,5 % 4 (class)
87,5-100% 5 (Excellence)
The teaching materials, learning aids, and descriptions of the semester assignments are available as downloadable electronic materials in the Moodle system. The assignments to be submitted must also be uploaded here.
Exam: The examination must be taken in oral form during the examination period. Getting the signature is a
prerequisite for taking an exam.

The method of the supplement:
− Failed tests can be made up in the form of repetition tests once during the semester.
− Failed mid-term assignments can be made up until the end of the semester.
− Signatures can be made up in the first two weeks of the exam period.

Compulsory literature

1. ASM Handbook Volume 6: Welding, Brazing, and Soldering, ASM International, 1993. https://metallurgynmaterials.files.wordpress.com/2014/03/vol-6-weldingbrazing-and-soldering.pdf
2. Ramesh Singh : Arc Welding Processes Handbook Wiley Global Headquarters ISBN 978-1-119-81905-9 https://drive.google.com/file/d/1b81YMkwu27QsmsYtKHStDbirCuDOsII9/view
3. Klas Weman: Welding processes handbook https://drive.google.com/file/d/1cuc6fHj7wsSb3wAX8nIW7IZAfDyoZXTP/view

Suggested literature

1. Welding and Related Processes for Repair and Maintenance Onboard: https://www.wilhelmsen.com/globalassets/ships-service/welding/documents/wilhelmsen-ships-service---unitor-welding-handbook.pdf
2. Leonard P. Connor : Welding Handbook Vol.1. 8th Edition ISBN 0-87171-281-4

Quality assurance methods of the subject:

The standard of theoretical and practical education is annually overviewed at an institution's conference based on the feedback of the teachers and students. They assess the success of the subject and make suggestions for necessary changes to maintain the interaction between theory and practical training.

Budapest, 2024.06.01.

Dr Tünde Kovács
Subject Leader