Study program: Mechanical engineering

Type and level of studies: Master academic studies

Course unit: Welding Technology Design

Teacher in charge: Prof. Dr Mišo Bjelić

Language of instruction: English

ECTS: 6

Prerequisites: None

Semester: Winter

Course unit objective: Introducing students to the theoretical and practical basics of calculation and selection of technological parameters for conventional welding processes. Mastering the appropriate theoretic knowledge and practical skills at a level sufficient for practical application and further specialization.

Learning outcomes of the course unit

After successful course completion, students should be able to:

- Choose the appropriate welding procedure for specific base material,
- Define the welding groove and to determine the measures for the preparation of the base material for welding,
- Select proper filler materials as well as appropriate power source,
- Choose proper methods and scope of welded joints inspection,
- Choose the type of necessary heat treatment,
- Calculate welding times and costs,
- Create appropriate technological documentation.

Course unit contents

Theoretical classes

Energy sources used for welding and their characteristics. Temperature fields in welded joints. Weldability: iron-carbon alloy, cast iron, aluminum and its alloys, copper and its alloys, other materials. The methodology of appropriate welding parameters determination for different welding processes: oxy-acetylene, MMA, GMAW, GTAW, and SAW process. Introduction to valid SRPS, EN, ISO standards, and IIW recommendations.

Practical classes

As part of the practical classes, students are introduced to the methodology of welding parameters determination through examples. Topics covered: Selection of welding procedure. Selection of consumables. Calculation and selection of welding parameters. Preparation for welding. Power source selection. Methods of weld testing and analysis. Post weld heat treatment. Calculation of welding times and costs. Welding documentation. Practical classes in laboratory.

Literature

1. Norrish J., Advanced welding processes, Woodhead Publishing, Cambridge, 2006.
2. Eds. Mahadev S., Muralidhar T., Welding and Joining of Advanced High Strength Steels, Cambridge, 2015.
3. Mathers G., The welding of aluminium and its alloys, Woodhead Publishing, Cambridge, England, 2002.
4. Eds. Ferjutz K., Davis J. R., ASM Handbook: Welding, Brazing, and Solderin, ASM International, Ohio, 1993.

Number of active teaching hours				**Other classes**
Lectures: 45	Practice: 30	Other forms of classes:	Independent work:	

Teaching methods

Theoretical classes in the form of lectures. Classroom and laboratory exercises. Practical classes in manufacturing companies in the area.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
Student's activity during lectures	10	oral examination	30
practical classes/tests	20	written examination	20
Seminars/homework		.....	

Project	20		
Other			

Grading system		
Grade	**No. of points**	**Description**
10	**91-100**	Excellent
9	**81-90**	Exceptionally good
8	**71-80**	Very good
7	**61-70**	Good
6	**51-60**	Passing
5	**Less than 51**	Failing