Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	**Institute of Mechanical Engineering and Technology Department of Materials Technology**

Lecture name: Thermal Cutting and Coating **Neptun code:** BAWTVE2MNF **Credits: 4**
Course type: Full-time
Period: 2024/25 2nd semester

Master course: Mechanical Engineering

Subject leader:	Dr Enikő-Réka Fábián associate professor	**Lecturers:**	Dr Enikő-Réka Fábián
Number of sessions/week/term: Weekly		Lecture: 2	Practise:1
Exam/ course assignment: Midd term exam		**Language:** English	

Course objective

Goal of the course: Introduction to the basics, systems and technological features of thermal cutting and coating processes. Overview of applicable cutting and coating equipment, tools, mechanisation and automation options.Summary of technology design considerations and methods.

Thematics: Introduction. Classification of cutting and related processes. Basics of thermal cutting and carvingPhysics of cutting thermal and flow relationships. Oxigen cutting. Arc cutting and gouging. Plasma cutting and gouging. Laser cutting and selective material removal. Equipment and devices for thermal cutting and gouging. Machining and automation options.
Application significance, material science fundamentals and preparation methods of surface coating. Bonding. Fluid bed coating. Painting. Enamelling. Electroplating. Thermal spraying. Plating. Physical Vapour Deposition (PVD). Chemical Vapour Deposition (CVD). Surface Plating. Surface alloying. Overlay welding. Other coating and surface treatment processes. Testing and qualification of surface treatment coatings.

Semester Weeks	**Subjects**
1	Introduction. Classification of cutting and related processes
2	Phisycs of cutting and gouging..
3	Watter jet cutting.
4	Oxyfuel gas cutting Arc cutting and gouging
5	Plasma cutting and gouging. Laser cutting and selective material removal
6	Mechanisation and automation options and technical solutions for cutting
7	*1st test and examination paper*
8	Significance of surface coating application, surface preparation method
9	Glue-on. Fluid bed coating. Painting. Enamelling. Electroplating
10	Rector holiday
11	Thermal spraying Physical vapor depositions. Chemical vapor depositions
12	Surface over-melting. Surface alloying. Cladding (surfacing, hardfacing)
13	*2nd test and examianation paper*
14	Other coating and surface treatment processes. Testing and qualification of surface treatment coatings

Mid-semester requirements (assignments, exams, papers, essays, presentations, etc.)	
Semester week	**Test**
7th	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 and you participate in lecture and practice classes your mid-term assignment is successful (you get signature).

The method for determining the midterm grade: the arithmetic average of the grade points (as averaging technical numbers) obtained for the completed quizzes, according to the rounding rules, but with a minimum average of 2.00 for a satisfactory grade.

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.

The method of the supplement:

- Failed tests can be made up in the form of repetition tests once during the semester.
- Mid term exam can be made up in the first two weeks of the exam period

Compulsory literature

1. Downloadable learning aid presentations, aids from the Moodle system of Óbuda University (https://main.elearning.uni-obuda.hu/)
2. Anand Pandey, Ashish Goyal: Metal Cutting Processes, De Gruyter 2022
3. Welding Handbook, 9 th ed Volume: 2, Welding processes, part 1 American Welding Society.,2004 ch. 14, ch. 15
4. Klas Weman: Welding processes handbook 2003, Woodhead Publishing Ltd chp 10 chp 11 https://drive.google.com/file/d/1cuc6fHj7wsSb3wAX8nIW7IZAfDyoZXTP/view
5. Welding Handbook, 8 th ed Volume: 3, Materials and Applications Part 1 American Welding Society.,2000 ch. 10,
6. Welding, flame cutting and allied processes, Healt and Safety Executive https://www.hse.gov.uk/mvr/mechanical-repair/welding.htm

Suggested literature

1. 1. Welding and Related Processes for Repair and Maintenance Onboard: chp 4, chp5, https://www.wilhelmsen.com/globalassets/ships-service/welding/documents/wilhelmsen-ships-service---unitor-welding-handbook.pdf
2. Welding Handbook, 9 th ed Volume: 1, Welding Science and Technologies, American Welding Society.,2001 ch.1,ch. 2, ch. 3, ch. 12, ch. 17

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.

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Dr **Enikő Réka Fábián**
Subject Leader