

SYLLABUS

1. Course title:

Theory of sintering and heat treatment

2. Code:

(max. 20 characters)

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course: Mandatory Elective**6. Prerequisites:****7. Class restrictions:****8. Duration / semester:**

1

6

9. Weekly contact hours:

9.1. Lectures:

2

9.2. Seminars:

1

9.3. Laboratory/Practice classes:

0

10. Faculty:

Faculty of Mechanical Engineering Tuzla

11. Department/study program:

Production Mechanical Engineering

12. Lecturer:

Dr.sc. Samir Butković, associate professor

13. Lecturer's e-mail:

samir.butkovic@untz.ba

14. Web site:

<http://mf.untz.ba/>

15. Course aims:

Acquiring fundamental theoretical knowledge in the field of sintering, heat treatment, diffusion phenomena, phase transformation, as well as formation of thermal cycles and selection of parameters for sintering and heat treatment of some material. Also, very important aim is to present specificities of furnaces and atmospheres used for sintering and heat treatment.

16. Learning outcomes:

After completing this course students are able to estimate sinterability of the material and its ability to be heat treated. Also, they are able to determine technological procedures for heat treatment and sintering, select appropriate furnace and atmosphere in order to achieve required properties of products.

17. Course content:

Crystal structure and defects in metals, principles and applications of phase diagrams, diffusion and phase transformation, Heat treatment processes, Thermo-mechanical processes, Thermo-chemical processes, solid-state sintering mechanisms, Liquid state sintering mechanisms, Testing of parts produced by sintering, Principles for formation of thermal cycles for sintering and heat treatment of: carbon steel, low alloyed steel and stainless steels. Furnaces and atmospheres.

18. Learning methods:

Lectures with active participation of students,
Exercises,
Preparation and presentation of seminar papers,

19. Assessment methods:

Activity during lectures,
2 tests (solving of tasks),
2 test (understanding of theory)
Seminar/homework papers,
Final exam,

Knowledge tests results are recognized as cumulative result if achieved results are positive after each individual exam and gives at least 50% of the planned and/or the necessary knowledge and skills. In order to pass the subject the student must achieve a minimum of 54 cumulative points.

20. Assessment components:

Attendance and activity during lectures, 6 points
2 tests (solving of tasks), 2 tests x 11points=22 points
2 test (understanding of theory), 2 tests x 11 points=22 points
Seminar/homework papers, 10 points
Final exam, 40 points

21. Required reading list:

1. Powder metal technologies and application, ASM Handbook Committee, 1998
2. M. Mitkov, D. Božić, Z. Vujović: Metalurgija praha, Beograd, (1998).
3. George E. Totten: Steel heat treatment, metallurgy and technologies, Taylor and Francis Group, 2007.

22. Web sources:**23. Applicable starting from the academic year:****24. Adopted in the Faculty/Academy session:**