

## SYLLABUS

**1. Course title:**

Heat and mass transfer II

**2. Code:**

(max. 20 characters)

**3. Cycle of study:**

1

**4. ECTS credits:**

5

**5. Type of course:** Mandatory  Elective**6. Prerequisites:**

No

**7. Class restrictions:**

No

**8. Duration / semester:**

1

6

**9. Weekly contact hours:**

9.1. Lectures:

3

9.2. Seminars:

1

9.3. Laboratory/Practice classes:

1

**10. Faculty:**

Faculty of Mechanical Engineering

**11. Department/study program:**

Power Mechanical Engineering

**12. Lecturer:**

Fikret Alić, Associate Professor

**13. Lecturer's e-mail:**

fikret.alic@untz.ba

**14. Web site:**

www.mf.untz.ba

**15. Course aims:**

Introduction to basics of mathematical modeling of mass transfer and heat. Solving typical model based on theory of the boundary layer. Basics of molecular transport by diffusion. Application of analogy between the transmission pulses, mass and heat transfer.

**16. Learning outcomes:**

Acquire knowledge of the types of heat transfer, and causes the way of change of phase. Students will become familiar with the principle of operation of the heat exchanger. Students will become familiar with the principles of mass transfer, methods and types of transfer, see the correlations to determine the mass transfer.

**17. Course content:**

Introductory lecture. Heat transfer of the fin surfaces. Condensation. Film condensation. Boiling. Convective boiling. Natural convection. Transfer of mass and energy through boundary layer. The introduction of dimensionless criteria - natural convection. Reynolds's analogy. The differential equations of mass diffusion. The transfer of heat or radiation irradiation. Flux and intensity of radiation. The properties of the visual factors. Effective exchanged radiant energy between two black bodies. The exchange of heat between the real bodies. Propagation of thermal radiation through the gas pass. Water penetration through the solid body.

**18. Learning methods:**

For the purpose of effective teaching and to achieve the objectives of the course and competence of students during the course will be used the following methods:

- Lectures using multimedia resources with active participation and discussion with students,
- Preparation and presentation problems during auditory exercises and individual and team / group labs,
- Presentation in the real environment.

**19. Assessment methods:**

After half of the semester, students take the writing test, which includes previously treated topics with lectures. The test consists of a group of multiple-choice questions, groups of questions for easy recall and group essay type questions. Student total in the first test can achieve 25 points. The test is taken by all students in the course at the same time, thereby achieving uniformity of the level of knowledge that is being tested, as well as the conditions in which the student takes the exam.

Also, after the second half semester, students take the written test for the second part of the topics covered during lectures. The test is scored as the first test with 25 points.

The final exam is oral. The right exit on the final exam is given to students who have achieved at each of the previous ways of testing a minimum of 50% points of the total number that can be achieved.

At the oral exam students answer three questions drawn from the program of the subject treated in class. Oral exam can be taken if a student answers to all three questions. The maximum number of points a student can achieve at the oral exam is 45 points.

Checks on all forms of knowledge are recognized as a cumulative exam if the achieved result is positive after each individual test and at least 50% of the total scheduled or required knowledge and skills.

In order for the student to pass the subject must achieve a minimum of 54 cumulative points of which a minimum of 25 points on the final exam.

**20. Assessment components:**

Rating exam is based on the total number of credits a student gained fulfilling exam prerequisites and passing exams and contains a maximum of 100 points, according to the following scale

Students' obligations Points

Presence in classes 5

25 Test I

Test II 25

Total prerequisites given 55

Final Exam 25-45

**21. Required reading list:**

1. Leinhard, J.H. IV, Leinhard, J.H. V (2008) A Heat Transfer Textbook, Cambridge, Phloginston Press

2. Brodkey, R.S., Hershey, H.C. (2001) Transport Phenomena, New York, McGraw Hill

3. E. Ganić (2005) Prenos toplote i mase, Sarajevo, Svjetlost

**22. Web sources:**

[http://www.efunda.com/formulae/heat\\_transfer/home/overview.cfm](http://www.efunda.com/formulae/heat_transfer/home/overview.cfm)

<http://energy.concord.org/energy2d/>

**23. Applicable starting from the academic year:**

2015/16

**24. Adopted in the Faculty/Academy session:**

01.06.2015