SYLLABUS

1. Course title:

Heat and Mass Transfer II

2. Code:

3. Cycle of study:

I

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester(s):

1 | VI

9. Weekly contact hours and student workload:

Semester (1)	VI	Semester (2)		(for two-semester courses)	Workload: (hours)
9.1. Lectures	3			Classes:	56,25
9.2. Seminars	1			Individual work:	121,75
9.3. Laboratory / Practice classes	1			In total:	178

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energetics and Thermal-fluid engineering

12. Lecturer:

PhD, Fikret Alić, Full Professor

13. Course aims:

To introduce students to the concepts of energy efficiency and rational use of energy.
-To present to students European and international standards in the aforementioned field.

-To present various methods used in buildings, industry and households in the evaluation of heat and electricity consumption and how to select an adequate method.
-To point out to students the need to manage energy resources and energy with the aim of achieving global sustainable development.

14. Learning outcomes:

They acquire knowledge about types of heat transfer, and causes and methods of phase change. They will become familiar with how heat exchangers work. They will become familiar with the principle of mass transfer, methods and types of transfer, and will become familiar with correlations when determining mass transfer.

15. Course content:

1. Introduction. Natural convection. Natural convection on a vertical plate.
2. Natural convection between two parallel plates. Dimensionless criteria-natural convection.
3. Condensation. Film condensation. Condensation on a rotating disk.
4. Condensation in the container. Droplet condensation.
5. Keying and nucleation mechanisms. Pool boiling.
6. Convective boiling. Phase change material within nanoparticles.
7. Knowledge test.
8. Heat transfer in porous structures. Differential equation of mass diffusion.
9. Mass and heat transfer through the boundary layer. Heat transfer by radiation - basic laws.
10. Flux and radiation intensity. Visible factor.
11. Energy exchanged by radiation between two black bodies.
12. Heat exchange between real bodies. Thermal screens-curtains.
13. The transfer of thermal radiation through the gas medium.
14. Solar radiation. Transport of moisture through solid bodies.
15. Knowledge test.

16. Learning methods:

The following methods will be used in the course of the course in order to effectively conduct classes and achieve the set objectives of the course and student competencies:
• lectures with the use of multimedia tools with active participation and discussions of students,
• preparation and presentation of problems during auditory exercises and individual and team/group laboratory exercises,
• presentation in a real environment.

17. Assessment methods:

The concept of knowledge assessment is based on continuous work with students throughout the semester. Knowledge assessment methods include: assessment of both individual and group activities during the semester, preparation of a seminar paper, and final knowledge assessment in written and/or oral form. This ensures equal treatment (written and/or oral knowledge assessment) for all students with different affinities.

Grade	described	by letter	points
5 (five)	Does not meet minimum criteria	F;FX	<54
6 (six)	meets the minimum criteria	E	54 -64
7 (seven)	Generally good, but with significant flaws	D	65-74
8 (eight)	Average, with noticeable errors	C	75-84
9 (nine)	Above average, with some errors	B	85-94
10 (ten)	Exceptional success without mistakes or with minor mistakes	A	95-100

18. Assessment components:

The exam grade is based on the total number of points that the student has earned by completing the pre-exam requirements and taking the exam and contains a maximum of 100 points, according to the following scale
Student obligations
Points
Lecture attendance 5
Test I 25
Test II 25
Total pre-exam requirements 55
Final exam 25 - 45

19. Mandatory 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

20. Additional reading list:

21. Web sources:

http://www.efunda.com/formulae/heat_transfer/home/overview.cfm
http://energy.concord.org/energy2d/

22. Applicable from the academic year:

2025/26

23. Adopted in the Faculty/Academy session: