UNIVERSITY OF NIŠ

Course Unit Descriptor	Faculty	Faculty of Mechanical Engineering

GENERAL INFORMATION	
Study Program	Energy and Process Engineering
Study Module (if applicable)	-
Course Title	Heat and Mass Transfer
Level of Study	☐ Bachelor ☒ Master's ☐ Doctoral
Type of Course	☒ Obligatory ☐ Elective
Semester	☒ Autumn ☐ Spring
Year of Study	I
Number of ECTS Allocated	7
Name of Lecturer/Lecturers	Gradimir S. Ilić, Mića V. Vukić, Miloš M. Jovanović
Teaching Mode	☒ Lectures ☐ Group tutorials ☐ Individual tutorials ☐ Laboratory work ☐ Project work ☐ Seminar ☐ Distance learning ☐ Blended learning ☐ Other

Purpose and Overview (max. 5 sentences)

Introducing students to the basic principles of heat and mass transfer in order to complete the knowledge obtained in other professional lectures. Students obtain knowledge to independently solve heat and mass transfer problems. They also gain knowledge of turbulent flow and boundary layer flow.

Syllabus (brief outline and summary of topics, max. 10 sentences)

1) Conservation laws transport quantities. Boundary layer theory. Prandtl equations. Some properties of the boundary layer. Boundary layer on the plate, Blasius solution. 2) The similarity of the boundary layer: Normalized boundary layer equations. The similarity parameters of the boundary layer. The functional form of solutions. The physical interpretation of dimensionless parameters. Boundary layer analogies. Turbulent flow. Reynolds equations. Modelling of the turbulent stresses: DNS, LES, algebraic models, two equation models. Turbulent flow in a hydraulically smooth pipe. The universal law of velocity distribution in a hydraulically smooth pipe, the wall law, universal friction law.
2) Physical background of conduction and diffusion. Fourier's law. Fick's law. Conductive heat transfer conservation equations. Convective heat transfer conservation equations. Similarity theory of transport processes. Turbulent models. Two and three dimensional heat and mass transfer. Steady and unsteady heat and mass transfer. Finned surfaces. Phase change heat transfer (evaporation and boiling). Radiation heat transfer.

Language of Instruction

☒Serbian (complete course) ☒ English (complete course) ☐ Other _____ (complete course)

☐Serbian with English mentoring ☐Serbian with other mentoring _____

Assessment Methods and Criteria			
Pre exam Duties	**Points**	**Final Exam**	**Points**
Activity During Lectures	**5**	**Written Examination**	**0** (or max 50 depending on Pre exam Duties)
Practical Teaching	**5**	**Oral Examination**	**Max. 50**
Teaching Colloquia	**40**	**Overall Sum**	**100**
***Final examination mark is formed in accordance with the Institutional documents**			