UNIVERSITY OF NIŠ

Course Unit Descriptor	Faculty	Faculty of Mechanical Engineering

GENERAL INFORMATION			
Study Program	Mechanical Engineering		
Study Module (if applicable)	-		
Course Title	Computational fluid dynamics		
Level of Study	☒Bachelor	☐ Master's	☐ Doctoral
Type of Course	☐ Obligatory	☒ Elective	
Semester	☒ Autumn	☐ Spring	
Year of Study	IV		
Number of ECTS Allocated	6		
Name of Lecturer/Lecturers	Miloš Jovanović		
Teaching Mode	☒ Lectures	☐ Group tutorials	☐ Individual tutorials
	☐ Laboratory work	☒ Project work	☐ Seminar
	☐ Distance learning	☐ Blended learning	☐ Other

Purpose and Overview (max. 5 sentences)

The aim of the course is to introduce all students with numerical solving of equations, which describes the flow of fluids. The course is targeting the theoretical aspects of numerical solving of differential equations and practical aspects modern CFD software.

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

1) Introduction. Benefits of computational fluid dynamics. Typical practical problems 2) Complex geometry, simple physics problems. A simpler geometry domain, complex physics problems. 3) Partial differential equations. Boundary and initial conditions 4) Hyperbolic, parabolic and elliptic PDE-physical interpretation, boundary and initial conditions. 5) The equations of motion. The equation of continuity. Momentum equation. 6) Dynamic similarity. A useful simplification. 7) Incompressible, inviscid flow. Panel method 8) Numerical methods for implementation of panel method 9) Finite element method. Airfoil problem. 10) Viscous incompressible fluid. Boundary layer of incompressible fluid. The laminar boundary layer, turbulent boundary layer. The separation of the boundary layer. 11) The implicit scheme. Keler box scheme 12) Flow in the rectangular channel. Flow in a curved rectangular channel

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
Lecture (participation)	5	Written Examination	0* (50)
Homework	5	Oral Examination	Max. 50
Project work	40	Overall Sum	100
* Refers to students who have already gained points by completing pre-exam requirements			