# UNIVERSITY OF NIŠ

| Course Unit Descriptor | Faculty | Faculty of Mechanical Engineering |
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| GENERAL INFORMATION | | | |
|---|---|---|---|
| Study Program | Mechanical Engineering | | |
| Study Module (if applicable) | Energetics and Process Techniques | | |
| Course Title | Unsteady and unstable turbomachinery flow | | |
| Level of Study | ☐ Bachelor | ☐ Master's | ☒ Doctoral |
| Type of Course | ☐ Obligatory | ☒ Elective | |
| Semester | ☒ Autumn | ☐ Spring | |
| Year of Study | II | | |
| Number of ECTS Allocated | 10 | | |
| Name of Lecturer/Lecturers | Dragica R. Milenković | | |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☒ Individual tutorials |
| | ☐ Laboratory work | ☒ Project work | ☐ Seminar |
| | ☐ Distance learning | ☐ Blended learning | ☐ Other |

**Purpose and Overview (max. 5 sentences)**

*To gain new knowledge in the field of unsteady and unstable turbomachinery flow. To enable students to independently and on scientific principles formulate unsteady and unstable flow phenomena.*

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

*1) General characteristics of unsteady fluid motion through turbomachinery cascades; Classification of unsteady flows in turbomachinery. Unsteady flow trough cascades. Mutual influence of cascades. Oscillating of turbomachinery blades 2) Cavitation phenomenona. Development of cavitation in steady flow. Unsteady cavitating flow. 3) Pumps and turbines cavitation. General characteristics of unstable fluid flow through turbomachinery. 4) Conditions for formation of unstable flow. 5) Classification of unstable turbomachinery flow. The instability caused by uneven flow distribution. Unstable flow caused by the loss of global stability. 6) Surge phenomenon. 7) Rotating stall phenomenon. 8) Theoretical study of unstable phenomena in turbomachinery. 9) The experimental study of unstable phenomena in turbomachinery. 10) Expanding the area of stable operating modes for pumps, compressors and fans. 11) Influence of of turbomachinery geometry on the occurrence of unstable operating regimes*

**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 | | | |