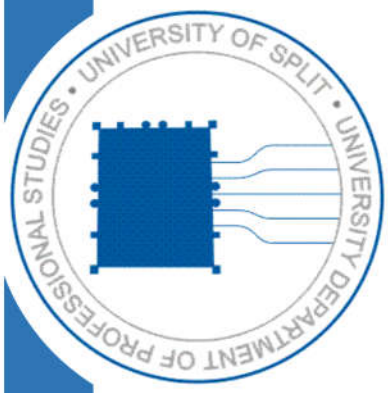
Course syllabus
Fluid Mechanics



COURSE DETAILS		
Type of study programme	Undergraduate professional study programme- 180 ECTS	
Study programme	MECHANICAL ENGINEERING	
Course title	Fluid Mechanics	
Course code	SKS022	
ECTS (Number of credits allocated)	5	
Course status	Core	
Year of study	Second	
Course Web site	https://moodle.oss.unist.hr/course/category.php?id=21	
Total lesson hours per semester	Lectures	30
	Practicals	30
Prerequisite(s)	None	
Lecturer(s)	Department of Mechanical Engineering: Zlatko Jankoski, Ph.D., Tenured College Professor	

COURSE DESCRIPTION	
Course Objectives:	- understanding basic laws, principles and phenomena in the area of fluid mechanics - to solve simplified examples of fluid mechanics - theoretical and practical preparation enabling students to apply the acquired knowledge and skills in professional and specialist courses.
Learning outcomes ***On successful completion of this course, student should be able to:***	1. define basic terms, values and laws in the areas of fluids properties, statics, kinematics and dynamics of fluids, and hydraulic design of pipes, 2. describe methods of implementing fluid mechanics laws and phenomena while analysing the operational parameters of hydraulic problems, systems and machines, 3. practically apply tables and diagrams, and equations that define the associated laws 4. calculate and optimise operational parameters of hydraulic problems, systems and machines, 5. explain the correlation between different operational parameters, 6. select engineering approach to problem solving based on the acquired physics and mathematical knowledge.
Course content	**Introduction:** Basic concepts of fluid mechanics. Fundamental terms. Physical values. Fluids and their properties. Forces inside fluid. **Fluid Statistics:** Pascal's law. Euler's equation of fluid statics. Measurement of pressure. Relative statics of fluid – constant acceleration, rotation. Forces of hydrostatic pressure. Buoyancy. Flotation. Stability. **Fluid Kinematics:** Euler and Lagrangian specification of fluid flow. Streamlines. Pathlines. Stream surface. Stream tube. Mass/volume flow. Control volume. **Fluid Dynamics:** Continuity equation. Basic laws of fluid dynamics – conservation of mass, conservation of linear momentum, conservation of energy. Ideal fluid flow. Application of Bernoulli's equation. Real fluid flow. Viscosity. Determination of losses. Reynolds experiment. Laminar and turbulent flow. Boundary layer. Velocity profile. Losses in pipes. Frictional losses. Nikuradse experiments. Moody's diagram. Local losses. Coefficients of resistance. **Hydraulic design of pipeline:** Different approaches in designing the pipeline – pressure drop, mass/volume low, diameter of pipeline. Graphical view. Energy properties of pumps and hydraulic machines. Dimensional analysis. Theory of similarity. Flow of fluid in open channels. Non- stationary flow and hydraulic shock.

CONSTRUCTIVE ALIGNMENT – Learning outcomes, teaching and assessment methods

Alignment of students activities with learning outcomes		
Activity	**Student workload ECTS credits**	**Learning outcomes**
Lectures	30 hours / 1 ECTS	1,2,5,6
Practicals	30 hours / 1 ECTS	3,4,5,6
Three mid-term exams (preparation and delivery)	51 hours / 1,7 ECTS	1,2,3,4,5,6
Self-study	30 hours / 1 ECTS	1,2,3,4,5,6
Office hours and final exam	9 hours / 0,3 ECTS	1,2,3,4,5,6
TOTAL:	**150 hours / 5 ECTS**	**1,2,3,4,5,6**

CONTINUOUS ASSESSMENT		
Continuous testing indicators	**Performance A_i (%)**	**Grade ratio k_i (%)**
First mid-term exam	50-100	30
Second mid-term exam	50-100	35
Third mid-term exam	50-100	35

FINAL ASSESSMENT		
Testing indicators – final exam (first and second exam term)	**Performance A_i (%)**	**Grade ratio k_i (%)**
Practical exam (written)	50 - 100	50
Theoretical exam (written and/or oral)	50 - 100	40
Previous activities (include all continuous testing indicators)	70 - 100	10
Testing indicators – makeup exam (third and fourth exam term)	**Performance A_i (%)**	**Grade ratio k_i (%)**
Practical exam (written)	50 - 100	50
Theoretical exam (written and/or oral)	50 - 100	50
Previous activities (include all continuous testing indicators)	70 - 100	10

PERFORMANCE AND GRADE		
Percentage	**Criteria**	**Grade**
50% - 61%	*basic criteria met*	sufficient (2)
62% - 74%	*average performance with some errors*	good (3)
75% - 87%	*above average performance with minor errors*	very good (4)
88% - 100%	*outstanding performance*	outstanding (5)

ADDITIONAL INFORMATION

Teaching materials for students (scripts, exercise collections, examples of solved exercises), teaching record, detailed course syllabus, application of e-learning, current information and all other data are available by MOODLE system to all students.