SYLLABUS

Basic data of the subject	
University	**University of Applied Sciences in Ferizaj**
Academic unit	**Faculty of Engineering and Informatics**
Program	**Industrial ingineering with informatics**
Title of the subject	**Hydraulics and Thermodynamics**
Level	Bachelor
Course Status	Elective
Year of studies:	llI, Semester V
Number of hours per week	3
Value of Credits - ECTS	4
Time / location	
Course lecturer	
Contact details	

Course Description	*This course will provide students with the basic knowledge and concepts of hydraulics and thermodynamics, the laws of hydraulics and thermodynamics and their application in solving engineering problems. Also, this course will provide students with knowledge about liquids, physical properties of liquids, Pascal's law, Archimedes' law, the equation of continuity, Bernoulli's equation and their application in solving technical problems , flow regimes. leaks through pipes, from tanks, resistances during leaks. Hydraulic machines (centrifugal pumps, water turbines, etc.), ideal and real gases, gas mixtures, thermodynamic processes, water vapor, circular cycles. Thermal machines (compressors, turbines, etc.).*
Objectives of the course	*The purpose of the course is to prepare students with basic knowledge of the concepts of hydraulics and thermodynamics, their laws, as well as the application of these laws in engineering systems to obtain useful work with as little energy expenditure as possible.*
Expected learning outcomes	*After completing this course (subject), the student will be able to:* • *To understand the basic concepts of hydraulics and thermodynamics and its laws;* • *Introduced the design of engineering problems related to hydraulics and thermodynamics, such as fluid flows and izo-processes, circular cycles of the machines and of the thermals plants;* • *To present, interpret and know how to use equations,diagrams and tables in solving theoretical and practical problems that belong to the engineering field;*

| | | • | *To apply the appropriate theoretical methods for the selection of engineering problems related to hydraulics and thermodynamics.* |

Contribution to the student load (which must correspond with learning outcomes)

Activity	Hour	Day/Week	in Total
Teaching (Lectures and exercises)	3	15	45
Practical work			
Contacts with the teacher/consultations	1	3	3
Field exercises			
Colloquiums, seminars			
Home-work			
Student's independent study time (in the library or at home)	2	15	30
Final preparation for the exam	2	12	24
Time spent in assessment (tests, quizzes, final exam)	2		2
Projects, presentations, etc			
Total			**104 hours**

Teaching methodology	*The course lasts 15 weeks with 3 hours of lectures and/or weekly individual and group exercises.* *The exercises will be held in the form of individual and group work in which concrete examples will be discussed. Active participation is extremely important, so students are encouraged to regularly attend lectures and exercises and contribute to the discussions that take place in the lectures. Lectures, exercises, individual work, discussions and group work. The Renewable Energy Laboratory (Room 204) will be used, in which they are accommodated hydraulic and pneumatic systems in which the Laws of Hydraulics and Thermodynamics are applied. Lectures and exercises have been prepared for each student in the PowerPoint program for teaching and learning lesson as easily and clearly as possible, accompanied by video inserts which are transmitted through of the projector.*
Prerequisites	*There are no prerequisites to start learning Hydraulics and Thermodynamics. However, it is recommended that students have basic knowledge of Mathematics, Physics and the Windows operating system.*

Assessment methods	*During the semester, students are given homework with assessment, two written tests are organized which are evaluated with 30 points each, or the student has the right to undergo only the final exam which has 60 points (written/oral test), the test contains the open questions some of these data with pictures. The student passes the exam if he collects* **51** *points from all evaluation criteria,*
	▪ *commitment and attendance:* *20%*
	▪ *seminar paper (colloquium)/*
	case studies/research project: *20%*
	▪ *tests or final exam:* *60%*
	Total: *100%*
	Rating:
	91-100 points – graded 10 (ten);
	81- 90 points - graded 9 (nine)
	71- 80 points – grade 8 (eight);
	61-70 points – grade 7 (seven);
	51- 60 points – grade 6 (six);
	0 - 50 points – The student repeats the exam.
The ratio of theory and practice:	*70% theory with exercises and 30% laboratory work and study visits. Parts of the lectures will be concretized in the Renewable Energy Laboratory (Room 204 - UASF).*

Literature	
Basic Literature	1. *HIDRAULIKA DHE TERMODINAMIKA, Prishtinë, 1998, Mr.inxh.XHEMAJL FEJZULLAHU, Dr.inxh.FEJZULLAH KRASNIQI.*
Additional Literature	1. *MEKANIKA E FLUIDEVE , Tiranë 2006, ANTONAQ LONDO, ROBERT PLUMBI.*
	2. *"MAKINAT DHE PAJISJET TEKNIKE", Kolegji BIZNESI, Prishtinë, XHEVAT BERISHA, Prishtinë, 2011.*
	3. *"TERMODINAMIKA E PËRGJITHSHME", Universiteti i Tiranës, HYSEN AGOLLI,Tiranë, 1987.*
	4. *FUNDAMETALS OF FLUID MECHANICS, Munson/Young/Okishi me Cd, USA 2002*

Designed learning plan	
Week	**Lectures and exercises to be held**
Week one	*General knowledge of hydraulics and thermodynamics. Theoretical basis of hydraulics; Physical properties of liquids*
Week two	*Hydraulics of fluids at rest; Pascal's law. Archimedes' law*
Week three	*Hydraulics of fluids in motion; Flow and the continuity equation*

Week four	*Bernoulli's equation for the ideal fluid; The hydraulics resistances for real fluids and flow regimes*
Week five	*The use of Bernoulli's equation in the dimensioning of the water systems*
Week six	*Hydraulic machines: The centrifugal pumps, the water turbines. Features and their choice*
Week seven	*Hydraulic machines: Water turbines* ***Test 1 - First intermediate evaluation***
Week eight	*Study visit. Metal Industry of Kosovo - "IMK", Ferizaj Hydraulic test of welded pipes.*
Week nine	*Introduction to Thermodynamics, State parameters. Ideal gas equation of state*
Week ten	*External influences (Mechanical Work, Volumetric work and the Exchanged Heat)*
Week eleven	*First Law of Thermodynamics (Internal Energy and Enthalpy)*
Week twelve	*Change of state of ideal gas (Isochora, v=const.; Isobar, p=const.; Isotherm, T=const.)*
Week thirteen	*Change of state of ideal gas (Isoentropy, s = const.; Polytropy, n = const.)*
Week fourteen	*Second Law of Thermodynamics (Circular Cycles, Carnot Cycle and Entropy). The vapor of water*
Week fifteen	*The Thermals machines: The Compressors, Turbines* ***Test 2 - Second intermediate evaluation***

Academic policies and rules of conduct

Regular participation in lectures and exercises is necessary, as well as active participation in the discussion and solving of tasks. Cell phones should be turned off or put on silent mode.