

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	MRE406	<b>SEMESTER</b>	4
<b>COURSE TITLE</b>	APPLIED HYDRAULICS		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Theory - lectures		2	5
Exercises		3	
Total (hours)		5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	general background		
<b>PREREQUISITE COURSES:</b>	-		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uowm.gr/courses/MRE208/">https://eclass.uowm.gr/courses/MRE208/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p>Consult Appendix A</p> <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>		
<p>The course is the basic introductory course at the fundamental concepts of Hydraulics.</p> <p>The aim of the course is to introduce students to the basic concepts of Hydraulics, as well as the understanding by the students of the introductory concepts of the applications of Hydraulics.</p> <p>Upon successful completion of the course, the student should have sufficient knowledge of the basic principles of hydraulics through the presentation of the main concepts - definitions.</p>		
<p><b>General Competences</b></p> <p><i>Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">                 Search for, analysis and synthesis of data and information, with the use of the necessary technology                  Adapting to new situations                  Decision-making                  Working independently                  Team work                  Working in an international environment                  Working in an interdisciplinary environment             </td> <td style="width: 50%; border: none;">                 Project planning and management                  Respect for difference and multiculturalism                  Respect for the natural environment                  Showing social, professional and ethical responsibility and sensitivity to gender issues                  Criticism and self-criticism                  Production of free, creative and inductive thinking                  .....             </td> </tr> </table>	Search for, analysis and synthesis of data and information, with the use of the necessary technology Adapting to new situations Decision-making Working independently Team work Working in an international environment Working in an interdisciplinary environment	Project planning and management Respect for difference and multiculturalism Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender issues Criticism and self-criticism Production of free, creative and inductive thinking .....
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<i>Production of new research ideas</i>	<i>Others...</i> .....
<i>Search for, analysis and synthesis of data and information</i> <i>Working independently</i> <i>Team work</i>	

### **(3) SYLLABUS**

Introduction.  
 Physical properties of fluids.  
 Hydrostatics.  
 Kinematics.  
 Continuity and motion equations for imaginary incompressible fluids.  
 Finite constant reference volume method.  
 One-dimensional analysis.  
 Applications:  
 Real fluids. Flow in closed ducts. Flow in open pipelines. Characteristics of porous medium physical properties of soil. Characteristics of porous medium - soil properties. Darcy's law and its limits. Permeability, hydraulic conductivity and its measurement. Flow in horizontal and inclined limit. Flow in aquifers under pressure and with free surface. Dupuit assumptions. Drainage. Flow network.  
 Hydrostatics. Sewage treatment plants, septic tanks. Water supply. Sewerage. Pumps. Tanks. Dams.

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	<i>Face-to-face, Distance learning</i>	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> <li>• Projector/pc presenting all lectures,</li> <li>• <b>COURSE RELATED NOTES AND ALSO UNSOLVED EXERCISES DATABASE SITED AT THE COURSE' e-class WEBSITE</b></li> </ul>	
<p style="text-align: center;"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<b>Activity</b>	<b>Semester workload</b>
	lectures	13
	Exercises	15
	Group work	-
	Educational visit to industries	-
	Atomic avocation	OPTIONAL ATOMIC WORK (SEVERAL UNSOLVED INCREASED DIFFICULTY EXERCISES) FOR ALL STUDENTS
	Personal study	13
Total (ects credits * 25)	125	
Course total	125	
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i>	<p>Students at the exams only have to solve exercises.</p> <p>Optional work 10% is taken into account and the students are finally graded.</p> <p>THE FINAL GRADE OF EACH STUDENT, COMES OUT FROM THE SUMMARY OF:</p> <ul style="list-style-type: none"> <li>• THE EXAMINATION GRADE AND</li> <li>• THE OPTIONAL ATOMIC WORK</li> </ul>	
<p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>		

#### (5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:

- Book [11029]: Applied plumbing, Terzidis George A.
- Book [11087]: Hydraulics lessons, Volume 1, Terzidis George A.

- Related academic journals: