COMPUTER APPLICATIONS IN HYDRAULICS

1	Course Title:	COMPUTER APPLICATIONS IN HYDRAULICS	
2	Course Code:	INS4052	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	8	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	2.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. SERDAR KORKMAZ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	skorkmaz@uludag.edu.tr 0224 24 09 04	
17	Website:		
18	Objective of the Course:	To teach the theories behind the hydraulic engineering applications and to do hydraulic design by using the computer programs that are used worldwide.	
19	Contribution of the Course to Professional Development:	To learn the theories behind the hydraulic engineering applications and to be able to perform hydraulic design by using the computer programs that are used worldwide.	
20	Learning Outcomes:		
		1	To be able to classify pressurized and open channel flows and calculate depth, section area and velocity computations
		2	To be able to design potable water network considering all the criteria by using up-to-date computer programs
		3	To be able to design open channel and stormwater collection networks, considering all the criteria by using up-to-date computer programs
		4	To be able to overcome the problems met during design using research techniques and engineering intuition
		5	To be able analyze and modify an existing design under different scenarios and extreme conditions.
		6	To be able to comprehend the technical specifications being used and be able to criticize, evaluate and present them.
		7	To be able to present the work done in both oral and written forms.
		8	
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21	Course Content:		

Course Content:

Week	Theoretical	Practice

1	Basic hydraulic principles, terms used in pressurized and open channel flows	Flow classification in Excel
2	Friction and local losses in pressurised pipes; pipes in series	Equivalent diameter computations for pipes in series; software application
3	Multi-reservoir systems; hydraulic head at junctions	Analysis of multi-reservoir systems; software application
4	Pipes in parallel	Equivalent diameter computations for pipes in parallel; software application
5	Water distribution networks, Hardy-Cross method	Solutions to water distribution networks using software and Excel
6	Pumped systems, pumps in series and in parallel, pump curve, pump efficiency	Solutions to pumped water distribution networks, pump head and pressure criteria using software
7	Gravity pipelines	Analysis of gravity pipelines and scenarios for using software
8	Introduction to open channel flow, flow types	Determination of flow type
9	Flow in composite and compound sections	Discharge computations using Manning equation
10	Concept of specific energy, channel transitions	Water depth computations for channel transitions using HEC-RAS program
11	Concept of specific force, hydraulic jump	Hydraulic jump computations using HEC-RAS
12	Gradually varied flow, flow profiles	GVF computations using HEC-RAS
13	Water surface profiles in a real river	River surface profile computations using HEC-RAS
14	Stormwater collection systems	Stormwater network solutions using software

22	Textbooks, References and/or Other Materials	1. Computer Applications in Hydraulic Engineering, 7th Edition, Bentley, 2007. 2008.

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	14	2.00	28.00
Self study and preperation	14	1.00	14.00
Homeworks	4	10.00	40.00
Midterm Exam	1	30.00	
Projects	0	0.00	0.00
Quiz	0	0.00	
Field Studies	0	0.00	0.00
Home work-project	4	10.00	
Midterm exams	1	2.00	2.00
Final Exam	1	60.00	
Others	0	0.00	0.00
Total	6	100.00	
Final Exams	1	2.00	2.00
Contribution of Term (Year) Learning Activities to Success Grade			
Total Work Load			116.00
Total work load/ 30 hr			3.80
Contribution of Final Exam to Success Grade			60.00
ECTS Credit of the Course			4.00
Total			100.00

TERM LEARNING ACTIVITIES	**NUMBE**	**WEIGHT**
Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	4	10.00
Final Exam	1	60.00
Total	6	100.00

Measurement and Evaluation Techniques Used in the Course	Written exams of numerical and theoretical questions and assignments

24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	5	5	5	0	3	0	4	0	0	0	0	0	0	0	0

ÖK3	5	5	5	5	0	3	0	4	0	0	0	0	0	0	0	0
ÖK4	4	4	4	4	0	0	0	5	0	4	0	4	0	0	0	0
ÖK5	5	5	5	4	0	0	0	5	0	0	0	0	0	0	0	0
ÖK6	0	4	4	3	0	0	4	5	5	0	4	5	0	0	0	0
ÖK7	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**