GROUNDWATER DEVELOPMENT

1	Course Title:	GROUNDWATER DEVELOPMENT
2	Course Code:	BSM6005
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	1
6	Semester:	1
7	ECTS Credits Allocated:	6.00
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. HAYRETTİN KUŞÇU
15	Course Lecturers:	Yok
16	Contact information of the Course Coordinator:	Prof.Dr.Hayrettin KUŞÇU Bursa Uludağ Üniversitesi Ziraat Fakültesi Biyosistem Mühendisliği Bölümü, Görükle Kampüsü e-posta: kuscu@uludag.edu.tr
17	Website:	
18	Objective of the Course:	To provide the engineers working in the field of irrigation with knowledge and skills in drilling and operating wells for irrigation and other purposes.
19	Contribution of the Course to Professional Development:	Knows groundwater hydraulics, analytical and numerical solutions of the encountered problems, as well as modeling using up-to-date computer programs.
20	Learning Outcomes:	

	1	Understanding the interaction between surface and groundwater
	2	Understanding the importance of our country's underground water potential
	3	To understand well design principles
	4	To understand well drilling techniques
	5	To understand well construction principles
	6	Understanding the well development and maintenance principles
	7	Ability to design well pump tests
	8	Ability to monitor and evaluate wells
	9	
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21	Course Content:	
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Week	Theoretical	Practice
1	Introduction, hydrological cycle, formation of groundwater	Introduction, hydrological cycle, formation of groundwater
2	Groundwater survey techniques	Groundwater studies sample applications
3	Well types	Well types

4	Well hydraulics	Well hydraulics calculations
5	Well design principles	Well design
6	Well drilling technologies	Drilling technologies
7	Well drilling (drilling) technologies	Drilling technologies
8	Well drilling (drilling) technologies	Drilling technologies
9	Well filter materials	Well filtering
10	Well construction	Well construction techniques
11	Well development and maintenance	Well development and maintenance
12	Water supply systems	Water supply systems
13	Pump (aquifer) tests in wells	Pump (aquifer) tests in wells
14	Monitoring and evaluation in wells	General evaluation

22	Textbooks, References and/or Other Materials:	Todd, D. K., 1964. Groundwater Hydrology. John Wiley and Sons, Inc., New York Driscoll, F. G., 1986. Groundwater and Wells. 2nd ed., Johnson division, UOP Inc., St. Paul, Minn., 1108 pp. Harlan, R. L., K. E. Kolm and E. D. Gutentag, 1989. Water-Well Design and Construction. Elsevier Science Publishers B.V., The Netherlands
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	0	0.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	100.00
Total	1	100.00
Contribution of Term (Year) Learning Activities to Success Grade		0.00
Contribution of Final Exam to Success Grade		100.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		Classic exam

24 **ECTS / WORK LOAD TABLE**

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	5.00	70.00
Homeworks	1	10.00	10.00
Projects	0	0.00	0.00
Field Studies	3	6.00	18.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	20.00	20.00
Total Work Load			174.00
Total work load/ 30 hr			5.80
ECTS Credit of the Course			6.00

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	4	3	4	2	1	4	4	2	3	1	1	0	0	0	0
ÖK2	3	4	2	3	2	1	3	4	1	2	1	1	0	0	0	0
ÖK3	4	4	2	4	1	1	4	3	1	2	1	1	0	0	0	0
ÖK4	3	4	3	3	2	2	2	3	2	1	1	1	0	0	0	0
ÖK5	3	3	4	3	2	3	2	3	2	2	2	2	0	0	0	0
ÖK6	3	3	4	3	3	3	3	3	2	3	3	2	0	0	0	0
ÖK7	4	3	3	4	4	3	3	4	3	4	2	3	0	0	0	0
ÖK8	4	4	3	3	3	2	2	3	3	4	4	4	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**		**3 Medium**			**4 High**			**5 Very High**					