HYDRAULICS IN POROUS MEDIA

1	Course Title:	HYDRAULICS IN POROUS MEDIA
2	Course Code:	BSM6002
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	2
6	Semester:	4
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. HAYRETTİN KUŞCU
15	Course Lecturers:	Yok
16	Contact information of the Course Coordinator:	Prof.Dr. Hayrettin KUŞÇU e-posta : kuscu@uludag.edu.tr Telefon: 0 224 2941407 Adres: Bursa Uludağ Üniversitesi, Ziraat Fakültesi, Biyosistem Mühendisliği Bölümü, Görükle Kampüsü, 16059, Nilüfer/BURSA
17	Website:	
18	Objective of the Course:	The objective of the course is to study the advanced theories concerning the statics and dynamics of fluids in porous media and to solve problems in this issue.
19	Contribution of the Course to Professional Development:	Developing academically on soil-water dynamics and uses this knowledge in scientific studies.
20	Learning Outcomes:	

	1	identify the elements that constitute the porous medium mathematically
	2	solve problems related to water in the soil
	3	analyze the fluid motion in porous media according to the steady and unsteady state flow assumptions
	4	formulate the basic flow equations in porous media
	5	solve groundwater flow problems by means of analytic, conform transformation (hodograph) and approximate methods
	6	solve groundwater flow problems by means of modeling and analogue methods
	7	solve the problems concerning immiscible fluids
	8	express the hydrodynamic dispersion theory concerning the porous media
	9	
	10	

21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Fluids and porous matrix properties	

2	Pressure and piezometric head	
3	The fundamental fluid transport equations in porous media	
4	The equation of motion of a homogeneous fluid	
5	Continuity equation for a homogeneous fluid	
6	Conservation equation for a homogeneous fluid	
7	Solving boundary and initial value problems	
8	Solving boundary and initial value problems	
9	Unconfined flow	
10	Dupuit-Forchheimer's assumptions	
11	Flow of immiscible fluids	
12	Hydrodynamic dispersion	
13	Models and analogs	
14	Models and analogs	

22	Textbooks, References and/or Other Materials:	1. Bear, J., "Dynamics of Fluids in Porous Media". Department of Civil Engineering. Technion- Israel Institute of Tecnology, Haifa, Dover Publications, Inc., 1988,New York. 2. Gemalmaz, E., "Gözenekli Ortam Hidroliği". Atatürk Üniversitesi Ziraat Fakültesi Kültürteknik Bölümü Doktora Ders Notları (Basılmamış), 1989, Erzurum.

23	Assesment			
	Activites	Number	Duration (hour)	Total Work Load (hour)
	Theoretical	14	3.00	42.00
	Practicals/Labs	0	0.00	0.00
	Self study and preperation	14	7.00	98.00
	Homeworks	1	15.00	15.00
	Projects	0	0.00	0.00
	Midterm Exam	0	0.00	0.00
	Field Studies	0	0.00	0.00
	Quiz	0	0.00	0.00
	Midterm exams	0	0.00	0.00
	Home work project	0	0.00	0.00
	Others	0	0.00	0.00
	Final Exam	1	100.00	
	Final Exams	1	25.00	25.00
	Total	1	100.00	
	Total Work Load			180.00
	Contribution of Term (Year) Learning Activities to Success Grade	0.00		6.00
	Total work load/ 30 hr			6.00
	ECTS Credit of the Course			6.00
	Contribution of Final Exam to Success Grade	100.00		
	Total	100.00		
	Measurement and Evaluation Techniques Used in the Course	Classic final exam		

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	3	3	2	3	3	2	4	3	3	2	3	3	0	0	0	0
ÖK2	3	3	3	3	3	2	4	3	3	2	3	3	0	0	0	0

ÖK3	4	4	3	4	3	2	4	3	3	2	3	3	0	0	0	0
ÖK4	3	4	3	3	3	2	4	3	3	2	4	4	0	0	0	0
ÖK5	3	4	3	4	3	2	4	3	3	2	3	3	0	0	0	0
ÖK6	3	4	3	4	3	2	4	3	3	2	4	4	0	0	0	0
ÖK7	3	4	3	4	3	2	4	3	3	2	3	4	0	0	0	0
ÖK8	3	4	3	4	3	2	4	3	2	2	3	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**