



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Groundwater Contamination							
Course Code		MCE535		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 ( <i>Hours</i> )	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		It is informed about giving basic information about groundwater hydraulics, determination of groundwater pollution and pollution-causing factors and pollution control.							
Course Content		Basic concepts, hydrological cycle, groundwater formation, aquifer types and their properties, groundwater flow, groundwater pollution and its causes, pollutant transport and fate considerations, pollutant source prioritization, groundwater monitoring and analysis, sampling techniques from groundwater, groundwater pollution control, groundwater quality management.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Case Study, Individual Study, Problem Solving					
Name of Lecturer(s)									

### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

### Recommended or Required Reading

1	Ray K. Linsley, Jozeph B. Franzini, David L. Freyberg, George Tchobanoglous, McGraw-Hill, Inc., 1992, Water Resources Engineering
2	R.Allan Freeze and John A. Cherry, 1988, Groundwater.
3	Canter, Knox and Fairchild, 1990. Groundwater Quality Protection, Lewis pub., New York.
4	EPA, 1985., Ground Water: Groundwater and contamination, Vol.1, USEPA, Center for Environmental Research Information, Cincinnati, Ohio, USA
5	EPA, 1985., Ground Water: Methodology, Vol.2, USEPA, Center for Environmental Research Information, Cincinnati, Ohio, USA
6	Batu, V., 1992., Solving groundwater problems with models, Dallas, USA.

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic concepts
2	Theoretical	Hydrological cycle
3	Theoretical	Groundwater formation
4	Theoretical	Aquifer types and their properties
5	Theoretical	Groundwater flow
6	Theoretical	Groundwater pollution and its causes
7	Theoretical	Groundwater pollution and its causes
8	Intermediate Exam	Midterm Exam
9	Theoretical	Pollutant transport and fate considerations
10	Theoretical	Pollutant transport and fate considerations
11	Theoretical	Pollutant source prioritization
12	Theoretical	Groundwater monitoring and analysis
13	Theoretical	Sampling techniques from groundwater
14	Theoretical	Groundwater pollution control
15	Theoretical	Groundwater quality management
16	Final Exam	Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	1	3	56
Assignment	3	0	16	48



Individual Work	13	0	4	52
Midterm Examination	1	20	2	22
Final Examination	1	20	2	22
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = <b>ECTS</b>				8
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	Defines the hydrological characteristics of groundwater.
2	To describe the groundwater pollutants.
3	To describe the transport the pollutants to groundwater
4	Defines groundwater analysis methods.
5	To manage the groundwater quality.

### Programme Outcomes (Civil Engineering Master)

1	To be able to develop expertise knowledge in a Civil engineering area founded on their graduate competence.
2	To be able to use the theoretical and practical expertise knowledge gained in their specialty area.
3	To be able to use the information, problem solving and / or practical skills from the field, in interdisciplinary studies.
4	To be able to create new knowledge by integrating their knowledge area with the knowledge coming from different disciplines; and solve problems that need expertise by using scientific research methods
5	To be able to solve the problems related to his/her area by using appropriate research methods
6	To be able to devise a problem in their specialty area, develop a solution methodology, solve the problem, and interpret the results and take action if necessary
7	To be able to criticize the knowledge in their specialty area, guide the learning process, and independently direct high level studies
8	To be able to systematically communicate the recent developments in their specialty area and their own studies to groups both inside and outside their specialty area, orally, in writing and visually
9	To be able to use computer software at a level required by their specialty area with drawing upon information and communication technology at a high level
10	To be able to introduce scientific, technological, social and cultural advancements in the field of civil engineering and to contribute to the process of being an information of the society and to sustain it.
11	To be conscious of professional and ethical responsibility and contribute to the establishment of this consciousness.
12	To be able to protect social, scientific, and ethical values during collection, interpretation, and dissemination stages of the data associated with their specialty area; instruct and supervise these values
13	To be able to use at least one foreign language in a level to follow current developments related to the field.

### Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	5	4	5	4	5
P2	4	5	4	5	4
P3	5	4	5	4	5
P4	4	5	4	5	4
P5	5	4	5	4	5
P6	4	5	4	5	4
P7	5	4	5	4	5
P8	4	5	4	5	4
P9	5	5	5	4	5
P10	4	4	5	5	4
P11	5	4	5	4	5
P12	4	5	4	5	5
P13	5	5	4	4	5

