

طرح دوره و جدول برنامه درسی- درس مدیریت فاضلاب صنعتی- دوره کارشناسی ارشد
مهندسی بهداشت محیط

Course Plan- Industrial Wastewater Management - MSc Level

Coordinating Unit:	Department of Environmental Health Engineering, School of Public Health	
Degree	MSc	
Course Title:	Industrial wastewater management	
Compulsory/Elective	Compulsory	
Course Prerequisites:	None	
Prerequisite knowledge	Wastewater Treatment Engineering	
Duration	One semester	Credit Units: 2
Course Description	<p>Many of the contaminants in an industrial wastewater are actually raw materials lost from production processes whose recovery would increase process efficiency and reduce wastewater treatment costs. Therefore, a thorough understanding of production processes and the sources of contaminants in wastewater is needed, as is knowledge of the waste characteristics and treatment options. This course begins with a review of the characterization of dissolved and particulate components of industrial wastewaters and an overview of wastewater management and treatment options. We'll then look at wastewater audits as a means of identifying the sources of contaminants and of quantifying the various components in an industrial wastewater. The concept of an environmental management system will then be examined, as will the legislative and regulatory framework within which industry operates. The theoretical and practical aspects of the design and operation of various treatment processes will be reviewed before we move on to study how these methods are applied in various industrial sectors.</p>	
Course Objectives	<p>Main Objectives: The aim of the course is to acquaint the students with specifics of industrial wastewater characteristic, waste minimization methods, advanced treatment processes and technologies. Analysis of concentration impacts, hydrodynamic and kinetic aspects will be performed in order to specify treatment processes, reactors and treatment lines for industrial wastewater and sludge treatment.</p> <p>Specific Objectives: To focus on Specifics of industrial wastewater. Typical processes (filtration, flotation, coagulation, precipitation, adsorption, ion exchange, stripping, membrane separation processes, chemical oxidation processes). Possibilities and restrictions of utilization of biological treatment processes. Relation between structure and biodegradability of organic compounds. Typical bioreactors and technological arrangements. Removal of specific pollutants (toxic, persistent and priority compounds) from industrial wastewater. Separation, treatment and disposal of sludge. Technological lines for industrial wastewater and sludge treatment. Specifics of treatment of wastewater from individual industrial branches. Minimization of water consumption and water reuse in industry.</p>	
Learning Outcomes (LO)	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Learn the physical/chemical/biological characteristics of industrial wastewater with emphasize to each industry 2. Learn the project management related to industrial wastewater 3- learn to select the best technologies due to economic, social and cultural community 4. Learn to industrial wastewater emission regulations and policy 5. Learn to alternative technology such as advanced treatments 	

Texts & References: <i>(* recommended textbook(s))</i>	1. Water Environment Federation, Industrial Wastewater Management, Treatment, and Disposal, third edition, McGraw-Hill, 2008. 2. Nemerow N.L, Industrial Waste Treatment, Elsevier Science & Technology Books, 2006 3. W. Wesley Eckenfelder, Industrial Water Pollution Control, 3rd edition, McGraw-Hill, Inc., 2000. 4. Nalco Company, The Nalco Water Handbook, McGraw-Hill, 2009.
Student Assessment:	1-Homeworks: 30%; 2-Presentations: 30% 3 One final examination (student’s presentation and report on project): 40%
Learning Outcome Assessment	1-Tests and final examination. 2- Course evaluation
Pedagogical Methods	<div>* Lecture</div> <div>* Project</div> <div>* Exercises and problems</div> <div>* Student presentation</div> <div>* Independent study</div> <div><input type="checkbox"/> e-learning</div>

Lesson Plan of Industrial Wastewater Management- MSc Level

Day(S) Sunday(S)	Date (yy-mm-dd)	Department	Time	Course Leader	Context
Week1		Environmental Health Eng.		Dr.Gholami	Industrial WW Treatment-definition, introduction
Week2		Environmental Health Eng.		Dr.Gholami	Type of industries
Week 3					Industrial wastewater management overviews
Week4					Waste minimization
Week5					Risk assessment
Week6		Environmental Health Eng.		Dr.Gholami	Project Management
Week7		Environmental Health Eng.		Dr.Gholami	Bioassay
Week8		Environmental Health Eng.		Dr.Gholami	Organic Estimate
Week9		Environmental Health Eng.		Dr.Gholami	Equalization
Week10		Environmental Health Eng.		Dr.Gholami	Floatation.
Week11		Environmental Health Eng.		Dr.Gholami	Waste Neutralization
Week 12		Environmental Health Eng.		Dr.Gholami	Industrial Pretreatment
Week13		Environmental Health Eng.		Dr.Gholami	-----
Week14		Environmental Health Eng.		Dr.Gholami	Membrane Filtration
Week15		Environmental Health Eng.		Dr.Gholami	Adsorption
Week16		Environmental Health Eng.		Dr.Gholami	Electrodialysis
Week17		Environmental Health Eng.		Dr.Gholami	Presentation
Week18		Environmental Health Eng.		Dr.Gholami	Presentation
Week19		Environmental Health Eng.		Dr.Gholami	Presentation