

Course unit title:	Fundamentals of Environmental Engineering		
Course unit code:	CE330		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	3		
Semester when the unit is delivered:	5 (Fall)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Christos Anastasiou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1. Define basic terms and concepts relating to Environmental pollution and engineering. 2. Recognize key terms and concepts relating to water supply and potable water treatment, wastewater production and treatment 3. Identify key unit processes (coagulation / flocculation, sedimentation, filtration, and disinfection) involved in the treatment of potable water, key wastewater characteristics 4. Differentiate among various wastewater streams based on their characteristics 5. Associate different treatment methods with analogous wastewater streams / sources 6. Describe the key features of a municipal solid waste sanitary landfill 7. Argue for / against incineration and / or landfilling as final disposal options for municipal solid waste. 8. Discuss key global issues pertaining to air pollution (climate change, acid rain, photochemical smog) 		
Mode of delivery:	Face-to-face		
Prerequisites:	None	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<p><u>Environmental Pollution and Public Health:</u> Basic terms and concepts relating to Environmental pollution and engineering. Important issues that relate to environmental pollution. Important sources of environmental pollution. Relationship between pollutants and the corresponding contributing sources. Possible scenarios of public health manifestations of environmental pollution sources and events.</p> <p><u>Water Supply and Treatment:</u> Key terms and concepts relating to water supply and potable water treatment. Key unit processes (coagulation / flocculation, sedimentation, filtration, and disinfection) involved in the treatment of potable water. The root causes of water supply issues that we are facing in Cyprus. Possible solutions to various potable water treatment scenarios. Conceptual design of a water treatment plant</p> <p><u>Wastewater Treatment:</u> Key terms and concepts relating to wastewater production and treatment. Estimation of wastewater quantity production from municipal and industrial sources. Identify key wastewater characteristics (BOD, COD, TSS, TN, TP, etc.). Differentiation among various wastewater streams based on their characteristics. Conceptual design of an Activated Sludge wastewater treatment plant. Key elements of various unit processes (sedimentation / clarification, filtration, aeration, and disinfection) involved in the biological treatment of municipal wastewater. Different treatment methods with analogous wastewater streams / sources (Aerobic, Anaerobic, Continuous flow, Sequencing Batch Reactors, Constructed Wetlands)</p>		

	<p><u>Solid Waste Management:</u> Key terms and concepts relating to municipal solid waste production, transport, selection and final disposal. Calculation of municipal solid waste quantities and characteristics. Key features of a municipal solid waste sanitary landfill. Alternative final disposal methods for municipal solid waste (i.e. incineration, composting, recycling).</p> <p><u>Air Pollution:</u> Key terms and concepts relating to air pollution engineering (sources, characteristics, and control methods). Key global issues pertaining to air pollution (climate change, acid rain, photochemical smog). Air pollution control methods (i.e. cyclones, baghouse filters, wet scrubbers, etc.)</p>
Recommended and/or required reading:	
Textbooks:	Nathanson J.A. 2003. <i>Basic Environmental Technology: Water Supply, Waste Management and pollution control</i> - 4th Edition, Prentice Hall, USA, ISBN 0-13-093085-7
References:	<ul style="list-style-type: none"> • Marquita K. Hill. 2004. <i>Understanding Environmental Pollution; A Primer</i>, Second Edition, Cambridge University Press, ISBN 0-521-52726-0 (2004) • G. M.Masters. 1997. <i>Introduction to Environmental Engineering and Science</i> - 2nd edition. Prentice Hall, ISBN 0-13-155384-4 (1997) • Journal Papers • Newspaper & Popular Magazine Articles • World Wide Web Sites (i.e. EU Environmental Commission, USEPA, USDA, UN-IPCC, etc.)
Planned learning activities and teaching methods:	The course will be presented through theoretical lectures in class. The lectures will present to the student the course content and allow for questions. The material will be presented using visual aids (i.e. PowerPoint presentation slides, documentaries, etc.). The aim is to familiarize the student with the different and faster pace of presentation and also allow the instructor to present related material that would otherwise be very difficult to do. The learning process will be enhanced with the requirement from the student to carry in-class discussions and tackling of hypothetical scenarios in small-group exercises. A final project, which will be required as part of the students assessment for the course, will allow students the opportunity to carry out independent research, synthesize basic concepts presented in class, as well as hone their writing and presentation skills. Besides from the notes taken by students in class, all of the course material will be made available through the class website which will be available through the University's E-learning platform ("Moodle"). The instructor will be available to students during office hours or by appointment in order to provide necessary guidance.
Assessment methods and criteria:	<ul style="list-style-type: none"> • Assignments 10% • Tests 40% • Final Exam 50%
Language of instruction:	English
Work placement(s):	No