



**Academic Year 2024-2025
Syllabus
Environmental Quality Engineering
6 CFU
Prof. Giulia Costa**

Course Description

The course focuses on some of the key global environmental challenges that our planet is currently facing and on the strategies that are being developed to address them both from a policy/legislative perspective and from a technological one.

The main objective of this course is to provide students with a fundamental understanding of complex environmental problems and of the main legislative and technical measures for mitigating human impacts on the environment. To this aim, the students will be provided with scientific and technical background for understanding and discussing complex environmental issues and possible solutions. In addition, the main aims and contents of international protocols, standards and framework directives, as well as of the main procedures and tools developed to manage and assess environmental impacts related to systems, processes or products will be examined.

Based on the knowledge acquired in the course, the students will be able to form their own opinions on global environmental issues and communicate them effectively.

Teaching Method

The course is carried out mainly through lectures and power point presentations prepared by the instructor. However, the active participation of the students is encouraged through class discussions and group presentations. One or two field visits to water or waste treatment plants may also be planned, if possible and on the basis of the interest of the students. Experts may also be invited to provide lectures on specific topics.

Schedule of Topics

Topic 1	Introduction: overview of environmental sustainability, contamination phenomena in different environmental compartments (air, water and soil), environmental measurements and environmental cycles.
Topic 2	Water quality issue, management and treatment: EU water framework Directive, traditional treatment processes in developed countries and approaches/technologies for the developing world.
Topic 3	Integrated waste management strategies and technologies. Food waste management.
Topic 4	Urban air quality issue and treatment strategies; mitigation strategies for global issues: stratospheric ozone depletion and climate change.
Topic 5	Contaminated sites issue, management and remediation strategies. Case of Brownfield regeneration.
Topic 6	Environmental impact assessment tools (life cycle assessment and environmental footprint).
Topic 7	Environmental quality management tools (environmental management systems, EMAS, Eco-label).

Textbook and Materials

Reading material on each course topic (handouts, reports, scientific papers and links to websites), will be made available to the students by the course instructor during the course and distributed also to students who are not in position to attend the course.

Main textbook (not to be purchased): “Environmental Engineering: Fundamentals, Sustainability, Design” by Mihelcic and Zimmerman, Wiley, 2014.

Assessment

Assessment will be carried out through a written exam, an oral discussion and a group presentation prepared on a topic selected together with the course instructor. In order to pass the exam each student will have to attain a sufficient grade in all three types of examination. The final grade will be based on the grades of the three types of examination as follows: written exam (50%), oral discussion (25%) and group presentation (25%). Students who do not pass one/more parts or reject the mark of one/more parts will be assessed on the final written and oral exams.

During the course, two written midterm exams will be carried out; tentatively, the first will regard topics 1 to 3 and the second topics 4 to 7. The grade of the written exam will be calculated as the average of the grades obtained in the midterms. The grades of each midterm will have to be sufficient in order to pass the written exam.

Students that do not take or fail one or more of the mid-term exams will take the final written exam regarding the entire course program, scheduled during the winter session and in the September session.

The written midterms and final written exam will consist of 11 multiple choice or open ended questions and each test will have a duration of 2 hours.

The oral discussion will be held after the written exam and will consist in a discussion of the written exam and include 1 or 2 questions on the course program. Students with a high class attendance (>80%) that are also attentive and actively participate to the lessons may be exempted from the oral discussion.

As for the group presentation, the class will be divided in groups of 3-4 students that will each select together with the course instructor a topic to study and prepare a Power Point presentation on. The presentations prepared by each group will be given by the students in front of the whole class in an event that will be scheduled at the end of the course, or during the course.

Students will be able to keep the results of intermediate tests only if they complete the exam within the winter exam session, otherwise the whole exam will have to be redone in another session.

The exam for non-attending students (more than 20% of absences) consists in the final written exam regarding the entire course program (50% of the final grade), followed by the oral discussion (25% of the final grade) and presentation on a topic selected together with the course instructor (25% of the final grade). The exam will take place during the winter session (2 dates in January/February 2024) or in the September 2024 session.

Office hours

Monday-Friday 10 A.M.-6 P.M. (upon appointment by e-mail).

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NOTE: If you are an Erasmus or a non Global Governance student who would like to attend one or more courses in the Global Governance programme, please be aware that, **before enrolling in the course**, you should have read the code of conduct and the procedural rules characterizing our programme. We assume that, if you enroll in the course, **you have read and accepted all Global Governance values and rules**. Notice that attendance is expected from the very first lesson and you need to attend at least 80% of the course to be considered an attending student.

Description of the methods and criteria for testing learning

The examination assesses the student's overall preparation, ability to integrate the knowledge of the different parts of the programme, consequentiality of reasoning, analytical ability and autonomy of judgement. In addition, language property and clarity of presentation are assessed, in accordance with the Dublin descriptors (1. knowledge and understanding; 2. applying knowledge and understanding; 3. making judgements; 4. learning skills; 5. communication skills).

The final grade will be related 70% to the degree of knowledge and 30% to the expressive capacity (written and oral) and autonomous critical judgement demonstrated by the student.

The examination will be graded according to the following criteria:

Unsuitable: important deficiencies and/or inaccuracies in the knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalisations and limited critical and judgement skills; the topics are exposed in an incoherent manner and with inappropriate language.

18-20: barely sufficient knowledge and understanding of the topics, with possible generalisations and imperfections; sufficient capacity for analysis, synthesis and autonomy of judgement; the topics are frequently exposed in an inconsistent manner and with inappropriate/technical language;

21-23: surface knowledge and understanding of the topics; ability to analyse and synthesise correctly with sufficiently coherent logical argumentation and appropriate/technical language.

24-26: fair knowledge and understanding of the topics; good analytical and synthetic skills with rigorously expressed arguments but not always appropriate/technical language.

27-29: complete knowledge and understanding of the topics; considerable capacity for analysis and synthesis. Good autonomy of judgement. Arguments presented in a rigorous manner and with appropriate/technical language.

30-30L: very good level of knowledge and thorough understanding of topics. Excellent analytical and synthetic skills and independent judgement. Arguments expressed in an original manner and in appropriate technical language.
