Main course information	
Academic subject	Environmental Biotechnologies *(i.c.)*
Degree course	Environmental Biology
Degree class	LM/6
ECTS credits (CFU)	5
Compulsory attendance	yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Francesco Bruni
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Tel.	+39 080 5443471
Tutorial time/day	Monday-Friday, 9 am-5 pm (prior contact by e-mail)

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	BIO/11	Lecture/workshop

Teaching schedule	Year	Semester
	I	II

Lesson type	CFU/ECTS	Lessons (hours)	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
	4	32	1	12	0	0	0	0

Time management	Total hours	Teaching hours	Self-study hours
	125	44	81

Academic Calendar	First lesson	Final lesson

Syllabus	
Course entry requirements	Molecular Biology knowledge including biomolecular techniques and recombinant DNA technology, gained during the Bachelor degree.
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
Knowledge and understanding	Learning molecular technologies to study the effect of environmental pollutants and cognition of the theoretical aspects underlying these approaches. Understanding the molecular mechanisms that could alter the human genome.
Applying knowledge and understanding	Application of biomolecular methodologies aimed at studying the biodiversity and rescuing cellular damage following the exposure to environmental pollutants.
Making informed judgements and choices	Acquisition of autonomy to analyse experimental data about the mutational effect of pollutants on the human genome.
Communicating knowledge and understanding	Appropriate use of the Molecular Biology jargon.
Capacities to continue learning	Capabilities of applying molecular biotechnologies to the environmental field.

Syllabus	
Course content	Mutations. Epigenetic effects of environmental pollutants. Metabolism of xenobiotics. Biomonitoring and biological markers. Bioremediation. Recombinant DNA: biotechnological applications. Environmental applications of NGS platforms.
Course books/Bibliography	Mutagenesi ambientale - Migliore (Ed. Zanichelli). Biologia molecolare - Amaldi, Benedetti, Pesole, Plevani (Ed. Casa Editrice Ambrosiana). Dai geni ai genomi - Dale, von Schantz (Ed. Zanichelli). Fondamenti di Biologia Molecolare - Allison (Ed. Zanichelli). Biotecnologia molecolare - Glick, Pasternak (Ed. Zanichelli).
Notes	Lectures (PDF format) are available for educational support.
Teaching methods	Lecture with PPT presentation and video support. Use of specific instruments and reagents for lab modules.
Assessment methods (indicate at least the type written, oral, other)	Oral exam with support of diagrams/graphics (when required).
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are	Both learning the basics and understanding of biomolecular approaches are ascertained. Acquisition of links between the various contents, traced and highlighted during the lectures, is considered particularly important. Partial exposure of the topics (e.g., simple description of a technique without knowing how to apply it) will be assessed as medium or low level. Ideally, the student should be able to describe environmental issues caused at molecular level by pollutants, proposing appropriate technologies and methods of prevention/resolution, as illustrated during the course (high level).
Further information	