



GENETIC ENGINEERING	
Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/18 (GENETICS)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	2nd semester (01/03/2022 - 14/06/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	FERRETTI LUCA (titolare) - 6 ECTS
Prerequisites	In consideration of the topics covered by the course it is mandatory to have a good knowledge of Molecular Biology, Biochemistry, Genetics and Chemistry.
Learning outcomes	<p>The course aims to present a detailed overview of the recombinant DNA technology from the the cloning and production of recombinant proteins in bacterial and eukaryotic systems to the analysis of novel and emerging techniques, such as genome editing. Examples of the application of recombinant DNA technology will be presented in the fields of research, bio-medicine, agriculture, livestock, forensics and archeology.</p> <p>The aim of the course is to provide students with the specific knowledge and ability to understand and perform standard recombinant DNA laboratory experiments. Moreover, at the end of the course students will be able to correctly evaluate and discuss the growing impact that</p>

	recombinant DNA technology is having on multiple aspects of our social life.
Course contents	The isolation and analysis of nucleic acids. The enzymes of recombinant DNA technology. The molecular cloning concept. Cloning vectors for prokaryotes and eukaryotes. PCR and cloning. Real Time PCR. DNA libraries: types, construction and uses. The selection of cloned DNA. The isolation of genes and the study of their function. Prokaryotic and eukaryotic host/vector systems for the overproduction of recombinant proteins. DNA mutagenesis and protein engineering. Molecular Pharming. Application of recombinant DNA in biomedicine, agriculture, livestock, and forensic sciences . Genome editing.
Teaching methods	Lessons with the projection and comment of slides and visualization of videos and animations from specialized web sites. Given the rapid changes in recombinant DNA technology scientific articles and reviews might be used to have an updated picture of selected topics. All the slides and materials used in classes will be published on the course web site through Kiro, the e-learning platform of the University of Pavia.
Reccomended or required readings	The course reference textbook is Gene Cloning and DNA Analysis: an Introduction by T.A. Brown, 7th ed. Wiley and Sons, 2016. Some arguments will be taken from “Molecular Biotechnology” by B.R. Glick e C.L. Patten, 7th editionASM Press 2017, but in that case following the lessons and studying the materials posted on the course web site on the e-learning platform Kiro, will be enough for the final exam. A useful textbook, more oriented on the technical aspects of recombinant DNA procedures is Tecniche e Metodi per la Biologia Molecolare byi Francesco Amaldi, Piero Benedetti, Graziano Pesole, Paolo Plevani, 2020 CEA (in italian though)
Assessment methods	Written final exam on the arguments covered by the course, with multiple choice questions, and open questions. There will be neither home assignments nor tests during the classes period.
Further information	Contact information: Prof. Luca Ferretti, Department of Biology and Biotechnology, via Ferrata 9, Pavia. E-mail: luca.ferretti@unipv.it; Tel. 0382 985551. For an appointment contact via E-mail.
Sustainable development goals - Agenda 2030	Some of the topics covered in this course are in line with the 2030 Agenda for Sustainable Development, with Goals 2 (2.5) - Maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species; 3 (3.b) Support the research and development of vaccines and medicines; 15 - Halt biodiversity loss. \$lbl legenda sviluppo sostenibile