UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Practical Course in Molecular Biology

2021-2-E0201Q052-E0201Q064M

Aims

The course aims at providig students with skills in basic molecular biology techniques.
Students attending the LTA-Molecular Biology practical are expected to achieve the following objectives:
Knowledge and understanding.
Consolidate and deepen basic knowledge (theoretical, technical and methodological) in the field of DNA manipulation techniques.
Applying knowledge and understanding.
Correctly interpret the experimental protocols and recognize their relevant aspects; carry out the proposed experimental protocols in compliance with good laboratory practices and safety standards; collect and process experimental data.
Making judgements.
Recognize the experimental design, consider its critical points; critically evaluate the results obtained; recognize the contexts of application of the experimental methods carried out.
Communication skills.
Re-elaborate experimental data, effectively describe experimental procedures and results, using an appropriate technical vocabulary.
Learning skills.
Correctly interpret experimental protocols similar to those practically performed, whose application is required in different and more complex contexts.

Contents

Some basic molecular biology techniques are the topic of this practical course. Laboratory experiences will be preceded by brief references to the theoretical principles and by detailed descriptions of the proposed procedures. The techniques considered concern the analysis, purification, characterization and manipulation of nucleic acids.

Detailed program

Molecular biology experiments are addressed in this module. The experiments are preceded by an adequate introduction of experimental procedures on instruments and reagents to be used. The experiments are followed by the discussion of the data obtained and of the possible applications of each technique.

The following procedures will be presented:

- nuclei acid analysis: spectrophotometry and definition of absorption spectrum, DNA dosage, intercalating dyes, electrophoresis on agarose gel;

- recombinant DNA technologies: preparation of DNA fragments by digestion with restriction enzymes or by polymerase chain reaction (PCR), ligation of a DNA into a vector for subcloning purposes and Escherichia coli transformation;

- amplification, purification and characterization of DNA molecules: recombinant plasmidic DNA extraction methods from E. coli clones and its characterization by restriction analysis followed by electrophoresis on agarose gel;

- in-silico analysis of DNA molecules by simple bioinformatics tools and planning of a subcloning strategy.

Prerequisites

Background: none.
Specific prerequisites: none.
General prerequisites: Students can take the exams of the second year after passing the examinations of Institutions of Biology, General and Inorganic Chemistry, Mathematics, and Foreign Language.

Teaching form

Each learning unit is addressed through practical lessons which are carried out in a teaching laboratory. At the beginning of each lesson, theory, aims and experimental design will be exposed. At the end of each module, an overall discussion of collected results may take place in a different classroom. For further details, please, refer to lesson calendar on the website of Biotechnology program.
Teaching language: italian.

In case an emergency should be present for Covid-19 pandemy, only some of the learning units will consist in practical lessons with small groups of students, according to the law prescriptions. The remaining topics will be developped with syncronous/asyncronous lectures. Material will be suggested which illustrate the practical aspects of the experiments.

Textbook and teaching resource

Learning material (slides of introductory lessons, handout, experimental data) is available at the e-learning platform of LTA-Molecular Biology module.

Semester

Second semester

Assessment method

Two-hour written examination, consisting of 5-6 exercices of the types addressed during the course. In case of sanitary emergency, the exam will be carried on by e-learning platform.

Office hours

Contact: on demand, upon request by mail to lecturers.