

Course Specifications

From the academic year 2017-2018 up to and including the

Molecular Techniques and their Application in Evolutionary and Ecological Studies (C002931)

Course size (nominal values; actual values may depend on programme)

Credits	3.0	Study time	90 h	Contact hrs	30.0 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	lecture	10.0 h
		practicum	20.0 h

Lecturers in academic year 2018-2019

De Clerck, Olivier	WE11	lecturer-in-charge
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Offered in the following programmes in 2018-2019

International Master of Science in Marine Biodiversity and Conservation	crdts	offering
	3	A

Teaching languages

English

Keywords

molecular evolution, genetics, sampling, techniques

Position of the course

This course offers an overview of the commonly used molecular techniques and analyses in phylogenetic, biogeographic and ecological research which aims to assess genetic diversity and reconstruct evolutionary or ecological relationships between organisms or entire communities.

Contents

Following a general overview of the basic principles of molecular evolution, commonly used molecular techniques will be discussed in detail. Techniques are approached from a theoretical as well as utilitarian perspective and the various applications will be evaluated. The following techniques and their respective analytical methods will be covered: Project design, sampling and storage of tissue, isozyme electrophoresis, DNA-DNA hybridization, DNA and RNA extraction, primer design and amplification (PCR), Sequencing, Amplified Length Polymorphism (AFLP), Restriction Fragment Length Polymorphism (RFLP), quantitative realtime PCR (qPCR), Denaturing Gradients Gel Electrophoresis (DGGE), clone libraries, amplification and applications of microsatellites. Newly developed technologies involving high throughput sequencing (RNA-seq, RAD-seq, Pool-seq) will be discussed from a theoretical perspective and their integration in ecological-evolutionary studies will be discussed. By means of practical exercises and lab work students will familiarize themselves with the various techniques.

Initial competences

Basic principles of genetics and cellbiology. Elementary knowledge of evolution as well as heredity is an advantage.

Final competences

Acquisition of a practical as well as theoretical understanding of the various molecular methodologies and analysis techniques, which are commonly used to infer relationships in evolutionary and ecological studies.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum

Learning materials and price

PDF files of powerpoint presentations summarizing the oral lectures will be available through Minerva. Cost: 0 EUR

References

Avise, J.C. 2004. Molecular markers, natural history and evolution. 2nd edition. Sinauer.
Weising K. 2005. DNA Fingerprinting in plants. Principles methods and applications. Taylor & Francis.

Course content-related study coaching

Opportunity for questioning the lecturers during the orals, and outside these via email, personal contact and in an electronic teaching environment.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Oral examination

Examination methods in case of periodic evaluation during the second examination period

Oral examination

Examination methods in case of permanent evaluation

Participation

Possibilities of retake in case of permanent evaluation

not applicable

Calculation of the examination mark

The final mark is based on the score during the oral exam (75%) and the participation during the practical exercises (25%).