Course Information Sheet

University: *University of Prešov in Prešov*	
Faculty: *Faculty of humanities and natural sciences*	
Code: *2EKO/MOLEK/22*	**Title of Course: Molecular Ecology**
Form of Study: *Lectures, practical lessons* **Number of contact hours:** *2 hours lectures/1 hour practical lesson per week* **per week:** *2/1* **per level/semester:** *20 lectures, 10 practical lessons, 90 hours of self-study*	
Number of credits: *4*	
Semester: *2nd year/winter semester*	
Degree/Level: *2. (master) degree*	
Prerequisities: -	
Grading Policy (Assessment/Evaluation): *ongoing evaluation, active participation in lectures and laboratory practices* *credit evaluated based on final test:* *a) A - 100,00 – 90,00 %* *b) B - 89,99 – 80,00 %* *c) C - 79,99 – 70,00 %* *d) D - 69,99 – 60,00 %* *e) E - 59,99 – 50,00 %* *f) FX - 49,99 and less %*	
Aims and Objectives: *After completing the course, the student understands the relationship between biology and ecology at the molecular level. Understands the mechanisms that lead to the differentiation of populations at the genetic level. Understands the use of molecular markers in population ecological studies. Knows the basic procedures of DNA isolation, sequencing. The student has theoretical and practical knowledge of basic molecular techniques used in current practice.*	
Syllabus/Indicative Content: *1. Molecular taxonomy and ecology - principles of the study* *2. Use of molecular methods in ecology, taxonomy and population biology* *3. Genes most often applied in molecular ecology, Ribosomal genes - structure, properties, Ribosomal spacers and intragenomic homologous copies of spacers, Large and small ribosomal subunit - use for phylogenetic analyzes.* *4. Mitochondrial DNA - structure, function, use, mtDNA applications for biogeography and phylogeography, microsatellites - structure, properties, use. Microsatellite design* *5. DNA isolation, methodical principle, methods of DNA and RNA isolation, Practical exercise - DNA isolation of microscopic biota (zooplankton) and from vertebrate tissues (e.g. fish)* *6. Gel visualization of DNA, electrophoretic separation* *7. PCR method, methodical principle, use, Principle of PCR diagnostics, Practical exercise - PCR method* *8. Sequencing, the principle of Sanger sequencing* *9. Next Generation Sequencing, Sequence analysis, working with data in the gene bank, sequence search, methods of their analysis* *10. Methodical principle and examples of the use of other molecular-ecological methods* *11. Hybridization methods, HRM, High Resolution Melting, RLB, Reverse Line Blot* *12. FISH, Fluorescent in Situ Hybridization;* *13. Applications of molecular methods in taxonomic and population study, Working with DNA sequence database (NCBI GenBank)*	
Suggested readings: *AGHOVÁ T., BENDA P., ET AL. (2019): Metodika správy a evidence tkáňové zoologické sbírky a determinace zoologického sbírkového materiálu na základě analýzy DNA. Národní muzeum, Praha, 111 pp.* *PORÁČOVÁ J., ŠUTIAKOVÁ, I. (2006) Základy genetiky : pre študentov vysokých škôl prírodovedného zamerania. Prešovská univerzita, Fakulta humanitných a prírodných vied (Prešov), ISBN80-8068-455-*	

3ID, 1, 267 s.
FLEGR J. 2009. Evoluční biologie. Academia, Praha.
J.R. FREELAND, S.D. PETERSEN, H. KIRK. 2011. Molecular ecology. Wiley Blackwell. 464 pp.
ŠMARDA ET AL. (2005) Metody molekulární biologie. Masaryková univerzita Brno, 188 pp.
ZIMA ET AL. (2004) Genetické metody v zoologii, 240 pp.

Language of Instruction:
Slovak

Other course information:

Grading history

A	B	C	D	E	FX
a	b	c	d	e	f

Uvádza sa percentuálny podiel hodnotených študentov, ktorí získali po zapísaní predmetu hodnotenie A, B, ... FX. Celkový súčet a, b, c, d, e, f je 100. Ak študent v jednom roku získal FX a po ďalšom zapísaní predmetu hodnotenie D, zohľadnia sa obe jeho hodnotenia.

Lecturer/Instructor:
Ing. Lenka Bobuľská, PhD.
PaedDr. Jakub Fedorčák, PhD.
RNDr. Beáta Baranová, PhD.
RNDr. Michal Rendoš, PhD.
RNDr. Radoslav Smoľák, PhD.

Last update: 9. mája 2022

Approved by: