Course description

Department/Unit /	KBE / WPMMB			**Academic Year**	2019/2020	
Title	Advanced course of molecular biology			**Type of completion**	Exam	
Accredited/Credits	Yes, 6 Cred.			**Type of completion**	Combined	
Number of hours	Lecture 8 [Hours/Semester] Tutorial 24 [Hours/Semester]					
Occ/max	Status A	Status B	Status C	**Course credit prior to**	NO	
Summer semester	0 / 0	0 / -	0 / 0	**Counted into average**	NO	
Winter semester	0 / 0	0 / 0	0 / 0	**Min. (B+C) students**	not determined	
Timetable	Yes			**Repeated registration**	NO	
Language of instruction	English			**Semester taught**	Winter, Summer	
Optional course	Yes			**Internship duration**	0	
Evaluation scale	S|N					
Hrs. in comb. stud.						
Auto acc. of credit	No					
Periodicity						
Substituted course	KBE/WAMOB					
Preclusive courses	N/A					
Prerequisite courses	N/A					
Informally recommended courses	N/A					
Courses depending on this Course	N/A					

Course objectives:

Course is designed to introduce students to both modern and traditional methods of molecular biology and extend their knowledge, they gained in previous courses. Students will learn to apply their knowledge for solving problems in primary and applied research.

Requirements on student

The course will be successfully finished if all the following conditions are met:
- participation in lab practice
- submit the lab protocols
- pass the control tests (at least 60 % success)

Content

Lectures:
1. Quantitative and digital PCR
2. Restriction endonucleases and molecular cloning
3. Mutagenesis, DNA damage, DNA repair

Laboratory practices:
1. Quantitative PCR I
2. Quantitative PCR II
3. Detection of DNA quadruplexes using PAGE
4. Detection of DNA damage caused by chemical agents
5. Restriction endonucleases
6. Seminar

Fields of study

Guarantors and lecturers

- **Guarantors:** Doc. RNDr. Petr Pečinka, Ph.D.
- **Lecturer:** Mgr. Jiří Červeň, Doc. RNDr. Petr Pečinka, Ph.D.
- **Tutorial lecturer:** Mgr. Jiří Červeň, Doc. RNDr. Petr Pečinka, Ph.D.

Literature

- **Basic:** Kneale G. G. *DNA-protein interactions: principles and protocols*. Humana Press Inc., New Jersey, 1994.
- **Basic:** Sambrook J. - Russell D. W. *Molecular Cloning: A laboratory manual 1-3*. New York: Cold Spring Harbor, 2001. ISBN 0-87969-577-3.
- **Basic:** Janson J.-C. *Protein purification: principles, high resolution methods, and applications. 3rd edition*. J. Wiley & Sons, New Jersey, 2011.
- **Recommended:** Friedberg, E. C., Walker, G. C., Siede, W., Wood, R. D., Schultz, R. A. & Ellenberger, T. *DNA Repair and Mutagenesis*. ASM Press, 2. vydání, 2006.

Time requirements

All forms of study

Activities	Time requirements for activity [h]
Being present in classes	32
Consultation of work with the teacher/tutor (incl. electronic)	10
Preparation for an exam	40
Self-tutoring	40
Continuous tasks completion (incl. correspondence tasks)	30
Total:	**152**

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

IC8 - Didactic test

IIA2 - Report/Record from laboratory and field exercise

prerequisite

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

Before study of the course, students:
- know principles and is able to practicaly perform basic molecular-biological methods (Gel electrophoresis, PCR)
- know principles of gene expression and its regulation

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

A1 - Lecture

A4 - Interview (asking questions when encoding and repeating the subject matter)

C4 - Instruction

D3 - Practice and creation of technical and working skills

D9 - Experiment

learning outcomes

Skills - skills resulting from the course:

After a successful completion of the course, students:
- are able to perform advanced molecular biological methods (qPCR, gene cloning)
- are able to analyze their results in context of conterporary molecular biological research
- are able to present results of their work in molecular biological laboratory

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Biology	Bachelor	Full-time	Experimentální biologie	1	2018	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Systematická biologie a ekologie	1	2018	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Biology with Other Degree Specialization	1	2013	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Experimental Biology	1	2	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Experimental Biology	1	2016	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Systematic Biology and Ecology	1	2012	2019	Povinně volitelné předměty	B		
Biology	Bachelor	Full-time	Systematic Biology and Ecology	1	2017	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Experimental Biology	1	2017	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Experimental Biology	1	2	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Systematic Biology and Ecology	1	2017	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Systematic Biology and Ecology	1	2012	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Teaching for Secondary Schools - Biology, Didactic Specializations	1	2014	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Teaching for Secondary Schools - Biology, Didactic Specializations	1	2015	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Teaching for Secondary Schools - Single-Specialization Biology	1	2015	2019	Povinně volitelné předměty	B		
Biology	Postgraduate Master	Full-time	Teaching for Secondary Schools - Single-Specialization Biology	1	2014	2019	Povinně volitelné předměty	B		
Chemistry	Bachelor	Full-time	Biology with Other Degree Specialization	1	2013	2019	Povinně volitelné předměty	B		
Chemistry	Postgraduate Master	Full-time	Biologie se zaměřením na ekologii a biodiverzitu	1	7 - 2017	2019	Povinně volitelné předměty	B		

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Chemistry	Postgraduate Master	Full-time	Experimentální biologie	1	7 - 2017	2019	Povinně volitelné předměty	B		
Chemistry	Postgraduate Master	Full-time	Teaching for Secondary Schools - Biology, Didactic Specializations	1	2014	2019	Povinně volitelné předměty	B		
Chemistry	Postgraduate Master	Full-time	Teaching for Secondary Schools - Biology, Didactic Specializations	1	2015	2019	Povinně volitelné předměty	B		
Physics	Bachelor	Full-time	Biology with Other Degree Specialization	1	2013	2019	Povinně volitelné předměty	B		