

Course code:	HOEARBT
Course title in language of instruction:	HOE Applied Plant Biotechnology
Course title in Czech:	HOE Aplikované rostlinné biotechnologie
Course title in English:	HOE Applied Plant Biotechnology
Mode of completion and number of credits:	Exam (6 credits) (1 ECTS credit = 28 hours of workload)
Mode of delivery/Timetabled classes:	full-time, 2/2 (full-time, hours of lectures per week / hours of seminars per week)
Language of instruction:	English
Level of course:	master; master continuing
Semester:	SS 2016/2017 - FH
Name of lecturer:	doc. Mgr. Miroslav Baránek, Ph.D. (supervisor) Ing. Kateřina Baránková, Ph.D. (instructor, lecturer) Ing. Aleš Eichmeier, Ph.D. (instructor, lecturer) Ing. Eliška Kadlecová (instructor, lecturer) Ing. Eva Ondrušiková, CSc. (instructor, lecturer) Ing. Jakub Pečenka (instructor, lecturer) Mgr. Jana Raddová, Ph.D. (instructor, lecturer)
Prerequisites:	none
Aims of the course:	Main goal of this subject is to acquaint students with practical applications of plant biotechnology methods and their use in plant growing practice. On the base of conveniently selected laboratory exercises students will handle experiments based on up to date principles (restriction enzymes, PCR, Real Time PCR, reverse transcription, in vitro multiplication, in vitro tehrmotherapy ...).
Course contents:	<ol style="list-style-type: none"> 1. Classical breeding methods (allowance 2/2) 2. The main trends in the utilization of biotechnology in horticulture, the relationship of biotechnology and classical breeding (allowance 2/2) 3. Methods of molecular genetics not manipulating the genetic information of studied organism (allowance 12/32) <ol style="list-style-type: none"> a. Isolation of DNA from plant tissues b. Polymerase chain reaction (PCR) and its preparation c. The molecular genetic methods based on fragmentation analysis d. Use of DNA markers for assessment of genetic relatedness e. Use of SSR markers in identifying varieties f. Use of Real Time PCR for quantification of GMO material in an unknown sample g. The use of molecular genetics in identifying of viral pathogens h. Sequencing DNA; public databases within molecular biology studies 4. Genetic manipulations to improve the performance of plants (allowance 2/0) 5. Tissue culture and their use (allowance 10/16) <ol style="list-style-type: none"> a. Elimination of viral pathogens using in vitro, legislation b. Isolation of meristem , meristem culture , micrografting c. The use of in vitro techniques in plant breeding (in vitro selection , somaclonal variation , genetic manipulation) d. Micropropagation of horticultural plant species 6. Excursion in the privat biotechnological company (allowance 0/4)

Learning outcomes and competences:**Generic competences:**

- ability to apply knowledge
- ability to create new ideas (creativity)
- ability to work independently
- science and research skills
- work in team

Specific competences:

- Application skills of professional knowledge
- Higher professional knowledge
- Students will learn the principles of operation of instruments and techniques covered in of plant biotechnology

Type of course unit:

required

Year of study:

Not applicable - the subject could be chosen at anytime during the course of the programme.

Work placement:

There is no compulsory work placement in the course unit.

Recommended study modules:

none

Assessment methods:

complete set of prepared laboratory reports, oral exam

Learning activities and study load (hours of study load)

Type of teaching method	Daily attendance
Direct teaching	
lecture	28 h
practice	28 h
laboratory work	56 h
consultation	6 h
public presentation (oral)	2 h
Self-study	
preparation for exam	26 h
preparation of presentation	12 h
elaboration of reports	10 h
Total	168 h

Basic reading list

- BARÁNEK, M. -- MORAVCOVÁ, K. -- PIDRA, M. *Biotechnologie v zahradnictví - návody pro praktická cvičení*. ediční středisko MZLU v Brně: Mendelova zemědělská a lesnická univerzita v Brně, 2006. 47 p. ISBN 80-7157-937-8.
- ROSYPAL, S. *Úvod do molekulární biologie*. Brno: Stanislav Rosypal, Brno, 2002. 1199 p. ISBN 80-902562-1-X.
- ROSYPAL, S. *Úvod do molekulární biologie*. ISBN 80-902562-2-8.
- GRAY, D J. *Plant development and biotechnology*. Boca Raton: CRC Press, 2005. 358 p. ISBN 0-8493-1614-6.
- TRIGIANO, R. *Plant Tissue Culture Concepts and Laboratory Exercises*. USA, Florida: CRS press, 1996. 564 p. ISBN 0-8493-9409-0.