

Subject Area: Advanced Methods in Biotechnology and Biodiversity

Subject: Plant functional genomics

Level: III-PhD

Year: I-III

Semester: 1-2

Speciality: N/A

Status:

ECTS: 3

Department(s): Department of Genetics

Cooperating Department: n/a

Form of teaching (Number of hours; Form of assessment: Exam or Credit)

Lectures

Seminars/Conversatoria

Practicals

Total

4 h

N/A

26 h

30 h

Staff:

SUBJECT COORDINATOR: Agnieszka Janiak PhD

LECTURE/CONVERSATORIA: Mirosław Kwaśniewski PhD, Agnieszka Janiak PhD

PRACTICALS: Damian Gruszka PhD, Agnieszka Janiak PhD, Mirosław Kwaśniewski PhD

Contents:

LECTURES:

Application of qPCR and microarrays in gene expression analysis, application of TILLING in new alleles discovery.

PRACTICALS:

Tilling method in allele discovery, gene sequencing and gene sequence analysis, *in silico* translation and evaluation of the effect of identified mutation on protein domain structure, the use of insertional lines and lines over-expressing selected genes in gene function analysis, gene expression analysis with use of Quantitative Real-Time PCR, the use of microarray method for the evaluation of differences in transcriptomes of mutants and their parent forms.

Methods and forms of teaching:

Lectures with use of computer presentations to illustrate the discussed processes.

Laboratory practical carried out according to manuals.

Requirements:

Basic knowledge of principles of genetics, genetic analysis, biochemistry and molecular biology.

Literature (maximum 5, preferably recent sources, all in English):

1. Bagge M, Xia X, Lübberstedt T. 2007. Functional markers in wheat. *Curr Opin Plant Biol.* 10(2): 211-6
2. Grotewold E. 2004. *Plant functional genomics: Methods and Protocols.* Humana Press, Totowa, New Jersey, pp. 472
3. Allison DB, Page GP, Beasley TM, Edwards JW. 2006. DNA Microarrays and related genomics techniques. Design, analysis and Interpretation of experiments. Chapman and Hall/CRC, Boca Raton, pp. 371
4. Shimkets RA. 2004. *Gene expression profiling. Methods and protocols.* Humana Press, Totowa, New Jersey, pp. 165
5. Wong ML, Medrano JF. 2005. Real-time PCR for mRNA quantitation. *Biotechniques.* 39 (1): 75-85.