

Advanced Agricultural Biotechnology

STRUCTURE

Study program / Qualification	Biotechnology and Entrepreneurship
Study year	I
Semester	II
Study subject regime	DOA
Total number of hours per week	Curs - 2ore; L/S/P-2ore
Total number of hours according to the curriculum	Curs - 28ore; L/S/P-28ore
Number of credits	8

STUDY SUBJECT OBJECTIVES

General objective of the study subject: To provide knowledge related to concepts, methods and tools employed to understand and manipulate the organisms (microorganisms, plants) to increase the production or processing of agricultural products.

Specific objectives:

1. To develop student's capacity to provide the required amount of quality food for the world's growing population using environmentally friendly technologies.
2. To provide the know-how development of new plant products, such as e.g. functional foods, pharmacologically active substances and new industrial raw materials for the market.
3. To develop the knowledge/competences in using different crops for non-food products (biofuels).

STUDY SUBJECT CONTENT

Course	Remarks on the hours
Introduction in Agricultural Biotechnology/Green Biotechnology	2
Basic techniques and tools in Plant Tissue Culture.	4
Genetic engineering for increasing crop productivity, and improve biotic and abiotic stress tolerance	4
Genetic engineering for quality improvement of plant production	4
New techniques for improvement of plant properties (genome editing, gene silencing etc)	2
New biopesticides/biostimulators for plant protection in ecological agriculture	4
Development of products for animal nutrition	2
New valorization pathways of macromycetes (food and pharmaceutical applications)	2
New insights in bioenergy producing; utilization of plant biomass by microorganisms	4

Laboratory /Seminar/ Project	Remarks on the hours
Basic techniques and tools in Plant Beneficial Microorganisms.	2
Screening for plant beneficial microorganisms useful as biofertilizers	2
Screening for plant beneficial microorganisms useful as biostimulants	2
Screening for plant beneficial microorganisms useful as biopesticides to control plant pathogens	2
Screening for plant beneficial microorganisms useful as biopesticides for pests' control	2
Screening for plant beneficial microorganisms useful as biopesticides to control weeds	2
Basic techniques and tools for evaluating plant interaction with selected beneficial microorganisms.	2
Microbial micro-scale growing techniques to obtain the starter cultures	2
Microbial bioproducts formulation	2
Case studies	10

BIBLIOGRAPHY

1. Jaronski Stefan T., 2014. Mass Production of Entomopathogenic Fungi: State of the Art. *In*: Mass Production of Beneficial Organisms. Elsevier Inc. <http://dx.doi.org/10.1016/B978-0-12-391453-8.00011-X>
2. Moshelion, M., Altman A. (2015). Current challenges and future perspectives of plant and agricultural biotechnology. Trends in Biotechnology 33: 1-6 (Invited Opinion Review).
3. Parrington John, 2016, Redesigning Life: How genome editing will transform the world, Oxford University Press
4. Poltronieri P., Burbulis N., Fogher C., 2013, From plant genomics to plant biotechnology, Woodhead Publishing Limited
5. [Reddy](#) Parvatha P., 2016, Sustainable Crop Protection under Protected Cultivation, Springer International Publishing Switzerland
6. **FNCA Biofertilizer Project Group, 2006. Biofertilizer Manual. Japan Atomic Industrial Forum. ISBN4-88911-301-0 C0550

EVALUATION

Activity type	Evaluation criteria	Evaluation methods	Share in the final grade (%)
Course	Individual performance (level of acquired theoretical knowledge)	Written examination	50%
L/P/S	Performance within team Individual performance	Current observation Case studies	50%
Other activities	-	-	-

Course titular's signature: Lecturer dr. Boiu-Sicuia Oana-Alina

Seminar / laboratory titular's signature: Lecturer dr. Boiu-Sicuia Oana-Alina