COURSE OUTLINE

1. GENERAL INFORMATION

FACULTY/SCHOOL	SCHOOL OF PLANT SCIENCE		
DEPARTMENT	CROP SCIENCE		
LEVEL OF STUDY	*Undergraduate*		
COURSE UNIT CODE	290	**Semester:**	9th Crop Sciense,
COURSE TITLE	**Breeding field crops**		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHNG HOURS**	**ECTS**
	Lectures	3	3
	Laboratory Exersices	2	2
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	Specialty (Agronomy, Plant Breeding, Biometry & Meteorology)		
PREREQUISITE COURSES:	Genetics		
LANGUAGE OF INSTRUCTION:	Greek (and English if required)		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

The aim of this course is the students become familiar with plant breeding methods of selected representative field crops such as wheat, barley, corn, sugar beet, potato, cotton, so following graduation, they can be able to design and implement breeding programs for developing new cultivars. General information is provided concerning their origin and botanical characteristics, also a description of the target traits for breeding, as well as the appropriate breeding method.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking
……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)
…….

Acquisition of teamwork skills: analysis and synthesis of knowledge, decision making

Data mining using online and library-based recourses.

Work in an interdisciplinary environment.

Promotion of free creative and inductive thinking

3. COURSE CONTENT

Wheat improvement. Origin and classification. Genetics of wheat. Genetic variability-Genetic Resources. Wheat improvement methods. Wheat hybrids. Knowledge to improve: Performance. Earliness. Resistance to cold, drought, aluminum, pathogens, insects. Breeding for quality traits.

Barley improvement. Origin and Classification. Barley genetics. Botanical features, male sterility. Varieties of barley. Breeding methods.

Corn improvement. Origin and tribes. The genetics of maize. Fertilization of corn. Xenia. Heterozygosity of open pollinated (OP) populations. Population improvement. Varieties - hybrids. Production of improved hybrids. Improvement goals: performance, adaptability, quality

Potato improvement. Origin and classification. Potato genetics. Objectives and methods of improvement. Improvement at haploid and diploid level. Tissue, cell and protoplast culture. Botanical seed. Breeding for abiotic/biotic stressors. Seed production

Cotton improvement. Origin and classification. Genetics of wheat. Floral features. Male sterility. Methods of cotton breeding. The conservation of cotton varieties. The objectives of cotton breeding. The yield in fiber. Resistance to pathogens and insects.

Sugar beet improvement. Origin and classification. Floral features. Monospermia. Polyploidy. Improvement methods. Mass and offspring selection. Production of hybrids. Interspecific hybridization. Objectives: sugar yield, pathogen resistance, earliness. Storage capacity.

4. TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	In-class lecturing
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	Use of online resources and electronic devices. Social media Learning process support by access to e-class asynchronous distance learning platform
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.*	

Activity/ Method	Semester workload
Lectures	39
Laboratory practice	26
Individual laboratory project (data processing and commenting)	
Personal study	60
Total of Course (25 hours of workload per ECTS)	***125***

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work,* *other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	**I. Final written exam in the theory of the course** including a combination of 10 short-answer questions, open-ended questions and multiple choice questions. **II. The written examination in the laboratory part of the course** includes 5 short answer, open-ended, problem solving and documentation questions (the ability to apply the principles and mechanisms and the way of approaching and documenting the answer is evaluated).

5. SUGGESTED BIBLIOGRAPHY:

"Principles of plant genetics and breeding" by Acquaah, George._Malden, MA ; Oxford : Blackwell, c2007
"Handbook of crossing technique in cultivated plants" by E. Gouli-Vandinoudi, M. Koutsika-Sotiriou, 2010
"Special Plant Improvement" by P. J. Kaltsikes

Related scientific journal: Crop Science, Molecular Breeding, Euphytica, Transgenic Research, Frontiers in Plant Science, Plants, Agronomy.

6. TEACHERS:

-Theory:

Pinelopi Bebeli, Professor
Vassilis Papasotiropoulos, Professor
Andreas Voloudakis, Assistant Professor
Eleni Tani, Assistant Professor

-Laboratory:

Pinelopi Bebeli, Professor
Vassilis Papasotiropoulos, Professor
Andreas Voloudakis, Assistant Professor
Eleni Tani, Assistant Professor
Anastasios Katsileros, Teaching assistant
Gkoufa Maria, Teaching assistant