General Information	
Academic subject	Plant Genetics
Degree course	Environmental and forest Sciences
Curriculum	Genetics
ECTS credits	4 ECTS Lectures + 2 ECTS Laboratory
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Rosanna Simeone	rosanna.simeone@uniba.it	AGR/07

ECTS credits details	Topic	SSD	Credits
Basic teaching activities	Principal aspects of genetics and biology of agro-forestry plants.	AGR/07	6

Class schedule	
Period	II semester
Year	2017-18
Type of class	Lecture- workshops

Time management	
Hours	150
In-class study hours	60
Out-of-class study hours	90

Academic calendar	
Class begins	5th March, 2018
Class ends	22nd June, 2018

Syllabus	
Prerequisites/requirements	Knowledge of inorganic and organic chemistry and biology
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	○ *Knowledge and understanding* Knowledge on the principal genetic methodologies ○ *Applying knowledge and understanding* Applying and understanding the principal genetic methodologies for agro-forestry species. ○ *Making informed judgments and choices* Capacity of applying the principal genetic methodologies for agro-forestry species. ○ *Communicating knowledge and understanding* Capacity of identifying the principal genetic methodologies for agro-forestry species. ○ *Capacities to continue learning* Capacity of communicate and continue learning the principal genetic methodologies for agro-forestry species.

Contents	**Genetics and the organism.** Chromosomes in prokaryotes and in eukaryotes. Mitosis. Meiosis. Life cycles in organisms of interest for genetic studies. **Mendelian analysis.** Mendel's experiments. Genotype and phenotype. The chromosome theory of heredity. Multiple alleles. Epistatic genes. Statistical analyses. **Linkage and eukaryotic chromosome mapping.** Crossing-over and recombination. Linkage maps. Two point test-crosses. **The genetic material.** The structure of DNA and RNA. Replication of DNA. The chromosome structure. Gene-protein relation-ships. Gene function. **Transcription and translation.** Transcription. Eukaryotic RNA. Mechanism of gene splicing. The genetic code. Translation. **DNA recombinant.** Restriction enzymes. Recombinant DNA methodology. Cloning vectors. Gene libraries. Clone identification. Polymerase chain reaction (PCR). DNA polymorphism. Genetic transformation in forest trees. **Mutations.** Origin of mutations. Gene mutations. Changes in chromosome structure. Aneuploidy. Auto- and allo-polyploidy. Interspecific hybridization in forest trees. **Quantitative genetics.** Qualitative and quantitative characters. Continuous variation. Genetic and environment variation. Heritability. Mapping of quantitative traits in plants. **Population genetics.** Hardy-Weinberg equilibrium. Changes from Hardy-Weinberg equilibrium: migration, mutation selection, inbreeding depression, heterosis. **Introduction to plant breeding.** Racial selection. Selection of plus trees. Half-sib and full-sib selection. Clonal selection. Phenotypic selection. Seed orchard. Seedling seed orchard.
Course program	
Bibliography	• Russel P.J., Wolfe S.L., Hertz P.E., Starr C., McMillan B. 2016. Genetica Agraria. EdiSES S.r.l. Ed. • Lorenzetti F., Ceccarelli S., Rosellini D., Veronesi F. 2011. Genetica agraria. Patron Ed. • Barcaccia G., Falcinelli M. 2005. Genetica e Genomica. Liguori Ed. • Figliuolo G. 2012. Genetica vegetale. Favia Ed. Further readings: • Griffiths A.J. F., Gelbart W. M., Miller J. H., Lewontin R. C. 2004. Genetica moderna. Zanichelli, Vol. I-II. • Chrispeels M. J., Sadava D. E. 2005. Genetica, Biotecnologie e agricoltura sostenibile. Idelson-Gnocchi

	• Notes from classes
Notes	
Teaching methods	Lectures will be presented through PowerPoint and overhead
Assessment methods (indicate at least the type written, oral, other)	A midterm write exam is scheduled for students enrolled to the Course. This exam will test the first half of the course's information in the middle of the semester and the rest of the course's information at the final exam. The final exam will consist on an oral test, as reported in the Guidelines of the Degree of Environmental and Forest Sciences. (art.10) and in the Annex A. The evaluation of the student will be based on established criteria, as explained in the Annex A of the Degree of Environmental and Forest Sciences. The final grade will be an average of both the midterm and final exam. For foreign the exam consists of an oral test with questions related to the course's information.
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.	o *Knowledge and understanding* Knowledge on the principal genetic methodologies o *Applying knowledge and understanding* Applying and understanding the principal genetic methodologies for agro-forestry production o *Making informed judgments and choices* Capacity of apply the principal genetic methodologies for agro-forestry production o *Communicating knowledge and understanding* Capacity of identify the principal genetic methodologies for agro-forestry production o *Capacities to continue learning* Capacity of communicate and continue learning the principal genetic methodologies for agro-forestry production
Official visiting hours.	Monday to Friday, 10.30-13.00 a.m. (Define the appointment by e-mail).