General Information	
Academic subject	Genetic and molecular methodologies (I. C.: Biotechnologies for Food Quality)
Degree course	Master programme: Food Science and Technology
ECTS credits	6 ECTS
Compulsory attendance	No
Teaching language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Agata Gadaleta	agata.gadaleta@uniba.it	AGR/07

ECTS credits details		
Basic teaching activities	4 ECTS Lectures	2 ECTS Laboratory or field classes

Class schedule	
Period	I semester
Course year	Second
Type of class	Lecture and Laboratory

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

Academic calendar	
Class begins	October 1st, 2018
Class ends	January 18th, 2019

Syllabus	
Prerequisites/requirements	Knowledge on genetics , biochemistry, crop and food production
Expected learning outcomes	*Knowledge and understanding* ○ Knowledge on the principal genetic-Molecular methodology *Applying knowledge and understanding* ○ Applying and understanding the principal genetic-molecular methodology for the quality and traceability of crop and food *Making informed judgements and choices* ○ Capacity of apply the principal genetic-molecular methodology for the quality and traceability of crop and food *Communicating knowledge and understanding* ○ Capacity of identify the principal genetic-molecular methodology for the quality and traceability of crop and food *Capacities to continue learning* ○ Capacity of communicate and continue learning the principal genetic-molecular methodology for the quality and traceability of crop and food The expected learning outcomes, in terms of both knowledge and skills, are provided in Annex A of the Academic Regulations of the Master Degree in Food Science and Technology (expressed through the European Descriptors of the qualification)
Contents	**Genomics** . Genome structure in plants, Segregation and linkage of genes. Recombination. Linkage maps. Chromosome mapping. Hybridization in situ. Organization of the genome. Simple sequences and simple sequence repeats. Multigenic families' Comparative genomics Localization of genes and molecular markers. Quantitative trait Loci QTL, analysis, QTL identification.

	Markers in genome analysis. Biochemical markers. Molecular markers. RFLP, SSR, AFLP, SNP markers. Chromosome in situ hybridization. Genome in situ hybridisation to identify alien genes. **Food traceability**. Traceability of food steps production. Rules for food security. Application of biochemical and molecular procedures in food traceability. Traceability of food. Qualitative and quantitative PCR **Advanced molecular analysis and bioinformatics** Sequencing methods: Sanger, Illumina, Solid. Use of bioinformatics tools in traceability analysis. Genetic transformation and gene expression in plants. Application of recombinant DNA methodologies. Agrobacterium method. Direct genetic transformation. Vectors. Main components of plant genes. Promoters. Selectable markers. Gene reporter. Antisense RNA. Production of GMO selectable markers free. **Molecular techniques for analytical control of seeds, plants, and derived products**. PCR, Real Time PCR and microarray in GMO evaluation. Protocols for GMO quantification. Approved GMO in Europe, GMO samples analysis and results description **Regulation of GMO**. GMO, environment and human health. Rules for GMO.
Course program	
Reference books	• Biotecnologie e genomica delle piante. 2014 Idelson-Gnocchi. • Gigliotti C., R. Verga, 2007 Biotecnologie alimentari, Piccin • Notes of the lectures distributed during the course. • Additional readings • Articles on journals related to genetics and biotechnology • Roggi C., G.Turconi, 2007 Igiene degli alimenti e nutrizione umana. La sicurezza alimentare.
Notes	
Teaching methods	Lectures will be presented through Powerpoint and overhead. Lecture notes and educational supplies will be provided by means of email or online platforms (i.e.: Edmodo, Google Drive etc.)
Evaluation methods	The exam consists of an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom and in the laboratory/production plants, as reported in the Academic Regulations for the Master Degree in Food Science and Technology (article 9) and in the study plan (Annex A). Students attending at the lectures may have a middle-term preliminary exam, consisting of an oral test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for a year. The evaluation of the preparation of the student occurs on the basis of established criteria, as detailed in Annex B of the Academic Regulations for the Master Degree in Food Science and Technology. Non-Italian students may be examined in English language, according to the aforesaid procedures.
Evaluation criteria	*Knowledge and understanding* o Knowledge on the principal genetic-Molecular methodology *Applying knowledge and understanding* o Applying and understanding the principal genetic-molecular methodology for the quality and traceability of crop and food *Making informed judgments and choices* o Capacity of apply the principal genetic-molecular methodology for the quality and traceability of crop and food *Communicating knowledge and understanding* o Capacity of identify the principal genetic-molecular methodology

	for the quality and traceability of crop and food *Capacities to continue learning* ○ Capacity of communicate and continue learning the principal genetic-molecular methodology for the quality and traceability of crop and food
Receiving times	Every day from 8.30 to 13.30 pm