



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2021/2022		
BACHELOR'S DEGREE (BSC)	AGRIFOOD SCIENCES AND TECHNOLOGIES		
INTEGRATED COURSE	PRODUCTION AND BIODIVERSITY OF HERBACEOUS CROPS - INTEGRATED COURSE		
CODE	18526		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/02, AGR/04		
HEAD PROFESSOR(S)	FREDA ALFONSO SALVATORE	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	FREDA ALFONSO SALVATORE	Professore Associato	Univ. di PALERMO
	SABATINO LEO	Professore Associato	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>FREDA ALFONSO SALVATORE</p> <p>Monday 09:30 12:00 Stanza del docente. Edificio 4 - Ingresso L, 2° piano</p> <p>Tuesday 09:30 12:00 Stanza del docente. Edificio 4 - Ingresso L, 2° piano</p> <p>Wednesday 09:00 12:00 Negli altri giorni, gli studenti possono prenotare un appuntamento inviando una email al docente.</p> <p>SABATINO LEO</p> <p>Monday 9:00 11:00 Studio del docente sito presso il Dipartimento SAAF, Ed. 5.</p> <p>Wednesday 9:00 11:00 Studio del docente sito presso il Dipartimento SAAF, Ed. 5.</p>		

DOCENTE: Prof. ALFONSO SALVATORE FRENDIA

PREREQUISITES	Basics of: general and systematic botany; organic chemistry; biochemistry.
LEARNING OUTCOMES	<p>Knowledge and understanding.</p> <p>At the end of the course, students will have basic knowledge about systems and processes of production of the main field crops and vegetables with particular reference to the impact that the different productive contexts (agricultural systems, environment, genotype used) determine on the qualitative and technological characteristics of the food crop products.</p> <p>Applying knowledge and understanding.</p> <p>The knowledge and skills acquired will allow to recognize the variability of the products achieved in different production contexts can be applied in the valorization of the specific qualitative characteristics of raw materials coming from the "field phase".</p> <p>Making judgments.</p> <p>Students will be able to evaluate specific quality parameters of raw materials from field crops and vegetables in relation to the agricultural system, the production environment and the genotype used.</p> <p>Communication skills.</p> <p>The student will be able to demonstrate to technicians and entrepreneurs, but also to a non-expert audience through a simple but proper language, differences and peculiarities of raw materials to be used in agro-food processing both artisanal and industrial.</p> <p>Learning skills.</p> <p>Setting the course towards a vision as wider as possible of the problems related to the characterization and valorization of the main raw materials produced from field and vegetable crops will be a necessary tool to interact with specialists and entrepreneurs in the agro-food sector and to use profitably the future upgrades by technical and scientific sources of the sector.</p>
ASSESSMENT METHODS	<p>The oral test consists of an interview; the final evaluation is expressed in thirtieths and is derived from the weighted average of the votes by the number of credits of the two modules. The questions, open or semi-structured and specifically designed to test the learning achievements, tend to verify: a) the acquired knowledge and the ability to establish connections between the contents (general sections, special sections, models, etc.) of both modules ; b) the ability to provide independent judgments about the contents of the course and to place the contents of the course within the professional and technological context.</p> <p>The minimum score is 18/30; the maximum score is 30/30 cum laude.</p> <p>The maximum score is achieved if the test ensures the full possession of the following: ability to represent emerging and/or minor issues of the discipline; strong ability to represent the impact of the course content within the sector where content enroll; ability to represent ideas and/or innovative solutions within the professional and technological context; c) adequate exhibition capacity: the maximum scoring can be achieved by persons who demonstrate complete fluency of the scientific and technological language, while the minimum scoring will be achieved if the examinee demonstrates a proper use of the language but not sufficiently articulated in relation to the professional context.</p> <p>The final grade will be judged insufficient when the student will demonstrate: difficulty to focus on the proposed topics, a shallow knowledge of the arguments and extreme limited exposure ability.</p>
TEACHING METHODS	Lectures; classroom and laboratory trainings; visits to farms and agri-food companies.

MODULE PRODUCTION AND BIODIVERSITY OF OPEN FIELD HERBACEOUS CROPS

Prof. ALFONSO SALVATORE FREND

SUGGESTED BIBLIOGRAPHY

La materia e' dispersa in diversi testi tradizionali, quali:

Ceccon P., Fagnano M., Grignani C., Monti M., Orlandini S. - Agronomia. EdiSES, Napoli. ISBN: 9788879599658

Ranalli P. - Leguminose e agricoltura sostenibile. Calderini Edagricole, Bologna. ISBN: 9788820647629

AA. VV. Il grano. Collana Coltura & Cultura. Ed. Script, Bologna. ISBN: 9788890147432

AA. VV. Il riso. Collana Coltura & Cultura. Ed. Script, Bologna. ISBN: 9788890279171

AA. VV. Il mais. Collana Coltura & Cultura. Ed. Script, Bologna. ISBN: 9788890279133

Materiale fornito dal docente.

AMBIT	50128-Discipline della tecnologia alimentare
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the module is to provide basic knowledge on the main crops for food and feed, and on the variability of their products in relation to the environmental context, to the production systems (conventional, integrated, organic, biodynamic, etc.) and the varietal framework (including both the modern varieties and the local populations). In particular the module will highlight the effects of technical management on the qualitative, commodity-related and technological characteristics of the main agro-food products derived from field crops. Such information provides the tool for the characterization and exploitation of the raw materials to be used in their respective agro-food chains.

SYLLABUS

Hrs	Frontal teaching
1	Introduction to the course: educational objectives, organization of the lessons and of the final examination, suggested bibliography.
4	Description of the main field crop cultivation systems in relation to the environment, to the available resources and the use of auxiliary inputs. Conventional, organic, integrated, biodynamic agricultural systems: technical and regulatory aspects. Smart agriculture.
4	Preservation and valorization of the field crop biodiversity: landraces; conservation varieties, traditional and typical products. Quality brands (PGI, PDO, Slow food presidia, etc.): control and certification.
2	Cereal crops: cereals types, origin, classification and taxonomy, economics, statistics and intended uses. Notes on the morpho-physiological, chemical and organoleptic characteristics of cereal production and on the biological cycle. Post-harvest management of yield grain.
10	Wheats: taxonomic classification, economic importance, and destination of productions. Structure, chemistry and biochemistry of kernel: grain proteins, structure and functional properties of gluten, starch and other carbohydrates, lipids, micronutrients and phytochemicals in wheat grain. Major classifications of consumer products and their end-use requirements. Technological quality, nutritional and healthy. Quality analysis of the grain and of the primary and secondary processing products. Genotype-environment interaction; Sicilian old durum wheat genotypes and traditional products.
4	Malting barley: taxonomic classification, morpho-physiology, and biochemistry of malting barley. Physiology and biochemistry of germination in barley. Malting technology and use of malt. Properties of grain with regard to its maltability: malting barley quality, malt quality for brewing; quality analysis of malting barley and its malts.
4	Corn: origins, taxonomic classification, economic importance, and uses. Development, structure, and composition of the kernel. Harvesting and postharvest management. Dry and wet milling processes, products, and applications. Nutritional properties, and feeding value of corn and its by-products. Composition, processing, and food uses of flour, oil and corn starch.
4	Rice: origins, taxonomic classification, economic importance, and uses. Area of cultivation, developmental biology, and genetic improvement of rice. Quality and commercial classification of rice. Harvesting, and postharvest management of paddy: cleaning, drying, dehulling, milling, and storage. Parboiling process. The rice grain and its gross composition. Nutritional properties of rice and rice bran. Food, feed and industrial uses of rice and its derivatives.
3	Minor cereal grains (oats, rye, triticale, tritordeum, sorghum, millet), and pseudocereals (buckwheat, quinoa): taxonomy, economics, statistics, and uses. Harvesting and postharvest management. Nutritional properties and utilization in food, feed and industrial of grain and its derivatives.
5	Pulses: origins, taxonomic classification, economic importance, and destination of productions. Description, development, structure, and composition of the pulses. Nutritional and anti-nutritional properties and utilization of legumes in food, feed and agri-food industries. Genotype-environment interaction and local products. Major legumes in the Mediterranean area (fava and chickpea, field pea, grasspea and lentil, beans and lupins).
4	Oil crops (soybean, sunflower, rapeseed): taxonomy, economic importance, and destination of productions. Nutritional and anti-nutritional properties and utilization in food, feed and industrial.

Hrs	Workshops
10	Analytical determination of the main quality parameters on cereal grains and grain flours. Milling and extraction of semolina. Rheological parameters of semolina dough of durum wheat. If it is not possible to carry out the foreseen practical activities, videos will be offered on the topics covered in the course.
Hrs	Others
5	Guided visits to agri-food companies specialized in the production, storage and processing of raw materials (cereals and pulses crops).

MODULE
PRODUCTION AND BIODIVERSITY OF VEGETABLE CROPS

Prof. LEO SABATINO

SUGGESTED BIBLIOGRAPHY

Angelini R. Il pomodoro. Coltura e Cultura, Bayer CropScience. 2010
 Romano Tesi. 2010. Orticoltura Mediterranea Sostenibile. Pàtron Editore, ISBN 8855530623
 Pardossi A., Prodsocimi Gianquinto G., Santamaria P., Incrocci L. 2018. Orticoltura Principi e Pratica. Edagricole-New Business Media, ISBN 978-88-506-5514-4

AMBIT	10691-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the course is to provide students with the knowledge of the main horticultural supply chain in the alimentary context with particular emphasis on specific crop potentiality according to determinate environmental conditions. The course will be divided into two major themes: a) enhancement of biodiversity, b) quality of vegetable production.

SYLLABUS

Hrs	Frontal teaching
2	Outline of Open field and protected production systems for high quality vegetable crop productions. The biofortification of vegetables. The use of biostimulants to enhance yield, nutritional and functional properties of vegetables.
2	Background on greenhouse and open field vegetable production cycles
4	Tomato: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide tomato supply chain, post-harvest treatments.
4	Eggplant: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide eggplant supply chain, post-harvest treatments.
2	Sweet pepper: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide sweet pepper supply chain, post-harvest treatments.
2	Melon: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide melon supply chain, post-harvest treatments.
2	Watermelon: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide watermelon supply chain, post-harvest treatments.
2	Lettuce: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide lettuce supply chain, post-harvest treatments.
2	Curly endive: botany, morphology, case studies concerning the techniques to improve the quality and the worldwide curly endive supply chain, post-harvest treatments.
Hrs	Practice
8	Practical training by mean of multimedia tools on vegetable supply chains.