



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Agrarie, Alimentari e Forestali		
<b>ACADEMIC YEAR</b>	2021/2022		
<b>MASTER'S DEGREE (MSC)</b>	FIRM AND QUALITY FOR THE AGRICULTURAL AND FOOD SYSTEM		
<b>INTEGRATED COURSE</b>	QUALITY AND POST HARVEST IN FRUITS AND VEGETABLES FARMING - INTEGRATED COURSE		
<b>CODE</b>	21239		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	AGR/03, AGR/04		
<b>HEAD PROFESSOR(S)</b>	MICELI ALESSANDRO	Professore Associato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	LIGUORI GIORGIA	Professore Associato	Univ. di PALERMO
	MICELI ALESSANDRO	Professore Associato	Univ. di PALERMO
<b>CREDITS</b>	12		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	1		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>LIGUORI GIORGIA</b>  Monday 09:00 11:00 Studio 24 - Dipartimento SAAF  Tuesday 09:00 11:00 Studio 24 - Dipartimento SAAF  Thursday 09:00 12:00 Studio 24 - Dipartimento SAAF</p> <p><b>MICELI ALESSANDRO</b>  Thursday 10:00 12:00 Edificio 5 - Ingresso B - Piano I (con prenotazione via email)</p>		

**DOCENTE:** Prof. ALESSANDRO MICELI

<b>PREREQUISITES</b>	General knowledge on quality management issues. It is desirable that student has knowledge on vegetable and fruit chains. The student must have knowledge about plant biology and physiology, the environment-plant system, crop management, and basic knowledge about the characteristics and management of fruit and vegetable crops.
<b>LEARNING OUTCOMES</b>	<p>The student must know the aspects related to the management of the quality of fruit products and the influence of crop, physiological and technological factors on the expression of vegetable and fruit quality. Understand the mechanisms that govern the quality of the fruits and determine it.</p> <p>Ability to apply knowledge and understanding Students must have the ability to apply the knowledge gained during the process of product management.</p> <p>Judgment autonomy Students must have the ability to apply the acquired knowledge, suggesting the appropriate solutions to the best expression and quality evaluation of the vegetable and fruit products.</p> <p>Communication skills Being able to use a technically correct language, in addressing the technical choices related to fruit management, particularly in post-harvesting.</p> <p>Learning ability Acquire the ability to adapt to the most up-to-date knowledge through the consultation of material of a divulgative nature</p>
<b>ASSESSMENT METHODS</b>	<p>Exam is oral. The oral test is a colloquium aimed at ensuring the knowledge required by the course; The evaluation is expressed in 30/30. Exams will tend to verify (a) acquired knowledge; B) ability to elaborate, c) an adequate capacity for exhibiting. The final examination aims at assessing whether the student has knowledge and understanding of the subjects, has acquired interpretative competence and autonomy in judging concrete cases. The threshold of sufficiency will be reached when the student shows the knowledge and understanding of the arguments at least in the general lines; They must also be capable of transmitting their knowledge to the examiner. Below this threshold, the examination is insufficient. By examining his arguments and exhibits, he is able to interact with the examiner, and the more his knowledge and capacity of application goes into the detailed disciplines subject to verification, the more the evaluation will be, positive.</p> <p>Excellent 30/30 and laude: excellent knowledge of the topics, excellent language property,</p> <p>Very good 26--29: Good property of arguments and language,</p> <p>Good 24--25 basic knowledge of the main arguments, discrete language property, with limited ability to apply autonomously. Knowledge of the solution of the proposed problems</p> <p>Satisfactory 21--23 sufficient knowledge, satisfying language property, Poor ability to apply the acquired knowledge sufficiently 18--20 minimum basic knowledge of the subjects and technical language,</p> <p>Insufficient does not have an acceptable knowledge of the contents of the topics covered in the teaching</p>
<b>TEACHING METHODS</b>	The course is developed in lessons, lab exercises and didactic workshops

## MODULE QUALITY IN HORTICULTURE

*Prof. ALESSANDRO MICELI*

### SUGGESTED BIBLIOGRAPHY

Bianco V.V. - Orticoltura. Patron Editore  
 Pardossi A., Prosdocimi Gianquinto G., Santamaria P., Incrocci L.– Orticoltura principi e pratica. Edagricole, Milano.  
 Tesi R. – Orticoltura mediterranea sostenibile. Patron Editore, Bologna.  
 Colelli G., Inglese P. – Gestione della qualità e conservazione dei prodotti ortofrutticoli. Edagricole, Milano  
 Dispense fornite dal Docente.

<b>AMBIT</b>	50544-Discipline della produzione
<b>INDIVIDUAL STUDY (Hrs)</b>	90
<b>COURSE ACTIVITY (Hrs)</b>	60

### EDUCATIONAL OBJECTIVES OF THE MODULE

Deepen specific quality concept and overall quality of vegetable products. Provide the information needed for an assessment of the quality characteristics and preparation for the market of the main vegetables, whether for fresh or processed produce. Deepen the knowledge of the productive sector of vegetable crops, with respect to the issues that affect the quality of these crops, the relationship between environment and quality, agro-industrial uses, etc.. Provide information on the means and techniques to preserve and enhance the quality of vegetable products in the post-harvest stages.

## SYLLABUS

Hrs	Frontal teaching
1	History and evolution of horticulture. The quality of horticultural products.
2	Quality components in horticulture: agronomical, technological, commercial, hygienic, nutritional, sensory and environmental.
2	Biological and nutritional value of vegetables. Functional foods and functional vegetables. Nutraceutical characteristics of vegetables.
3	Regulatory and quality standards for horticultural products. PDO and PGI vegetable products. Traceability and certification of horticultural production chains.
8	Agronomical and technical practices for the improvement of the quality characteristics of horticultural products.
2	Nitrates: accumulation and toxicity in vegetables - techniques to reduce their accumulation.
5	Means and techniques to preserve and maintain the quality of vegetable products during post-harvest.
3	Post-harvest sorting and grading systems for vegetable; cooling systems. Controlled and modified atmosphere.
6	General aspects and quality parameters of tomato, pepper, eggplant, potato.
2	General aspects and quality parameters of watermelon, melon.
2	General aspects and quality parameters of garlic and onion.
2	General aspects and quality parameters of Strawberry.
2	General aspects and quality parameters of Artichoke.
4	General aspects and quality parameters of leafy vegetables and minimally processed vegetables.
2	General aspects and quality parameters of broccoli, cauliflower and other edible brassicas.
Hrs	Practice
2	Sensory analysis of vegetables.
6	Evaluation of quality characteristics of horticultural crops in open field and greenhouses.
4	Vegetables in Mass Market Retailers.
Hrs	Workshops
2	Outline of analytical methodologies for quality assessment. Practical analysis for quality assessment of vegetables.

**MODULE**  
**QUALITY AND POST HARVEST PROCESSING IN FRUIT FARMING**

*Prof.ssa GIORGIA LIGUORI*

**SUGGESTED BIBLIOGRAPHY**

- G. Colelli, P. Inglese. 2020 Gestione della qualità e conservazione dei prodotti ortofrutticoli, Edagricole
- F. Sottile, C. Peano. 2019. Principi di Arboricoltura, Edises
- Sansavini et al., 2012. Arboricoltura Generale, Patron Ed.
- Kader A. 2002. Postharvest technology of Horticultural Crops, UCANR, pubbl. 3311
- Articoli scientifici distribuiti dalla docente

<b>AMBIT</b>	50544-Discipline della produzione
<b>INDIVIDUAL STUDY (Hrs)</b>	90
<b>COURSE ACTIVITY (Hrs)</b>	60

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The course provides students with the knowledge required for the development of quality of production of fruit tree species and the mechanisms that control it both during development and maturation of the fruit and post-harvest. The course will deal with issues related to the classification and certification of quality of fruit.

The course aims to teach the students the aspects relating to the upgrading of products with quality characters specific, local, biological, historical, with reference to:

- a) the biological mechanisms that regulate the quality of the fruits during their development, their accrual and post-harvest;
- b) systems and the evaluation criteria of quality, both in terms of both sensory and instrumental procedures;
- c) the cultural factors, technological and logistical influencing the quality of the product;
- d) technologies of fruit storage and processing;
- e) the criteria and classification tools and certification of quality.

**SYLLABUS**

Hrs	Frontal teaching
6	Horticultural systems; the concept of quality in horticulture; fruit consumption and market acceptance
4	Fruit quality and genotype x environment interactio, terroir, and european certification of origin
2	Fruit morphology, growth and development
4	Fruit respiration: climateric and aclimateric fruit, the role of ethylene
2	Fruit transpiration: how to measure and how to control it
4	Orchard systems, orchard management and fruit quality. Harvest strategies and maturity indexes
2	Fruit growth, development, quality and post harvest management: the case of peaches
2	Fruit growth, development, quality and post harvest management: the case of citrus
2	Fruit growth, development, quality and post harvest management: the case of kiwifruit
2	Fruit growth, development, quality and post harvest management: the case of olive oil and table olive
4	Fruit growth, development, quality and post harvest management: the case of cactus pear
2	FRuit growth, development, quality and post harvest management: the case of mango litchi and avocado
4	Fruit growth, development, and quality: the case of kaki and pomegranate
2	Fruit growth, development, quality and post harvest management: the case of table grape
4	Fruit postharvest technology; minimally processed fruit: physiology and technology
Hrs	Practice
2	Fruit quality analysis and minimally processed fruit production
Hrs	Workshops
2	The application of maturity indexes: instruments and measurements
2	olive oil sensory analysis
2	Sensory analysis: descriptors and application
Hrs	Others
6	GDO Technical visit