

COURSE: **EXPLOITING OF VEGETABLE AND MEDICINAL PLANTS FOR BIOACTIVE COMPOUNDS**

ACADEMIC YEAR: **2017-2018**

TYPE OF EDUCATIONAL ACTIVITY: Characteristic

TEACHER: Prof. Vincenzo Candido

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Language: Italian

ECTS: 6 (5 lectures + 1 practicals)	no. of hours: (40 h lectures + 16 h practicals)	Campus: Potenza School of Agriculture, Forest, Food and Environmental Sciences (SAFE) Program: MSc Food Science and Technology	Semester: 1
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EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The objective of course is to provide food technologist the knowledge and skills needed to manage the exploiting of vegetable and medicinal plant productions.

- **Knowledge and understanding:** Botanical and agronomic knowledges on the traditional vegetable and medicinal productions in relation to the most representative crops; understanding the variation of the main produce characteristics in relation to the traditional genotypes/landraces utilized; knowledge on the bioactive compounds in the wild and cultivated vegetables and herbs; knowledge on grown methods and techniques able to increase nutraceutical products.
- **Applying knowledge and understanding:** Ability to identify the factors influencing the quality of productions and the synthesis of bioactive compounds in vegetable and medicinal plants.
- **Making judgements:** Ability to propose solutions suitable to optimize the quality of productions and the nutraceutical value of vegetables and medicinal plants.
- **Communications skills:** Ability to communicate the impact of vegetable and medicinal plants on human health and the influence of cultural techniques and the genotype on the synthesis of bioactive compounds.
- **Learning skills:** Ability to access the statistical data sources (surfaces, productions and trade of the main vegetables and herbs) and to understand and summarize the data. Ability to document the factors influencing the quality of production and the synthesis of bioactive substances in vegetable and medicinal plants.

PRE-REQUIREMENTS

Basic knowledges concerning botany, agronomy and plant production science are required.

SYLLABUS

Lessons

The activities are divided in 6 blocks.

Block 1 (8h, lectures):

The student will acquire theoretical and practical knowledges on vegetables by the participation at lessons and also by personal study. Topics to be developed are the following: origin and definition of vegetable crop science, classification criteria of vegetable species, main quality traits of vegetables; composition of vegetables (dry matter content, vitamins, minerals, antioxidants). Nitrate accumulation in the edible parts of vegetables: effects on human health, legislative aspects, agronomic strategies for the nitrate reduction. Quality traits of vegetables in pre- and post-harvest: vegetable storage techniques. Main vegetable cultivation methods (conventional, integrated and organic methods; soilless culture); vegetable crop scheduling; cultivar choice; seasonal and extra-seasonal vegetable products. Influence of cultural practices and genotype on the synthesis of bioactive substances and enhancement of the corresponding high value nutraceutical products.

Block 2 (8h, lectures):

Technical and scientific informations on the main vegetable crops for processing industry and for fresh market, with particular reference to those grown in Southern Italy: *Solanaceae* (processing and fresh market tomatoes, potato, pepper, eggplant), *Brassicaceae* (cabbage, broccoli, cauliflower, savoy cabbage, kale, broccoli raab, turnip, radish, minor

species).

Block 3 (8h, lectures):

Description of other vegetable species in continuation of the previous block: *Asteraceae* (artichoke, chicory, lettuce, endive and escarole, minor species), *Cucurbitaceae* (melon, pumpkin and zucchini, cucumber, minor species), *Alliaceae* (garlic, onion and shallot, asparagus, minor species), *Apiaceae* (fennel, carrot, celery, parsley).

Block 4 (8h, lectures):

Description of other vegetable species in continuation of the previous block: *Chenopodiaceae* (chard and red beet, spinach), *Leguminosae* ('borlotto' bean, snap bean, green peas for fresh market and for processing). 'minimally processed' and 'easy to eat' vegetables; microgreens; biofortified vegetables and biofortification techniques.

Block 5 (8h, lectures):

Herbs and medicinal plants: definition, classification, economic and marketing importance, cultivation, "balsamic time" and harvesting, processing, extraction of active compounds and/or essential oils. The following species will be described: basil, *Echinacea* spp., dandelion, saffron).

Block 6 (16h, Practices):

Laboratory and farm practices will be conducted in order to give to the students knowledges on classification of the main vegetable and medicinal plants and the related cultivation techniques.

TEACHING METHODS

Lectures (40 h), laboratory and farm practices (16 h).

EVALUATION METHODS

Oral exam, consisting of questions based on theoretical knowledges and laboratory practices. To pass the exam the students have to achieve at least 18 points on 30.

TEXTBOOKS AND LECTURE MATERIAL

- Bianco V.V., Pimpini F., 1990. *Orticultura*. Patron Editore, Bologna. 991 pp.
- Tesi R., 2010. *Orticultura mediterranea sostenibile*. Patron Editore, Bologna. 503 pp.
- Tesi R., 2008. *Colture protette. Ortoflorovivaismo in ambiente mediterraneo*. Edizioni Agricole de Il Sole 24 ORE Business Media s.r.l., Milano. 349 pp.
- Marzi V. De Mastro G., 2008. *PIANTE OFFICINALI. Coltivazione, trattamenti di post-raccolta, contenuti in principi attivi, impieghi in vari settori industriali ed erboristici*. Adda Ed. Bari. 472 pp.
- Notes from lessons.

INTERACTION WITH STUDENTS

During the first lesson, after describing the aims, contents and exam procedures, it will be collected the list of students attending the course enclosed their registration number and e-mail. During the lessons, teaching materials will be provided. Students may contact the teacher anytime by mobile phone or e-mail for any clarifications or to set an appointment in his office at SAFE, I floor. The teacher will meet the students on Tuesday, Wednesday and Thursday, from 10.00 to 13.30.

EXAMINATION SESSIONS (TENTATIVE)¹

6/2/2017, 8/3/2017, 15/4/2017, 10/5/2017, 7/6/2017, 5/7/2017, 13/9/2017, 11/10/2017, 15/11/2017, 13/12/2017, 10/1/2018, 14/2/2018, 14/3/2018.

EVALUATION COMMITTEE

Prof. Vincenzo Candido (President), Prof.ssa Stella Lovelli (Member), Dr. Donato Castronuovo (Replacement member), Prof. Michele Perniola (Replacement member), Prof.ssa Mariana Amato (Replacement member).

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.



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