

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

ACADEMIC YEAR: **2016-2017**

TYPE OF EDUCATIONAL ACTIVITY: Basic

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Language: Italian

ECTS: 6 (5 lessons; 1 seminars, farm and laboratory practice)	no. of hours: (lessons e tutorials/practice) 40 lessons 16 seminars, farm and laboratory practice	Campus: Potenza School: SAFE Program: MSc Food Science and Technology	Semester: I
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EDUCATIONAL GOALS

Botanic identification and classification of vegetable and medicinal plants and their suitability to be cultivated for high quality productions; main crop systems (conventional, integrated and organic, soilless cultivations); vegetable farm management and crop scheduling; cultivar choice; qualitative aspects of the seasonal and extra-seasonal vegetables; agronomic aspects of the production of 'minimally processed' and 'easy to eat' vegetables; microgreens; biofortified vegetables and biofortification techniques.

To analyze the health traits of vegetable and medicinal produces. To know the several health compounds of different plants and the cultivar/genotypes of interest for their high biosynthesis of nutraceuticals.

Traditional vegetable and medicinal productions in relation to the most representative crops; variation of the main produce characteristics in relation to the traditional genotypes/landraces utilized; bioactive compounds present in the produce of the wild and cultivated species utilized as vegetables; grown methods and techniques of interest for increasing nutraceutical produce.

EXPECTED LEARNING OUTCOMES

At the end of the course, the students will be able to have knowledges on the cultivation, use and qualitative aspects of vegetables, both cultivated and wild ones, and medicinal plants, for alimentary use and for the extraction of bio-active compounds.

PRE-REQUIREMENTS

Basic knowledges concerning 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

Theoretical lessons (40 hours), laboratory and farm practices (16 hours).

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 ON-LINE EDUCATIONAL MATERIAL

- Bianco V.V., Pimpini F., 1990. Orticoltura. Patron Editore, Bologna. 991 pp.
 - Tesi R., 2010. Orticoltura 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.
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INTERACTION WITH STUDENTS

In 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 (FORECAST)¹

Monthly a date will be agreed with the students.

SEMINARS BY EXTERNAL EXPERTS YES X NO

FURTHER INFORMATION

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