

## COURSE OF STUDY Herbal and Nutraceutical Science

ACADEMIC YEAR 2023-24

ACADEMIC SUBJECT Pharmacognosy

General information	
Year of the course	1st
Academic calendar (starting and ending date)	19/02/2024 – 14/06/2024
Credits (CFU/ETCS):	8
SSD	BIO14
Language	Italian
Mode of attendance	obligatory

Professor/ Lecturer	
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Virtual room	30tg37z
Office Hours (and modalities: e.g., by appointment, on line, etc.)	All days, by appointment

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
190	56	14	120
CFU/ETCS			
8	7	1	

<b>Learning Objectives</b>	The course is mainly aimed at the study of drugs of natural origin for use in the field of herbal, cosmetic and dietetic health products. Particular emphasis is given to herbal drugs registered in the National and European Pharmacopoeia. The pharmacognostic aspects of the plant and drug source and the phytotherapeutic application are described (botanical description, phytochemical, purpose).
<b>Course prerequisites</b>	The requirements for students wishing to enroll in the three-year degree course in Science and Technology of herbal and health products are: Mathematics (proportions, percentages, roots, powers, logarithms, equivalences, first degree equations); Physics (physical quantities, units and systems of measurement); Chemistry (Periodic system of elements, substances, elements, mixtures and compounds, the concept of chemical reaction, changes of state); Biology knowledge of the cell, basic knowledge of the main biological molecules).

<b>Teaching strategie</b>	Lectures and demonstration exercises in the classroom and / or in the laboratory
<b>Expected learning outcomes in terms of</b>	

<p><b>Knowledge and understanding on:</b></p>	<ul style="list-style-type: none"> <li>○ knowledge of medicinal plants and their active ingredients</li> <li>○ ability to classify and recognize plant organisms</li> <li>○ understanding of the relationships between cultivation practices and the quality of raw materials and processed products</li> <li>○ ability to understand the relationships between the structure of natural products and their activity in biological systems</li> <li>○ knowledge of extraction and analytical techniques applied to herbal, cosmetic and dietetic products</li> <li>○ ability to prepare protocols for new formulations of herbal, cosmetic and dietetic products.</li> </ul>
<p><b>Applying knowledge and understanding on:</b></p>	<ul style="list-style-type: none"> <li>○ ability of morphological and phytochemical recognition of plant drugs;</li> <li>○ knowledge of their bioactivity and therapeutic application;</li> <li>○ ability to use active ingredients of natural origin in the field of health;</li> <li>○ possession of the basic elements for an appropriate business organization;</li> <li>○ ability to provide information and advice on medicinal plants and their use, on active ingredients for health, food, cosmetic and pharmaceutical purposes</li> </ul>
<p><b>Soft skills</b></p>	<ul style="list-style-type: none"> <li>• <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> <li>○ ability to develop and apply protocols extraction and analytical for the obtaining of phytocomplexes or principles active</li> <li>○ ability to apply protocols for the quality certification of phytopreparations, cosmetics and health products</li> <li>○ ability to find and use data to formulate original answers to problems in the field of pharmaceutical sciences and technologies applied to the field of medicinal plants and products for health and cosmetic use.</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ communicate their conclusions, as well as their knowledge to their peers, superiors and all users of their business</li> <li>○ Graduates in Herbal and Nutraceutical Sciences acquire the ability to work in a team and, through the mandatory practical internship, those communication, relational and organizational skills essential for entering the world of work</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Graduates in Herbal and Nutraceutical Sciences must have the ability to undertake, with a high degree of autonomy, more advanced studies aimed at further professional development such as Masters and Specialization Courses in those scientific sectors (herbal, cosmetics, foods) culturally more similar to the degree course or to continue in a master's degree in science and / or health.</li> </ul> </li> </ul>
<p><b>Syllabus</b></p>	
<p><b>Content knowledge</b></p>	<p>Macro and micromorphological pharmacognostic analysis of drugs. Concept of general and specialized metabolism; officinal and medicinal plant; active principle; drug; drug. Total preparations and pure principles. Chemical classification of active ingredients: Monosaccharides, oligosaccharides, polysaccharides; lipids; polyphenols; terpenes, alkaloids. Sources of variability of the content in active ingredients. Selection of plant material (spontaneous and cultivated plants). Collection, preparation and storage of drugs. Extraction and purification procedures. Extracts. Biotechnological production of active ingredients. Quality control of drugs. Reference parameters according to the Official Pharmacopoeia (Ash; Bitter index; Stomatal index; Swelling index; haemolytic activity). Purpose of use: principles of phytotherapy and mechanisms of Monographs: Acacia senegal; Yarrow; Agar agar; Garlic; Aloe; Altea; Starch; Witch hazel; Star anise; Green anise ; Peanut; Arnica; Artemisia; Gummiferous</p>

	<p>astragalus; Atropa belladonna; Oats; Burdock; Hawthorn; Cocoa; Coffee; Calendula; Chamomile; Capsicum; Artichoke; Milk thistle; Cascara; Cassia; Centaury; Centella; China; Citrus sp; Coriander; Turmeric; Cotton; Digital; Drosera; Echinacea; Helichrysum; Horsetail; Eucalyptus; Fennel; Buckthorn; Fucus; Gelidium; Gentian; Gingko; Ginseng; Guarana; Matè; Hypericum; Horse chestnut; Ispagula; Lavender, Sink, Spigo; Linen; Licorice; Hop; Mauve; Almond tree; Meliss to; Mint; Mirossilo; Blueberry; Olive tree; Nettle; Passionflower; Plantain; Poplar; Psyllium; Rhubarb; Ratania; Castor: Rusco; Willow; Sage; Elder; Dandelion; Rate; You; Thyme; Turpentine; Bearberry; Valerian; Red grapevine.</p>
<b>Texts and readings</b>	<p>- G. Mazzanti, M. Dell’Agli, A.A. Izzo - Farmacognosia e Fitoterapia- Piccin ed., 2020          - Bruni A.- Farmacognosia generale ed applicata - Piccin ed., 1999.          - F. Capasso, R. De Pasquale, G. Grandolini – Farmacognosia: botanica, chimica e farmacologia delle piante medicinali, II Ed., Springer, 2011;          - Heinrich, Barne, Gibbons, Williamson – Ed italiana N. Galeotti, G. Mazzanti, M. Serafini –Fondamenti di farmacognosia e fitoterapia, EDRA-LSWR, 2015</p>
<b>Notes, additional materials</b>	
<b>Repository</b>	

<b>Assessment</b>	
Assessment methods	
Assessment criteria	<ul style="list-style-type: none"> <li>• <i>Knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ General aspects of subject</li> </ul> </li> <li>• <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Ability to create connections in the subject studied</li> </ul> </li> <li>• <i>Autonomy of judgment</i> <ul style="list-style-type: none"> <li>○ Critical reasoning ability of the study carried out</li> </ul> </li> <li>• <i>Communication skills</i> <ul style="list-style-type: none"> <li>○ Skills in the use of specialized vocabulary</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Complex topics</li> </ul> </li> </ul>
Final exam and grading criteria	Final oral exam
<b>Further information</b>	
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