



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche
ACADEMIC YEAR	2021/2022
MASTER'S DEGREE (MSC)	PHARMACY
SUBJECT	DIETARY FOOD AND PRODUCTS
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	20893-Attività formative affini o integrative
CODE	19174
SCIENTIFIC SECTOR(S)	CHIM/10
HEAD PROFESSOR(S)	DI STEFANO VITA Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	DI STEFANO VITA Monday 9:00 11:00

DOCENTE: Prof.ssa VITA DI STEFANO

PREREQUISITES	The student will have the knowledge of organic chemistry and analytical chemistry for understanding the topics that will be dealt during the course.
LEARNING OUTCOMES	<p>The course aims to give the student knowledge on the chemical structure and functional and nutritional properties of the constituents of foods.</p> <p>The purpose of the course is the study of the chemical reactions occurring following the technological processing and conservation treatments provided by the course program.</p> <p>In addition, the course aims to give the student the tools for a proper knowledge of a food label in terms of compliance with current European legislation in order to evaluate possible food frauds.</p> <p>It will be appreciated the elaborate properties, the autonomy of judgment and the ability to apply new acquired knowledge. At the end of the course, the student will have to expose the arguments in a clear and articulated way using the appropriate scientific terminology required by course.</p>
ASSESSMENT METHODS	<p>The final score, which consists of an oral exam, will be given on the answers at least three questions regarding the program, with reference to the suggested texts.</p> <p>The oral exam aims to verify if the student has acquired the knowledge expected by the program of the course; it will also evaluate his elaboration abilities and his autonomy of judgement about the disciplinary contents with language properties.</p> <p>The score is expressed using a 30-point scale (from min 18/30 to max 30/30 cum laude).</p> <p>The student gains a minimum range score (with a score between 18/30 and 21/30) if he or she will demonstrate sufficient knowledge of the required arguments even if with scientific vocabulary not adequately articulated. The score will be increased (range score from 22/30 to 28/30) if the candidate shows a deep knowledge of the topics with deep personal study of the recommended texts.</p> <p>Positive scores will also be given if he/she shows autonomy of judgement and comprehension of acquired knowledge, with the correct use of scientific vocabulary.</p> <p>The score of 30/30 and 30/30 cum laude will be gained by the candidate who shows optimal knowledge of the topics, which he expresses in a clear and articulated way with optimal language skills and good analytical skills, showing his judgement autonomy and his application ability of the newly acquired knowledge.</p>
EDUCATIONAL OBJECTIVES	<p>The course proposes to provide the necessary knowledge on the composition of diverse classes of substances, of the main fresh and preserved foods, to expose the basic requirements in terms of composition, preparation and conservation rules also on the basis of current legislation.</p> <p>During the course, the main technological processes for the various food preparations and related chemical processes will be studied, with particular regard to vegetable products typical of the Mediterranean environment.</p> <p>Numerous essays and specific analytical techniques also well be described for authentic, hygienic and correct procedures, and for the detection of fraud, food adulteration in derivative products and beverages.</p>
TEACHING METHODS	Frontal lessons
SUGGESTED BIBLIOGRAPHY	<p>L. Mannina, M. Daglia, A. Ritieni "La chimica e gli alimenti , nutrienti e aspetti nutraceutici, 2019, CEA editrice</p> <p>P. Cabras, A. Martelli. "Chimica degli alimenti ". Ed. Piccin (Padova, 2004)</p> <p>P. Cappelli, V. Vannucchi. "Chimica degli alimenti - Conservazione e trasformazioni ". Ed. Zanichelli (2015)</p> <p>T. P. Coultate, "La Chimica degli Alimenti", Ed. Zanichelli (Bologna, 2004). H.D. Belitz, W. Grosch, P. Schieberle.</p> <p>"Food Chemistry, 3° revised edition". Springer-Verlag Ed. (Berlin, Germany, 2004) O. R. Fennema, Food Chemistry, Marcel Dekker Ed. (New York, USA)</p>

SYLLABUS

Hrs	Frontal teaching
1	Introduction. What is Food Chemistry? Foods and food ingredients. main and secondary food components. energy content, basal metabolism and body mass index.
2	Preservation methods: alteration of foods. Methods of physical and chemical conservation. Use of waste. Freezing. Frozen food. Drying. Lyophilization. Ionizing radiations.
6	Organic components. Carbs. Overview, classification. Monosaccharides: structure and reactivity. Disaccharides and oligosaccharides. Oxidation and reduction, polyols. Polysaccharides. Starch. Dextrin. Glycogen. dietary fiber. Cellulose, hemicellulose and lignin. Pectins. Polysaccharides from seaweed. Gums and mucilage. nutritional and carbohydrate metabolism. Reactions of sugars in acid, alkali and heat. thermal degradation of molecular markers, hydroxymethylfurfural, lactulose, Caramelization. Maillard reaction.

SYLLABUS

Hrs	Frontal teaching
6	Lipids. Overview, classification, fatty acids, essential fatty acids, cis and trans fatty acids. Biosynthesis. Saturated and unsaturated fats. Nomenclature of fatty acids. Triglycerides. Diglycerides. Unsaponifiable fraction of the oil. Terpenes, phytosterols. Polyphenols, Cholesterol. Waxes. complex lipids, phospholipids and glycolipids. Nutritional properties of lipids. Reactions of lipids in foods: hydrogenation, isomerization, oxidation. LARN
6	Protein. Amino acids, peptides, proteins: structure, properties, classification. Essential amino acids and protein quality. nutritional, protein value of food. functional properties of proteins (emulsifying properties, moisturizing). Modifications of proteins in foods during technological treatments. thermal degradation indicators of protein and amino acids: isopeptidi, lysinoalanine, furosine, Maillard reaction
2	Proteins: LARN. Food sources. Analytical methodologies for the separation of proteins and peptides. Electrophoresis on agar and polyacrylamide, SDS PAGE. Revelation. Protein quantification. Amino acid analysis. Proteomic analysis through MS. Kjeldahl method.
2	Food additives classification. Description of the chemical properties of the main classes of food additives (preservatives, antioxidants, emulsifiers, etc.)
3	Oil and olive, ripening of fruits, characteristics of oils and typologies. Extraction of oil from olives. Extraction systems. Composition of olive oil. Legislation. Quality and purity control. Refining and grinding oils. Sage oil. Oil and Mediterranean Diet. Sensory analysis of oil. Chemical analysis of olive oil: detoxification of acidity, analysis of fat, sterol fraction analysis, dienes and trienes analysis, iodine number, determination of peroxides number , determination of chlorophyll. Labeling.
2	Butter, chemical composition, fatty acids. Margarines, functional, dietetic foods and supplements containing omega-3 FA
2	Water: Structure and properties of water. Colligative properties. Osmotic pressure. Water in food. Water activity (aw). Influence of water on the speed of food spoilage. Drinking water. Hydrogeological criteria, organoleptic criteria, physical criteria, chemical criteria. Water: Hardness. Microbiological criteria. Physical and chemical disinfection. Microbiological pollution indicators. Bioelements and biological role.
2	Functional foods: general principles. Probiotic foods (yogurt), prebiotics (soluble and insoluble dietary fiber), symbiotic; antioxidants; polyunsaturated fatty acids (PUFA).
1	Glycemic index. Synthetic sweeteners: saccharin, aspartame, acesulfame, cyclamates, steviol glycosides, Neotame, advantame, Sweet proteins, Polyols, DGA. EFSA Claims 2012.
3	Cereals: Edible plants, general information. Wheat and processing, nutritional composition. Bread and Pasta. Corn, Rice and Processing. Oats, Rye, Spelled. Nutraceutical components of cereals
2	Bioactive constituents of foods of plant origin
4	Undesirable substances. Toxicology Background. toxic substances naturally present in food. Contaminants of natural origin: mycotoxins, bacterial toxins. Chemical contaminants: pesticides, waste packaging, environmental pollutants. toxic substances which originate during the thermal treatments of foods.
2	Toxic metals (As, Pb, Hg, Cd, Cr)
2	Food labeling: function, mandatory indications, nutrition declaration, expiry date, compulsory supplementary information, indications of ingredients that cause allergies and intolerances. Current legislation.