General information		
Academic subject	***Biochemistry of food and food supplements***	
Degree course	Biotechnologies for the quality and the healthiness of nutrition	
Academic Year	2021/2022	
European Credit Transfer and Accumulation System (ECTS)		6
Language	*Italian*	
Academic calendar (starting and ending date)	*4/10/2021- 28/01/2022*	
Attendance	*Mandatory*	

Professor/ Lecturer	
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Department and address	*Department of Biosciences, Biotechnologies and Biopharmaceutics*
Virtual headquarters	
Tutoring (time and day)	Thursday afternoon 15.30-17.30, by previous appointment ,or by the platform Microsoft Teams

Syllabus	
Learning Objectives	Deep knowledge of biochemistry of nutrition including: chemical composition and digestive/metabolic utilization of foods, specific need of different nutrients, metabolic alterations/ pathologies due to genetic origin or incorrect nutrition, evaluation of adequacy of dietary regimens applied to particular situations, evaluation of possible introduction of specific food supplements for the maintenance of an individual healthy state.
Course prerequisites	*Basic knowledge of biochemistry and physiology*
Contents	Nutritional bioelements: glucids, classification, energy and structural functions; glucid minimum; glucidic absorption and metabolism; glucose homeostasis. Lipids, classification, energy and structural functions; fatty acids, cholesterol, phospholipids, lipoproteins; lipid absorption and metabolism; lipid minimum. Proteins, classification; metabolic, energy and structural functions; calculation of protein minimum; biological value and digestibility of proteins; consequences of protein excess or deficiency. Phases and effects of fasting. Water-soluble and fat-soluble vitamins: functions, recommended daily allowances. Inorganic elements: water and mineral salts (Ca, P, Mg, Na, K, Cl, Fe, Cu, Zn, Se, I, Cr), functions, recommended daily allowances, content in foods, metabolism. Biochemical effects of alcoholic beverages consumption.

	Food supplements and dietetic products: creatine, glutamine, carnitine, saline supplements. Foods and technology: novel food products. Biological, wholemeal, "light", fortified, functional and innovative foods. Role of antioxidants in nutrition. Free radical species, oxidative stress, toxicity of free radicals (interactions with proteins, lipids and nucleic acids). Mechanisms of defense against free radicals: enzymatic (superoxide dismutase, glutathione peroxidase, glutathione reductase, catalase, glucose-6-phosphate dehydrogenase) and non-enzymatic (vitamin C, vitamin E, carotenoids, bioflavonoids, glutathione, ceruloplasmin, selenium). Nutrition and health: molecular bases of pathologies associated to incorrect eating habits. Food allergies and intolerances. Diet with calorie restriction and longevity. Biochemical analysis of some kinds of diets.
Books and bibliography	Personal notes from lectures and laboratory classes. Presentations (in pdf) provided by the teacher. Le basi molecolari della nutrizione by G. Arienti – Piccin Editore Biochimica per le discipline biomediche by J.W. Baynes e M.H.Dominiczak – Elsevier Ed. I principi di biochimica di Lenhinger by D.L. Nelson e M.M. Cox – Zanichelli Ed.
Additional materials	

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	*40*	*12*	*98*
ECTS			
6	*5*	*1*	
Teaching strategy	Lectures will be presented through PC assisted tools (PowerPoint, video). Laboratory classes will include experimental sessions, presentation of videos, reading of study-cases. Lecture notes and educational supplies will be provided by means of online platforms.		
Expected learning outcomes			
Knowledge and understanding on:	Deep knowledge of the biochemical processes of nutrition including: o chemical composition of foods		

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	o digestive/metabolic utilization of foods o specific requirements for the different nutrients o pathologies due to genetic origin interfering with nutrition or due to incorrect feeding
Applying knowledge and understanding on:	o Ability of evaluating the suitability of diets to specific cases o Ability of evaluating the content of specific nutrients in different foods and their adequacy for particular needs
Soft skills	• *Making informed judgments and choices* o Ability of identifying the possibility of introducing specific foods and/or supplements to maintain individual well-being o Ability of identifying foods and/or supplements useful for the integrative treatment of pathologies • *Communicating knowledge and understanding* o Ability of utilizing adequately written and oral communication in Italian and English o Ability of setting up visual presentations for the diffusion of data from scientific and experimental literature • *Capacities to continue learning* o Ability of deepening issues related to nutrition for the maintenance of individual physical well-being and for management of pathologies by reading updated paper and electronic literature and participation to seminars and thematical meetings.

Assessment and feedback	
Methods of assessment	The exam consists of an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom and in the laboratory.
Evaluation criteria	• *Knowledge and understanding* • Description of the chemical composition and of the digestive/metabolic utilization of foods. Knowledge of the specific requirements for the different nutrients. • *Applying knowledge and understanding* • Identification of the possible nutritional strategies for pathologies due to incorrect nutrition or to genetic origin. Evaluation of the suitability of particular foods for specific diets. • *Autonomy of judgment* • Elaboration of reasonable hypotheses for the composition of foods and/or

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	diets for the maintenance of individual physical well-being. • *Communicating knowledge and understanding* • Ability to explain adequately the specific compositions of foods and the reasons for the choice of certain diets. • *Communication skills* • Ability to set up presentations to diffuse scientific contents at various levels. • *Capacities to continue learning* • Ability to update in a constant and autonomous way the notions about the possibilities to innovate foods and their combinations in diets.
Criteria for assessment and attribution of the final mark	
Additional information	

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