Universitat de Lleida

DEGREE CURRICULUM

NUTRACEUTICS AND AGING

Coordination: MOTA MARTORELL, NATÀLIA

Academic year 2021-22

Subject's general information

Subject name	NUTRACEUTICS AND AGING
Code	100629
Semester	1st Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Character	Modality
Bachelor's Degree in Human Nutrition and Dietetics	4	OPTIONAL	Attendance-based

Course number of credits (ECTS)	6
Type of activity, credits, and groups	

Activity type	PRAULA	TEORIA
Number of credits	3	3
Number of groups	1	1

Coordination	MOTA MARTORELL, NATÀLIA
Department	EXPERIMENTAL MEDICINE
Important information on data processing	Consult this link for more information.

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MOTA MARTORELL, NATÀLIA	natalia.mota@irblleida.udl.cat	3	
OBIS MONNE, ELIA	elia.obis@udl.cat	3	

Subject's extra information

Due to the current health situation caused by the Covid-19 pandemic, most of the subject has been programmed in virtual format. However, depending on the evolution, this programming may be affected by either an increase in presence or virtuality.

Learning objectives

Knowledge goals:

1. Understanding the social dimension of the aging population.
2. Demonstrate that the biological elements involved in the aging process are knowed.
3. Understanding the close relationship between the structure and function at all levels of organization of living as a determinant of longevity beings.
4. Discerning and understanding how the different nutritional interventions can modify the aging process.

Capability goals: Students who pass the subject must be able to:

1. Use oral and written communication skills in the most appropriate and effective way.
2. Think clearly and critically, fusing experience, knowledge and reasoning.
3. Identify, interpret and solve problems effectively.

Competences

CE1. To know the chemical, biochemical and biological fundamentals of application in human nutrition and dietetics.

CE2. Apply the mathematical and physical concepts learned in biomedical experiments and research.

CE34. Describe the main types of poisons, toxins and their actions.

CG3. Recognize one's own limitations and the need to maintain and update one's professional competence, with special recognize one's own limitations and the need to maintain and update professional competence, giving special importance to learning, in an autonomous and continuous way, new knowledge, products and techniques in nutrition and food, as well as motivation for quality.

CG4. Respect the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values.

CG5. Apply the gender perspective to the tasks of the professional field

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the development and defence of arguments and problem solving within their area of study.

CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature.

CB4. That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.

CB5. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

CT1. Have a correct oral and written expression.

CT2. Master a foreign language.

CT5. Acquire essential notions of scientific thought.

Subject contents

Lesson 1. Aging process

The historical perspective. Social dimension of the aging population. Definition of aging. Average longevity versus maximum longevity. Aging theories.

Lesson 2. Nutraceutics

Definition. Classification. Properties, structure and function. Bioavailability study and bioavailability.

Lesson 3. **Oxidative stress**

The natural history of oxygen. Oxygen toxicity. The origin of the theory of free radicals.

Lesson 4. **Reactive oxigen species**

Chain mitochondrial electron transport. The generation of reactive oxygen species. physiological mechanisms that influence the production of ROS.

Lesson 5. **Antioxidant cellular systems**

Enzymatic antioxidants. Nonenzymatic antioxidants. Antioxidants repair systems, replacement or detoxification.

Lesson 6. Oxidative stress effects

Reactive molecular intermediates of first and second generation. Endogenous oxidative damage on lipids, proteins and DNA.

Lesson 7. Longevity and oxidative stress

Interspecies comparative studies. Injury and endogenous antioxidant levels in longevity. Endogen oxidative damage in aging. Structural cellular components resitants to oxidative damage.

Lesson 8. Nutritional interventions

Caloric restriction and oxidative stress. The mechanism of caloric restriction. Caloric restriction and aging. Protein restriction, oxidative stress and aging. Methionine restriction, oxidative stress and aging.

Lesson 9. Aging related pathologies

Neurodegenerative diseases: Alzheimer and Parkinson. Study on the effect of nutrition on aging and

associated pathologies.

Lesson 10. Nutraceutical foods and aging

Nutraceuticals and aging. Aging related pathologies and nutraceutical use and effects .

Methodology

To achieve the objectives and acquire the powers conferred upon the following activities are scheduled:

Classroom teaching : They are made with all students. They are intended to give an overview of the thematic content of the subject highlighting those aspects that are going to serve them in their training.

Seminars : They are conducted with all students and attendance is mandatory. The seminars are aimed at students to apply theoretical concepts and deepen with the most important and most complex aspects of the issues.

Specific work: Bibliographic research work with Professor monitoring will be conducted and will be presented at the end of the course. The works are aimed at students to apply the theoretical concepts and deepen with some aspect of the subject complex through also the implementation of the transversal competences.

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Development plan

Day	
1	introducció
2	Tema 1.Envelliment
3	Seminari 1.
4	Tema 2. Nutriceutics
5	Seminari 2.
6	Tema 3.Estrès oxidatiu
7	Tema 4. ROS I
8	Tema 4. ROS II
9	Tema 5. Antioxidants
10	Tema 6. Efectes dels ROS
11	Seminari 3.
12	Seminari 4.
13	Tema 7. Longevitat
14	Estudi
15	Tema 8. CR
16	Tema 8. MetR

17	SEminari 5.
18	SEminari 6.
19	Tema 9. Patologies
20	Seminari 7.
21	Seminari 8.
22	Seminari 09.
23	Seminari 10.
24	Seminari 11.
25	Presentació oral treballs
26	Presentació oral treballs
27	Presentació oral treballs
28	Presentació oral treballs
29	Presentació oral treballs
30	Presentació oral treballs

Evaluation

Exams 58%.

Two exams (29% each) including all the theoretical part. The exams will consist of multiple choie questions and short-answer questions.

To pass the course, students will have to pass this appraisement with a minimum of 50% of the value of this section.

Failure to attend an examination for fully justifiable reasons, will be communicated during the same week of the announcement of the exam. Date and timetable agreed between the teacher and student for the exam within the same week of the call will be sought.

Seminars 17%

The seminar is conducting reviews of the literature discussing scientific articles related to the topics discussed in class. Comments will be made and discussed different aspects the seminar. One of the seminars will try to conduct a debate on an issue related to any topic of the subject.

The evaluation is as follows:

- Assistance to seminars, implementation of activities, active participation in the comments of the different scientific papers, participation and conduct of the debate.

- Compulsory attendance at all seminars. Two excused absences are allowed.

Specific work 25%

Students will have to do a bibliographic research by some topics selected by the teacher, submit a written report, and will have to present it orally in front of the class.

The duration of the presentation will be 20 minutes plus 5 or 10 minutes of questions.

Each student will have to do at least 5 questions and / or comments along attendance at presentations of the work from their classmates.

The evaluation will be as follows:

- Written work (introduction, content, conclusions, literature) 35%

- Oral presentation (introduction, content, conclusions) 35%

- Resolution of Questions 5%

- If the student fails to attend more than two presentations of the work of their peers 10% of the note is subtracted.

- Exam to evaluate the knowledge learned from all the specific works of the classmates.

Bibliography

Halliwell, B. **Free radicals in biology and medicine**. Publicació Oxford; New York: Oxford University Press, 2007 Edición 4th ed

Masoro, Edward J **Caloric restriction: a key to understanding and modulating aging**. [Recurs electrònic] : a key to understanding and modulating aging / Edward J. Masoro Publicació Amsterdam ; Boston : Elsevier, 2002 Edición 1st ed

Antioxidant and redox regulation of genes [Recurs electrònic] / edited by Chandan K. Sen, Helmut Sies, Patrick A. Baeuerle Publicació San Diego : Academic Press, 2000

Handbook of the biology of aging [Recurs electrònic] / editors, Edward J. Masoro and Steven N. Austad Publicació Amsterdam ; Boston : Elsevier Academic Press, 2006 Edición 6th ed.

McDonald, RB. **Biology of Aging**. Edited by Garland Science, Taylor & Francis Group, LLC., 2014.

Enlazes de interés

www.freemedicaljournals.com

www.scopus.com

www.ncbi.nlm.nih.gov

www.nutricion.org

www.nal.usda.gov/fnic

Revistas

Age

Ageing research review

Aging cell

Biogerontology

Rejuvenation research

Experimental Gerontology

Gerontology

Journal gerontology B physiological sciences

Neurobiology of Aging

Journal of nutritional Health and aging

Experimental aging research

Molecular Nutrition and Food Research

Journal of Biological Chemistry

Current Biology

Mechanisms of Ageing and Development

Free radical Biology and Medicine

Food and Chemical Toxicology

American Journal of Clinical Nutrition

Proceedings of the NationalAcademy of Sciences USA

Revista Española de Geriatría y Gerontología (REGG)

Etc...