

NUTR 301Ea The Mediterranean Diet: from Fiction to Facts

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Office Hours: Tuesday 11:00-12:00 / Wednesday 17:30-18:30

Course information:
Spring 2020
Monday and Wednesday
16:00-17:20

Course Description

The course is intended to teach students about the critical role of nutrition on longevity and diseases related to aging. The Mediterranean diet is a type of diet located geographically in countries bordering the Mediterranean Sea. This diet has unique characteristics since it combines excellent gastronomic properties with a high and extremely healthy nutritional value. However, a series of not real myths or fictions created around the Mediterranean diet simply devalues it and its favorable properties. That situation is not helpful to increase the adherence to the MD, crucial to improving the health in general and to promote longevity. The objective of this course is to show the composition of the authentic Mediterranean diet and study from a biological point of view the components that are responsible for the positive effects on health.

Course Goals and Methodology

The course aims are to introduce students to the study of the Mediterranean Diet from a double point of view, the biological reasons for its positive effects on the health and longevity, and the nature and properties of typical nutrients included in this diet. This study will be complemented by the elaboration of Spanish dishes containing foods of the MD.

Goals:

- Know what is the Mediterranean Diet (MD)
- Analyze the components of the Mediterranean Diet
- Identify the biological effects of nutrients included in the MD
- Determine how MD nutrients can promote good health
- Evaluate how MD nutrients can retard aging.
- Analyze some Spanish dishes containing components of the MD

At the beginning of the course as a starting material, students will have the syllabus. No reference textbook is available since topics included in the course are not included in only one book. Students will have access to materials to follow the course at the e-Learning platform called Virtual Classroom or Aula Virtual (<https://campusvirtual.upo.es/>) using the login/password provided during the course enrollment.

This course uses an inverted class or flipped class methodology. It implies that students must prepare the class beforehand by using varied materials indicated by the teacher. These materials can be videos, papers, and web pages. Using these materials, students must answer two questionnaire that will help the teacher to prepare the class session.

The answers in the questionnaires will not be evaluated; it is noted that the student has answered both questionnaires, that he/she has participated and prepared the next class.

The evaluation in this course is continuous. In each of the lessons, we will include evaluation activities that will be accumulated throughout the course. In this course, the daily homework assignment will be to prepare the following class using the material supplied by the professor.

Learning Objectives

Through this course, students will:

- Describe the origins of the Mediterranean Diet (MD).
- List the essential components of the MD
- Analyze if a diet fits the criteria of MD using the MD score (MDS)
- Design dishes adjusted to the MD
- Analyze epidemiological studies about the effects of MD
- Describe the effects of MD on the health
- Describe the diseases on which MD acts positively
- Explain how MD prevents or mitigates the effects of human diseases
- Define what aging is
- List the hallmarks of aging
- Apply the effects of MD to the causes of aging
- Describe the active ingredients found in MD foods to fight against disease or aging
- Analyze the molecular function target of the active ingredients of MD foods

Required Texts

Books of General Biochemistry:

- Principles of biochemistry. Lehninger, Albert L. ; Nelson, David L. (David Lee), 1942- ; Cox, Michael M. ; New York : Freeman; 2013
- Biochemistry. Berg, Jeremy M. ; Tymoczko, John L. ; Stryer, Lubert ; New York : W. H. Freeman and Company; cop. 2002

Books of Nutrition:

- Clinical nutrition Nutrition Society (Great Britain) ; Elia, Marinos ; Chichester, West Sussex : Wiley-Blackwell; c2013
- Molecular basis of nutrition and aging Malavolta, Marco.; Mocchegiani, Eugenio; London : Academic Press; 2016

Other sources:

- Olive : a global history. Lanza, Fabrizia. London : Reaktion Books; 2011

- Olive oil and health Quiles, José L.; Ramírez-Tortosa, M. Carmen.; Yaqoob, Parveen.; Wallingford, UK ; Cambridge, MA : CABI Pub.; c2006
- Cereals and pulses nutraceutical properties and health benefits Yu, Liangli.; Cao, Rong.; Shahidi, Fereidoon, 1951-; Ames, Iowa : Wiley-Blackwell; 2012
- Phytochemicals of Nutraceutical Importance Prakash, D. ;Sharma, G. ;Prakash, Dhan ; Sharma, Girish Wallingford: CABI; 2014

The rest of the bibliography (articles, videos, and web pages) will be provided to the students as the material of the different lessons.

The origin of the graphic materials is indicated in the corresponding documents or slides.

Course Requirements and Grading

Final exam: At the end of the course. It is an online exam performed in a computer room. It is composed of 30 multiple choice questions where only one option is correct, 4 short-answer questions and one essay question.

Class activities, lab reports: Each lesson ends with a group or individual activity that will be reviewed by the professor.

Participation: Students must participate in preparing each class in advance with material provided by the professor. Before each lesson, students should complete two questionnaires, one of multiple-choice questions with a single correct answer, and a second short-answer questionnaire. It will be possible to obtain the maximum grade (100%) after the completion of both questionnaires if the answers indicate a real dedication to carry it out. The score of the questionnaires can be increased up to 110% if a student obtains 100% in the multiple-choice questionnaire. This questionnaire can be completed up to 4 times.

Classbook: The class book is a notebook that will be used as a method for controlling class attendance, and as a tool for student participation. In the notebook, students should respond to questions raised by the teacher during class, surveys, or other activities.

Mid-term exam: To evaluate the course in the middle, the student must perform an individual exam.

The final grade will be calculated as follows:

- Participation (15%)
- Classbook (10%)
- Midterm Exam (20%)
- Class activities: Regular classes and lab activities (25%)
- Final Exam (30%)

General Course Policies

Leaving the classroom: Leaving the classroom on repeated occasions is disturbing to both professors and classmates and may adversely affect the participation grade. Please make use of the 10-minute breaks in between classes to fill up the water bottle, use the restroom, and other activities.

Punctuality and tardiness: Arriving late to class is disruptive to both the professor and classmates. Please be punctual as the professor may count late arrival as half of an absence or close the door, not let any late students in and consider it as one full absence.

Communicating with instructor: Please allow at least 48 hours for your instructor to respond to emails. The weekend is not included in this timeframe. If you have an urgent request or question for your professor, be sure to send it during the week.

Attendance and Absentee Policy

Attendance is mandatory at all classes. As we understand that you might fall ill or be unable to come to class (e.g. due to a religious holiday, a flight delay, a family wedding/reunion, a graduation, a job interview, etc.) at some point during the semester, you are allowed up to 4 absences. You will be responsible for the material covered and any work missed. You will not need to justify your absences (up to 4) in any way unless you miss an exam, a presentation, a quiz, etc. In this case, you must present a doctor's note (signed, stamped and dated) to be able to reschedule the exam, etc. It will still count as an absence but you will be allowed to retake the exam, etc. We don't encourage you to use all 4 days unless you really need them as your participation grade may suffer if you are not in class. If used unwisely and you get sick late in the semester, the following penalties will apply:

- On your 5th absence, 1 point will be taken off of your final Spanish grade
- On your 6th absence, 3 points will be taken off of your final Spanish grade
- On your 7th absence, 5 points will be taken off of your final Spanish grade

For classes that meet once a week, each absence counts as two. For classes that meet daily, the penalties outlined above apply if you go over 6 absences (7th absence=5th absence above). Exams missed due to an excused absence must be made up within a week of returning to classes. Talk to your professor immediately after your return.

Academic Honesty

Academic integrity is a guiding principle for all academic activity at Pablo de Olavide University. Cheating on exams and plagiarism (which includes copying from the Internet) are clear violations of academic honesty. A student is guilty of plagiarism when he or she presents another person's intellectual property as his or her own. The penalty for plagiarism and cheating is a failing grade for the assignment/exam and a failing grade for the course. Avoid plagiarism by citing sources properly, using footnotes and a

bibliography, and not cutting and pasting information from various websites when writing assignments.

Learning Accommodations

If you require special accommodations, you must stop by the International Center to speak to Carmen G. Hernández (the Faculty coordinator: cgheroje@acu.upo.es) to either turn in your documentation or to confirm that our office has received it. The deadline is February 21st. Carmen will explain the options available to you.

Behavior Policy

Students are expected to show integrity and act professionally and respectfully at all times. A student's attitude in class may influence his/her participation grade. The professor has a right to ask a student to leave the classroom if the student is unruly or appears intoxicated. If a student is asked to leave the classroom, that day will count as an absence regardless of how long the student has been in class. Cell phone use is not allowed, and animals (except seeing-eye dogs) are not permitted in the classrooms.

Time distribution table corresponding to face-to-face classes

Classroom	27 h
Laboratory and field work activities	12 h
Exams	3 h
Total	42 h

Course contents

Lesson 1: What is the Mediterranean diet?

1. The historical origin of the Mediterranean diet (MD)
2. The traditional Mediterranean diet
3. The seven countries study
4. The food composition of the Mediterranean diet
5. Ultra-processed foods in MD
6. Benefits of MD
7. The Mediterranean diet score (MDS)
8. The pyramid of the Mediterranean diet
9. MD versus Standard Western diet

Lesson 2: Health benefits of MD

1. Survival studies versus epidemiologic studies
2. Aging parameters
3. Component of epidemiological studies
4. Proven effects of MD and food components

Lesson 3: Biological mechanisms of MD effects

1. General effects of MD on aging-related diseases
2. Definition and theories of aging
3. Nutritional aspects of aging
 - a. Nutrient sensing
 - b. Mitochondrial dysfunction
 - c. Epigenetics changes
5. MD and caloric restriction

Lesson 4: Aging-related diseases: targets of MD

- a. Metabolic syndrome, diabetes and obesity
- b. Vascular inflammation, dyslipidemia and CVD
- c. Cancer
- d. Degenerative diseases

Lesson 5: Olive oil as the best source of MUFA

1. The olive and olive tree
 - a. Olive tree culture
 - b. Structure and fruit development
2. Methods to produce olive oil
 - a. Procedure
 - b. Types of olive oil
 - c. The composition of the olive oil

- i. Fatty acids
 - ii. Triacylglycerols (TAGs)
 - iii. Polyphenols
 - iv. Esterols
 - v. Odorant molecules
 - d. Quality parameters in olive oil
 - i. Acidity
 - ii. Peroxidation
3. Epidemiological studies of EVOO effects
4. Biological effects of EVOO

Lesson 6: The role of PUFA in the MD action

1. Nutritional value of fish
 - a. Sources of PUFA
 - i. Oily fish and nuts
 - b. Omega-3 and omega-6 PUFA
 - c. Effects of PUFA on the health
 - d. Negative effect of fish consumption
 - i. Toxic compound accumulation
 - ii. Peroxidation
 - e. The ratio $\omega 3/\omega 6$
 - i. Meaning of the ratio
 - ii. Anti-inflammatory action of $\omega 3$

Lesson 7: How avoid meat in MD as source of proteins?

1. Protein function and structure
 - a. Amino acids structure
 - b. Type of amino acids
 - c. Proteogenic and essential amino acids
2. Amino acid requirements in the diet
 - a. Animal sources in MD
 - b. Plant sources in MD
3. Legumes in MD as protein source
 - a. Nutritional
 - b. Cost
 - c. Environmental
4. Seafood in MD as protein source
 - a. Nutritional
 - b. Cost
 - c. Environmental
5. The savvy combination of legumes and cereals in MD

Lesson 8: The hidden role of fiber in MD goodness

- a. Sources of edible fiber in MD
- b. Fiber classification
- c. Fiber properties
- d. Physiological effects of fiber

Lesson 9: MD is an antioxidant diet

1. Antioxidant in fruits, vegetables and spices
 - a. Redox reactions and redox stress
 - b. Free radicals
 - i. Definition
 - ii. Formation
 - c. Effects of oxidative stress
 - d. Antioxidants classification
 - e. Action of antioxidants to block oxidative stress
2. Epidemiologic studies about fruits
3. Examples of antioxidants
 - a. Carotenoids
 - b. Vitamin C
 - c. Resveratrol
4. Antioxidants as bioactive molecules
 - a. The hormetic effect

Holidays

- Thursday, February 27: "Puente." No classes will be held.
- Friday, February 28: Día de Andalucía.
- Monday, March 2: "Puente." No classes will be held.
- Sunday, April 5 - Sunday, April 12: Semana Santa (Holy Week).
- Friday, May 1: Labor Day.
- Saturday, April 26 - Sunday, May 2: Feria de Abril (Seville's April Fair).

Class Schedule

#	Date	Location	Activity	Due Date
1	29/01/2020	Classroom	Presentation	
2	03/02/2020	Classroom	Lesson 1a	Q: 03/02/2020
3	05/02/2020	Computer Room	Lesson 1b	
4	10/02/2020	Lab 4 B23	Ultraprocessed foods and MD (I)	
5	12/02/2020	Lab 4 B23	Ultraprocessed foods and MD (II)	R: 19/02/2020
6	17/02/2020	Classroom	Lesson 2	Q: 17/02/2020
7	19/02/2020	Classroom	Class Activity 2: rMED score	R: 26/02/2020
8	24/02/2020	Classroom	Lesson 3	Q: 24/02/2020
9	26/02/2020	Classroom	Class Activity 3: MD and Okinawan diet	R: 11/03/2020
10	04/03/2020	Classroom	Lesson 4	Q: 04/03/2020
11	05/03/2020	External visit	Visit to EVOO factory	R: 13/03/2020
12	09/03/2020	Computer Room	Midterm Exam	
13	16/03/2020	Classroom	Class Activity 4: Targets of MD	R:16/03/2020
14	18/03/2020	Classroom	Lesson 5	Q: 18/03/2020
15	23/03/2020	Lab 4 B23	EVOO production	
16	25/03/2020	Lab 4 B23	EVOO quality	R: 25/03/2020
17	30/03/2020	Classroom	Lesson 6	Q: 30/03/2020
18	01/04/2020	Classroom	Class Activity 6: Sources of fat	R: 08/04/2020
19	13/04/2020	Classroom	Lesson 7	Q: 13/04/2020
20	15/04/2020	Classroom	Class Activity 7: Meat or veggies?	R: 23/04/2020
21	20/04/2020	Classroom	Lesson 8	Q: 20/04/2020
22	22/04/2020	Classroom	Class Activity 8: Jeopardy game (I)	R: 30/04/2020
23	4/05/2020	Classroom	Lesson 9	Q: 04/05/2020
24	6/05/2020	Classroom	Class Activity 9: Jeopardy game (II)	R: 06/05/2020
25	11/05/2020	Kitchen lab	Kitchen (I)	
26	13/05/2020	Kitchen lab	Kitchen (II)	
27		Computer room	Final Exam	