NUTR 301E The Mediterranean Diet: From Fiction to Facts

Course Description

The course is designed to teach students about the critical role of nutrition in longevity and diseases related to aging. The Mediterranean Diet is a type of diet located in countries bordering the Mediterranean Sea. This diet has unique characteristics, combining excellent gastronomic properties with a high and highly healthy nutritional value. However, false myths or fiction about the Mediterranean diet devalue its favorable properties. That situation does not help increase the adherence of MDs, which is crucial to improving health in general and promoting longevity. This course aims to show the composition of the authentic Mediterranean Diet and study from a biological point of view the components responsible for the positive effects on health.

A Critical Point. An introductory knowledge of biology, biochemistry, or organic chemistry is required to follow this course adequately.

Course Objectives and Methodology

The course aims to introduce students to the Mediterranean Diet from two points of view: a) the biological reasons for its positive effects on health and longevity and b) the nature and properties of specific nutrients in this diet. This study will be complemented by elaborating dishes containing foods of the MD.

Goals:

- Know what the Mediterranean Diet (MD) is
- 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 that contain components of MD.

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

This course uses an inverted-class or flipped-class methodology. Students should analyze the class material prior to the beginning of each lecture, which can include videos, papers, and Web pages. At the end of each lecture, students must answer one exam.

Evaluation in this course is continuous. In each lecture, we will include evaluation activities accumulated throughout the course. The following list contains mandatory course activities:

- Video class/quiz: Watch a video about the lecture and try to answer several questions.
- Online exams: One quiz after each lecture on the Blackboard
- Class Activities: Individual or group activities performed in the classroom using Kahoot, Genially, or questionnaires.
- Lab work: Laboratory Activities

Learning Objectives

Through this course, students will:

- Describe the origins of the Mediterranean Diet (MD).
- List the essential components of MD.
- Analyze if a diet meets the MD criteria using MD scores.
- Transfer the MD to a different geographical location.
- Design dishes adjusted to the MD.
- Analyze epidemiological studies on the effects of MD.
- Describe the impact of MD on health.
- Describe the diseases in which MD acts positively.
- Explain how MD prevents or mitigates the effects of human diseases.
- Describe the active ingredients found in MD foods to combat disease or aging.
- Analyze the target molecular function of the active ingredients in MD foods.

Recommended Texts

It is not necessary to purchase textbooks for this course. All necessary bibliographical material will be provided. In some activities, students may need an additional bibliography. In that case, journals can be accessed from the University's computer network.

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 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

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

Course Requirements and Grading

Final exam: This is an online exam conducted in a computer room at the end of the course. It comprises 30 multiple-choice questions with only one option and 5 short-answer questions.

Mid-term exam: In the middle of the course. It is an online exam conducted in a computer room. It comprises 30 multiple-choice questions with only one option and 4 short-answer essay questions.

Class activities and laboratory reports: Each lecture ends with a group or individual activity that the professor will evaluate. The reports of class and lab activities will be hand-delivered during the class on the date indicated in the rules for each activity. Late submission will be penalized with 20% on the grade obtained for each day late.

Participation: Students must prepare each class in advance with material provided by the professor. This material has a class video that students should view and answer several questions.

Lesson quiz: At the end of the class, students should complete an online exam with multiple-choice questions with a single correct answer. It is recommended that students check the due dates of the online exam as they cannot be completed after this date.

The final grade will be calculated as follows:

- Participation (25%)
    - Online exams 15%
    - video quiz 10%
- Mid-term exam (20%)
- Class activities and laboratory reports: Regular classes and lab activities (30%)
- Final exam (25%)

This course does not offer the possibility of recovering or compensating for the lack of delivery of class activities or low grades with additional activities not indicated in this syllabus. Throughout the course it will be offered extra activities such as a visit to an olive oil factory or attendance at a cooking laboratory, which can be used to improve the grade of the class activities. **They may not be used to improve exam grades.**

General Course Policies

Leaving the Classroom: Leaving the classroom repeatedly disturbs both professors and classmates and may adversely affect the participation grade. Please take 10-minute breaks between classes to fill the water bottle, use the restroom, and do other activities.

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

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

Student engagement policy

Student's engagement will account for at least 20% of the final grade for every course, thus highlighting its significance for high-impact learning.

Students will receive two engagement grades: a mid-term grade (at least 10%) and an end-of-semester grade (at least 10%).

An engagement rubric is provided to ensure transparent and consistent grading.

Absences and lack of engagement

Absences during the add/drop period do not count against students' engagement grades but may impact their performance in the course.

As a consistent lack of academic engagement may raise concerns about a student's overall academic performance, the following steps will be taken to support students' success:

Initial outreach – after missing 3 classes*

E-mail from professor reiterating engagement policy and consequences for additional absences.

* 1 class for courses that meet once a week and 6 classes for courses that meet daily.

Second outreach – after missing 4 classes*

E-mail from professor and notification of academic staff at the International Office.

* 2 classes for courses that meet once a week and 8 classes for courses that meet daily.

Academic probation – after missing 6 classes*

Student is called in for a meeting with academic staff at the International Office. Automatic notification of home institution and further academic consequences.

* 3 classes for courses that meet once a week and 12 classes for courses that meet daily.

Any additional absences will result in a failing grade.

RUBRIC

Criteria	Exemplary (9-10)	Proficient (7-8)	Passing (5-6)	Poor (0-4)
Attendance	Arrives on time and stays for the entire duration of class. No absences, or if absent once, demonstrates knowledge of course material missed.	Misses no more than two sessions or is occasionally late. Demonstrates knowledge of course material missed.	Misses 3 or 4 sessions or frequently arrives late/leaves early; exhibits little knowledge/interest regarding course material missed.	Misses 5 or more sessions and does not demonstrate knowledge of course material missed.
Preparation	Consistently well-prepared; demonstrates deep understanding of readings and completes assignments.	Usually prepared; completes readings with some understanding and usually completes assignments.	Occasionally prepared. Demonstrates limited understanding of materials and occasionally completes assignments.	Rarely prepared; minimal effort to engage with course materials.
Participation	Actively participates in discussions with thoughtful comments/questions ; demonstrates knowledge of the material and critical thinking skills.	Participates often demonstrating knowledge of material and critical thinking skills.	Participates once in a while or contributions lack depth or relevance.	Does not participate or is disruptive during discussions.
Attentiveness & Respect	Fully engaged and attentive during all sessions; respectful to professor and fellow students. Use of laptop/tablet for notetaking only; no cellphone use.	Generally attentive, with very infrequent lapses in focus and use of electronic devices for non-class related purposes. Respectful to professor and fellow students.	Occasionally inattentive or disengaged. Use of electronic devices for non-class related purposes thus showing disrespect towards professor and fellow students.	Rarely attentive, focused or responsive. Repeated use of electronic devices for non-class related purposes thus showing disrespect towards professor and fellow students.
Collaboration & Feedback	Effectively collaborates with peers in group or in-class activities following professor's instructions. Incorporates feedback to improve learning & performance.	Collaborates frequently with peers or in in-class activities. Incorporates feedback and makes moderate efforts to improve learning & performance.	Occasionally works well with peers but does not contribute substantially to in-class or group assignments. Responds to feedback inconsistently with minimal improvement.	Does not collaborate with peers, does not complete in-class or group assignments. Ignores feedback.

Academic Honesty

Academic integrity is a guiding principle for all academic activity at Pablo de Olavide University. Cheating on exams and plagiarism (including copying from the Internet) violate academic honesty. A student is guilty of plagiarism when he or she presents another person's intellectual property as his 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 properly citing sources, using footnotes and a bibliography, and not cutting and pasting information from various websites when writing assignments.

About using artificial intelligence (AI)

The use of AI tools such as grammar checkers, ChatGPT, etc., and automatic translation tools is prohibited unless expressly authorized by the instructor to enhance the students' learning experience. Plagiarism includes but is not limited to, the unacknowledged use of these tools to create content submitted as one's own. If using any of these tools is suspected, the instructor can request notes and other materials to prepare the assignments. Students must retain these materials until the final grades are posted. Failure to produce these materials when requested can negatively impact student grades.

Learning accommodations

If you require special accommodations or have any other medical condition you deem may affect your class performance, you must stop by the International Center to speak to Marta Carrillo (mcaroro@acu.upo.es) to turn in your documentation or to confirm that our office has received it. Marta will explain the options that are available to you.

Behavior Policy

Students are always expected to show integrity and act professionally and respectfully. 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 allowed only for teaching activities. Animals (except seeing-eye dogs) are not permitted in classrooms.

Time distribution table corresponding to face-to-face classes

Classroom	33 h
Laboratory and fieldwork activities	10 h
Exams	3 h
Total	**46 h**

Course Content

Lecture 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 and MD pattern
4. The Pyramid of the Mediterranean Diet
5. The Food Composition of the Mediterranean Diet
6. Benefits of MD
7. MD versus standard Western diet
8. The Mediterranean diet score (MDS)
9. Transferring MD to other countries
10. Ultra-processed foods in MD

Lecture 2: How to analyze MD effects

1. Epidemiological studies classification
    a. Case-control
    b. Cohort studies
    c. Random Controlled Trials (RCT)
2. Cohort studies in MD
3. RCT in MD
4. Survival studies versus epidemiological studies
5. Components of Epidemiological Studies
6. Proven effects of MD foods

Lecture 3: Biological Mechanisms of MD Effects

1. A general view of metabolism
    a. Main Features of Metabolism
    b. Functions of metabolism
    c. Nutrient digestion
    d. Fuel for organs
2. Nutrient Assimilation
    a. Carbohydrates
    b. Proteins
    c. Fats
3. Effects of MD Foods on Metabolic
4. Definition of aging
5. Metabolic pathways modified by MD
6. Mitochondrial improvement generated by MD
7. Epigenetic changes in MD
8. Caloric restriction in MD

Lecture 4: Aging-related diseases: MD targets

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

Lecture 5: Olive oil as the best source of MUFA

1. Olive and olive tree
    a. Olive tree culture
    b. Structure and Fruit Development
2. Methods of Producing Olive Oil
    a. Procedure
    b. Types of olive oil
    c. The composition of olive oil
        i. Fatty acids
        ii. Triacylglycerols (TAGs)
        iii. Polyphenols
        iv. Sterols
        v. Odorant molecules
    d. Quality parameters in olive oil
        i. Acidity
        ii. Peroxidation
3. Epidemiological studies of the effects of EVOO
4. Biological effects of EVOO

Lecture 6: The role of PUFA in MD action

1. Sources of PUFA
    a. Oily fish and nuts
2. Omega-3 and omega-6 PUFA
3. Effects of PUFA on Health
4. The Negative Effect of Fish Consumption
    a. Toxic Compound Accumulation
    b. Peroxidation
5. The ratio ω3/ω6
    a. Meaning of the ratio
    b. The anti-inflammatory action of ω3
6. Nuts as an alternative source of PUFA

Lecture 7: How to avoid meat in MD as a source of proteins

1. Protein Function and Structure
    a. Amino acid structure
    b. Type of amino acids
    c. Essential and proteogenic amino acids
2. Amino acid requirements in the diet
    a. Animal sources in MD
    b. Plant Sources in MD
3. Legumes in MD as a protein source
    a. Nutritional
    b. Cost
    c. Environmental
4. The smart combination of legumes and cereals in MD

Lecture 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

Lecture 9: MD is an antioxidant diet

1. Antioxidants in fruits, vegetables, and spices
    a. Redox reactions and redox stress
    b. Free radicals
        i. Definition
        ii. Formation
    c. Effects of Oxidative Stress
    d. Antioxidant classification
    e. The action of antioxidants to block oxidative stress
2. Epidemiologic studies of fruits
3. Examples of antioxidants
    a. Carotenoids
    b. Vitamin C
    c. Resveratrol