

Marine and Aquatic Ecosystems in the Mediterranean

LANGUAGE: English

TOTAL HOURS: 45 hours

CREDITS: 3 credits

SIS Course Code: MSC 299 (Marine Science)

This course will appear on a Jacksonville University transcript as MSC 299 - Special Topics: Marine and Aquatic Ecosystems in the Mediterranean

DESCRIPTION

The course will explore the different marine and freshwater ecosystems throughout the Mediterranean, highlighting their unique biodiversity and ecological importance, main threats, and conservation priorities. The first part of the course will look into the dynamics that characterize some of the most important marine and freshwater ecosystems, highlighting their conservation needs. The second part of the course will focus on the human impact on coastal and aquatic habitats, including fishing and tourism, and identify the key threats posed by these industries, as well as priority actions to reverse and mitigate the current situation. The last element will focus on restoration and conservation efforts for these vulnerable ecosystems in the region and will ask students to formulate habitat-specific conservation plans for selected locations. The course will feature a number of field trips to complement the in-class elements, and to provide a more direct exposure to the subjects discussed in class.

COURSE OBJECTIVES

By the end of the course, students will be able to:

- Identify the defining characteristics and dynamics of key marine and freshwater Mediterranean ecosystems.
- Recognize the main threats for vulnerable marine and freshwater habitats and come up with effective conservation and mitigation strategies.
- Understand the historical and current trends of marine resource exploitation by humans in the region and be familiar with regional policies.
- Recognize the Ecological importance of Wetlands.
- Formulate management plans for a range of aquatic ecosystems.

METHODOLOGY

The course objectives will be met through a combination of lectures, discussions, written assignments, exams and field trips to give students the opportunity to learn from a broad range of pedagogical elements. These elements are described below:

Lectures will provide the platform to introduce each topic, set core concepts and analyze the different elements involved in each session while promoting discussions to share different points of view and encourage student participation.

Readings: selected literature for each session will provide an overview of the relevant subject and background information, or a case study that illustrates the main ideas to be discussed during class. Readings consist mostly of academic publications (peer-reviewed articles).

Reading Assignments will be based on the reading for a particular session and aim to help the student identify the key information from the selected article(s) and facilitate discussion during class.

In-class activities are designed to apply the learned information and help the student assimilate it in a more personal way. These consist of group activities, analyses, presentations and documentary viewings among others. These activities also promote student participation.

Research project: Students will choose a topic related to the course material and explore it in more detail, proposing a long-term management approach for an identified regional problem. The written part will be followed by an oral presentation.

Field trips will provide a hands-on experience to some of the topics through visits to certain localities that exemplify some key topics presented in class. There will be **Four** field studies as part of this course, supporting several of the course subjects:

- a. Delta del Llobregat (Wetlands and coastal ecosystems).
- b. Barcelona Aquarium (Marine Ecosystems).
- c. Maresme/Vilanova (Fishing, urban coastline).
- d. Port Olympic (self-guided visit).

EVALUATION

Attendance to classes and field trips is mandatory; poor attendance will affect the final grade of the student as well as the everyday participation grade.

The final grade will be calculated as follows:

Class participation and Homeworks	15%
Field Trips	20%
Research Project	25%
Midterm exam	20%
Final exam	20%

Class Participation: Participation will be graded every class following a participation rubric. Active class participation includes coming to class prepared and on time, having read the material for that day and show active reflection on that material, answering questions from the professor, generating questions and engaging in group activities using required reading for that day. Students are encouraged to express their opinions in class with the professor and the other students.

Exams: Both the midterm and the final exams may contain a mix of short answer and essay questions aimed to test the students' full comprehension of facts and the ability to argue his/her opinions based on class material.



ACADEMIC INTEGRITY

SIS programs foster critical thinking and intellectual development of its students. In doing so, SIS requires that students introduce their original thoughts, opinions, and ideas in all of their assignments with the support of cited sources. Any violations of academic integrity- such as cheating, plagiarism, self-plagiarism, academic misconduct, fabrication, misuse or misrepresentation of research, and noncompliance - may result in an automatic "F" or immediate dismissal from the program if the student falls below the minimum number of credits required for the term; 12 credits during the semester, or 3 hours during the summer.

Cheating: Any action that violates the rules and guidelines given by the instructor for submitting assignments or exams.

Plagiarism: Any action that presents the ideas, opinions, research, etc. of another as your own.

- Directly copying another's work without citing sources
- Submitting another person's work into your own without properly citing the source(s) used.
- Paraphrasing another person's work without providing appropriate citations

Self-Plagiarism: Submitting a piece of one's own work to receive credit for multiple assignments in one or more class.

Academic Misconduct: Any act that impedes or threatens the open exchange, expression, or flow of information or fair evaluation of students. This includes intimidation and complicity in any acts or attempts to interfere with the ethical and fair submission and evaluation of student work.

Fabrication: Providing inaccurate or false information, including research findings, quotes, and cited sources, etc.

Non-Compliance: Failure to comply with the values, objectives, and procedures contained in this policy.

As SIS is accredited by Jacksonville University, students are held accountable to JU's [Academic Integrity and Code of Conduct](#). You are expected to read and understand the JU terms and regulations of Academic Misconduct.

(<https://drive.google.com/file/d/1PyZmN0EAH1o4bKVZdxVYKw-wdiwXewx/view>)

ATTENDANCE POLICY

Semester: Students are allowed THREE absences throughout the semester without penalty. Starting with the fourth absence, the student's FINAL GRADE will be lowered by a fraction of a letter (1/3 of a letter grade). For example, if a student has 4 absences and a final grade of B+, the grade will be lowered to a B, if 5 absences the grade is lowered to B-.

Summer: Students are allowed TWO absences throughout the summer without penalty. Starting with the third absence, the student's FINAL GRADE will be lowered by a fraction of a letter (1/3 of a letter grade). For example, if a student has 4 absences and a final grade of B+, the grade will be lowered to a B, if 5 absences the grade is lowered to B-.

*January Term students are allowed TWO absences as well.

There are NO excused absences. If a student misses class because s/he is sick, that counts as one of the allowed absences. No excused absences and no excuses.

Quizzes, exams and participation points that are missed because of an absence cannot be recuperated.

Students that arrive late 5 minutes or more will receive a 0 for participation for the day.

COURSE CONTENT

SESSION	CONTENT	READINGS
1	Course Introduction	
2	The Mediterranean Sea: An Overview	<p>Tanhua, T., et al. (2013). The Mediterranean Sea system: a review and an introduction to the special issue. <i>Ocean Science</i> 9, 789-803.</p> <p>Picotti, V., Negri, A., & Capaccioni, B. (2014). The Geological Origins and Paleoceanographic History of the Mediterranean Region: Tethys to Present. In G. Stefano and Z. Dubinsky (Eds), <i>The Mediterranean Sea. Its history and present challenges</i> (p-3-10). Heidelberg: Springer.</p>
3	Life in Aquatic Ecosystems	<p>Mann, K.N. (1991). Organisms and ecosystems, In R.S.K. Barnes and K.H. Mann (eds.). <i>Fundamentals of aquatic ecology</i>. London: Blackwell. (pp 8-11).</p> <p>Shurin, J.B., Gruner, D.S., & Hillebrand, H. (2006). All wet or dried up? Real differences between aquatic and terrestrial food webs. <i>Proceedings of the Royal Society B</i>. 273, 1-9.</p>
4	Coastal Ecosystems: Rocky shores, sandy beaches and Seagrass beds.	<p>Sala et al. (2012). The structure of Mediterranean rocky reef ecosystems across environmental and human gradients, and conservation implications. <i>PLoS ONE</i> 7: e32742.</p> <p>Little, C. (2000). <i>The biology of soft shores and estuaries</i>. Oxford: Oxford University Press. (pp 35-56).</p> <p>Gili, J.M. et al (2014). Zoobenthos. In S. Goffredo and Z. Dubinsky (eds.) <i>The Mediterranean Sea. Its history and present challenges</i>. Heidelberg: Springer. (213-235).</p>



		Pérez-Lloréns, J. et al. (2014). Autochthonous seagrasses. In S. Goffredo and Z. Dubinsky (eds.) <i>The Mediterranean Sea. Its history and present challenges</i> . Heidelberg: Springer (137-158).
5	Field Trip I: Barcelona Aquarium	
6	The Biodiversity of the deep Sea Climate Change in the Mediterranean	Donovaro, R., et al. (2010). Deep-sea biodiversity in the Mediterranean Sea: the known, the unknown and the unknowable. <i>PLoS One</i> 5, e11832. Lejeusne, C., Chevaldonne, P., Pergent-Martini, C., Boudouresque, C.F., Pérez, T. (2009). Climate change effects on a miniature ocean: the highly diverse, highly impacted Mediterranean Sea. <i>TREE</i> 1204 : 1-11.
7	An Introduction to Wetlands Characteristics of Mediterranean Wetlands	Franco, A., Elliott, M., Franzoi, P., & Torricelli, P. (2008). Life strategies of fishes in European Estuaries: the functional guild approach. <i>Marine Ecology Progress Series</i> 354 : 219-228. Blondel, J., Aronson, J., Bodiou, J.Y., and Boeuf, G. (2010). <i>The Mediterranean Region: Biological Diversity in Space and Time</i> . New York: Oxford University Press (128-131).
8	Mediterranean Wetlands: case studies	(Literature to be selected during class).
9	Field-Trip II: Delta del Llobregat	
10	Mid-term Exam	
11	Fisheries I: Overfishing Mediterranean key fisheries.	Jackson, J.B.C., et al. (2001). Historical overfishing and the recent collapse of coastal ecosystems. <i>Science</i> 293 : 629-638. Heffernan, J.P. (2014). Dealing with Mediterranean Bluefin Tuna: A study in international environmental management. <i>Marine Policy</i> 50 , 81-88. Sumaila, U.R. & Huang, L. (2012). Managing Bluefin Tuna in the Mediterranean Sea. <i>Marine Policy</i> 36 , 502-511.
12	Fisheries II: Artisanal Fishing and case studies.	Forcada, et al. (2010). Structure and spatio-temporal dynamics of artisanal fisheries around a Mediterranean marine protected area. <i>ICES Journal of Marine Sciences</i> 67 : 191-203.

		Leitao, P. et al. (2020). Shifting baselines in a Mediterranean small-scale fishery. <i>Ocean and Coastal Management</i> 183 , 104985.
13	Field Trip II: Vilanova Port	
14	Marine Protected Areas Tourism and sustainable development of coastal Areas	Guidetti, P. and Sala, E. (2007). Community-wide effects of marine reserves in the Mediterranean Sea. <i>Marine Ecology Progress Series</i> 335 : 43-56. Bramwell, B. (2004). The policy context for Tourism and Sustainability in Southern Europe's Coastal regions. In: B. Bramwell (Ed), <i>Coastal Mass Tourism: Diversification and Sustainable Development in Southern Europe</i> . Clevedon: Channel View Publications.
15	Presentation of Research projects	
16	Final Exam	

*Number of sessions and order of assignments may vary depending on the term.

BIBLIOGRAPHY

Required Readings

- Blondel, J., Aronson, J., Bodiou, J.Y., and Boeuf, G. (2010). *The Mediterranean Region: Biological Diversity in Space and Time*. New York: Oxford University Press (128-131).
- Bramwell, B. (2004). The policy context for Tourism and Sustainability in Southern Europe's Coastal regions. In: B. Bramwell (Ed), *Coastal Mass Tourism: Diversification and Sustainable Development in Southern Europe*. Clevedon: Channel View Publications.
- Donovaro, R., et al. (2010). Deep-sea biodiversity in the Mediterranean Sea: the known, the unknown and the unknowable. *PLoS One* **5**, e11832.
- Forcada, et al. (2010). Structure and spatio-temporal dynamics of artisanal fisheries around a Mediterranean marine protected area. *ICES Journal of Marine Sciences* **67**: 191-203.
- Franco, A., Elliott, M., Franzoi, P., & Torricelli, P. (2008). Life strategies of fishes in European Estuaries: the functional guild approach. *Marine Ecology Progress Series* **354**: 219-228.
- Gili, J.M. et al (2014). Zoobenthos. In S. Goffredo and Z. Dubinsky (eds.) *The Mediterranean Sea. Its history and present challenges*. Heidelberg: Springer. (213-235).
- Guidetti, P. and Sala, E. (2007). Community-wide effects of marine reserves in the Mediterranean Sea. *Marine Ecology Progress Series* **335**: 43-56.
- Heffernan, J.P. (2014). Dealing with Mediterranean Bluefin Tuna: A study in international environmental management. *Marine Policy* **50**, 81-88.
- Jackson, J.B.C., et al. (2001). Historical overfishing and the recent collapse of coastal ecosystems. *Science* **293**: 629-638.
- Leitao, P. et al. (2020). Shifting baselines in a Mediterranean small-scale fishery. *Ocean and Coastal Management* **183**, 104985.

- Lejeusne, C., Chevaldonne, P., Pergent-Martini, C., Boudouresque, C.F., Pérez, T. (2009). Climate change effects on a miniature ocean: the highly diverse, highly impacted Mediterranean Sea. *TREE* **1204**: 1-11.
- Little, C. (2000). *The biology of soft shores and estuaries*. Oxford: Oxford University Press. (pp 35-56).
- Mann, K.N. (1991). Organisms and ecosystems, In R.S.K. Barnes and K.H. Mann (eds.). *Fundamentals of aquatic ecology*. London: Blackwell. (pp 8-11).
- Pérez-Lloréns, J. et al. (2014). Authochthonous seagrasses. In S. Goffredo and Z. Dubinsky (eds.) *The Mediterranean Sea. Its history and present challenges*. Heidelberg: Springer (137-158).
- Picotti, V., Negri, A., & Capaccioni, B. (2014). The Geological Origins and Paleoceanographic History of the Mediterranean Region: Tethys to Present. In G. Stefano and Z. Dubinsky (Eds), *The Mediterranean Sea. Its history and present challenges* (p-3-10). Heidelberg: Springer.
- Shurin, J.B., Gruner, D.S., & Hillebrand, H. (2006). All wet or dried up? Real differences between aquatic and terrestrial food webs. *Proceedings of the Royal Society B*. **273**, 1-9.
- Sala et al. (2012). The structure of Mediterranean rocky reef ecosystems across environmental and human gradients, and conservation implications. *PLoS ONE* **7**: e32742.
- Sumaila, U.R. & Huang, L. (2012). Managing Bluefin Tuna in the Mediterranean Sea. *Marine Policy* **36**, 502-511.
- Tanhua, T., et al. (2013). The Mediterranean Sea system: a review and an introduction to the special issue. *Ocean Science* **9**, 789-803.