

BIOL/ENVR 354

Conservation Issues Confronting the Mediterranean Sea and Sustainable Solutions – An Interdisciplinary, Project-Based Approach

Semester 2024/ Session I

Course Instructor(s)

Drs. Jacqueline McLaughlin and Kathleen Fadigan

(Office) Hours Available

TBD

Course Description

Students in this short-term study abroad course will be engaged in a Project-based Learning (PBL) project. As such, they will be given the freedom and opportunity to explore a challenging, real-world problem to develop a deeper and more enriched understanding. To accomplish this, participants will venture into physical classrooms and laboratories, and field-based environments to learn from local, national, and international experts, researchers, and faculty about sustainability, conservation, environmental science, marine biology, and international policy and law while they work to unravel the complex anthropogenic pressure of plastic pollution in the Mediterranean Sea. Working in small groups, students will address the following question:

How can we help reduce the amount of plastic pollution in the Aegean Sea?

To answer this specific question, students are required to: devise a plan of action at any level that addresses a select audience(s), and explain their chosen plan in a public product such as a poster, scientific paper, brochure, presentation given to envisioned policy makers, a piece of art, etc.

The bottom line is that students must answer the above question through in-depth inquiry. Final grades will depend on how student groups exhibit and communicate what they have learned in this course while advocating for environmental justice via the United Nations Sustainability Goals (UNSDGs). Importantly, students will be mentored through all aspects of their PBL project and, as such, will be required to complete a series of milestone assignments up until their final presentation of their work (PBL Works, <https://www.pblworks.org/what-is-pbl/gold-standard-project-design>).

Project Based Learning (PBL) is a teaching method in which students learn by actively engaging in real-world and personally meaningful projects. In PBL, the project is the vehicle for teaching the important knowledge and skills students need to learn. PBL incorporates sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, leading to a public product that answers a *challenging question*.

Learning Outcomes

A. Specific Competencies

Students will be able to...

- Develop a critical understanding of key questions, vocabulary, and core concepts in the fields of environmental science and conservation biology.
- Gain proficiency in specific scientific research skills related to data collection and analysis per their field work with Archipelagos.

- Garnish the skills and habits of mind to be transdisciplinary thinkers, i.e., integrate knowledge across multiple disciplinary domains to solve problems facing conservation realities and environmental sustainability issues.
- Strengthen scientific communication skills (oral and written).

B. Transversal Competencies

Students will be able to...

- Work effectively in cross-cultural and disciplinary teams.
- Engage in open, effective, and appropriate interactions across cultures.
- Strengthen their ability to engage in critical thinking regarding complex interdisciplinary problems.
- Integrate skills and knowledge towards SDGs and environmental advocacy.
- Apply knowledge and skills to the real world.

CYA Regulations and Accommodations

Attendance Policy

CYA regards attendance in class and on-site (in Athens or during field study trips) as essential. Absences are recorded and have consequences. Illness or other such compelling reasons which result in absences should be reported immediately to the Student Affairs Office.

Academic Accommodations

If you are a registered (with your home institution) student with a disability and you are entitled to learning accommodation, please inform the Office of Academic Affairs and make sure that your school forwards the necessary documentation.

Policy on Original Work

Unless otherwise specified, all submitted work must be your own original work. Any ideas taken from the work of others must be clearly identified as quotations, paraphrases, summaries, figures etc., and accurate internal citations and/or captions (for visuals) as well as an accompanying bibliography must be provided.

Use of Laptops

In-class or onsite use of laptops and other devices is permitted if this facilitates course-related activities such as note-taking, looking up references, etc. Laptop or other device privileges will be suspended if devices are not used for class-related work.

Organization and Policies

- **Classroom:** This course physically meets various times a week to go over core concepts, engage students in dialogue and/or experiential learning activities, or participation in interactive presentations given by invited speakers or instructors. Class activities are outlined in the below schedule. Know that you will not be memorizing; but instead, you will be questioning, reasoning, and critically thinking about the assigned material.

We expect that you come to class prepared, work-hard, and actively participate in class. You are required to read all required readings and to complete online activities ahead of class, and to engage in all homework activities to your fullest potential. Be ready for class! Class time will be more engaging and productive if you participate in class discussions.

Field Work: Field work will commence on the second week of classes and will meet as scheduled. Please check planned activities and reading assignments carefully before attending scheduled field activities.

- **PBL Assignments**

You will work in a group setting to carrying out a PBL project which includes three Milestone Assignments and one final presentation. The latter will be presented at the end of the semester in a public and professional setting wherein all groups will showcase and communicate their work. All aspects of these assignments will be mentored such that students are guided through the process of inquiry, knowledge acquisition, success in the acquisition of skills, and personal fulfillment.

- **Journaling**

Journal writing assignments can benefit students by enhancing reflection, facilitating critical thought, expressing feelings, and writing focused arguments. Your journal entries will be short (250 – 350 words) responses to prompts intended to facilitate personal and professional reflection. These entries will be submitted to your instructors for grading and must be original in content.

Evaluation and Grading

Knowledge of class material will be evaluated by three group-based PBL milestone assignments, four individual journal prompts, and a group-based PBL final presentation. Evaluation will also include classroom and field-based participation.

Class grades will be determined by a percentage scale based upon the total number of points available (1,200).

PBL Milestone Assignment #1	= 100 points
PBL Milestone Assignment #2	= 100 points
PBL Milestone Assignment #3	= 100 points
Journal Prompts	= 100 points (25 points each)
Mock News Broadcast from Geneva	= 200 points
Student Engagement/Class Participation	= 100 points
Post-field assignment	= 100 points
Final Group PBL Presentation	= 400 points
Total	= 1,200 points

Letter grade equivalents:

95-100	A
90-94	A-
87-89	B+

84-86	B
80-83	B-
75-79	C+
70-74	C
60-69	D
0-59	F

REQUIRED Book:

Wilson, E.O. (2002). *The Future of Life*. New York, USA, Knopf (Random House). **(HARD or Soft COPY BOOK)**

Class Day	Day/Date/Place (if applicable)	Course Agenda and Assignments
1	Mon May 20 Athens	Student Arrival 18:00 Orientation 19:30 Welcome dinner by CYA
2	Tue May 21 Athens	14:00 – 16:00 Introduction & Course Overview: (15 min) Project Based Learning (PBL): Overview of Assignments (15 min) Ice Breaker Group Activity: Deconstruct an UN SDG and apply it to your life with subsequent class discussion (30 minutes) Lecture (with Q & A): <i>What is Sustainability?</i> Dr. Lara Fowler ; Penn State University’s Chief Sustainability Officer and Director Penn State’s Sustainability Institute (60 min; ZOOM) 19:00 – 20:30 Evening Video and Class Discussion: What Happens to Plastic in the Ocean The Mystery of Missing Plastic ENDEVR Documentary (90 minutes)
3	Wed May 22 Athens	14:00 – 16:00 UN SG Group Activity: Choose three UN SDGs and tie them into the overarching theme of global water with subsequent group report out (45 min) Lecture (with Q & A): <i>Global Water Issues</i> ; Dr. Andrew Warner ; Director Penn State University’s Water Initiative (60 min; Zoom) Video: Water is Life (a geological perspective); PBS, Dr. Stephen Mojzsis. Followed by review of homework assignment (15 minutes)
4	Thu May 23 Athens	9:00 – 12:00 Field Trip: Psyttaleia Island for guided tour of Athen’s water treatment facility. 14:00 – 16:00 Class Activity and Discussion: <i>Water as the Universal Solvent</i> (30 min) Lecture (with Q & A): <i>Earth’s Terrestrial and Marine Ecosystems</i> (60 minutes)

		<p>Classroom Activity: <i>What is Biodiversity?</i> Followed by review of <u>homework assignment</u> (30 minutes)</p> <p>PBL Milestone #1 submission DUE – “The Life of Plastics” assignment</p>
5	Fri May 24 Athens	<p>14:00 – 16:00 Classroom Discussion: <u>Ecosystems and Ecological Networks</u> (30 minutes) Lecture (with Q & A): <i>Species Diversity and Conservation</i>; <u>Dr. Carlos de la Rosa</u>, CEO The Center for Plant Conservation, USA (60 min; ZOOM) Overview and Logistics: Traveling to NGO, <u>Archipelagos</u>, Samos Island and review of required book chapter readings/journaling (30 min) 16:30 – 17:30 Off Campus Afternoon Group Discussion: Casual get-together to discuss particulars, and to address student questions per required PBL final project, student expectations, and faculty mentorship (60 min). Journal Prompt #1 Submission DUE</p>
6	Sat May 25 Athens	No class
7	Sun May 26 Athens	No class
8	Mon May 27 Athens	<p>14:00 – 16:00 Classroom Activity and Discussion*: <u>International Resolutions – Tackling Marine Litter and Microplastics</u> ; guest presenter TBD (60 min) *Required Reading: Sharma, S., Sharma, V., & Chatterjee, S. (2021). Microplastics in the Mediterranean Sea: sources, pollution intensity, sea health, and regulatory policies. <i>Frontiers in Marine Science</i>, 8, 634934. Presentation (with Q & A)**: <u>SDGs Dashboard and Metabolism of Cities Living Lab</u>, <u>Dr. Gabriela Fernandez</u>, Metabolism of Cities Living Lab (MOC-LLAB), Center for Human Dynamics in the Mobile Age, San Diego State University, San Diego, California, United States (60 min; ZOOM) **Pre-lecture link: <u>Virtual Exhibition on SDGs</u> Journal Prompt #2 Submission DUE</p>
9	Tue May 28 Samos	<p>FIELD EXCURSION #1* 08:00 Departure for Samos Island (Airplane) Orientation and Briefing: Introduction to marine conservation in the Aegean Sea (endangered species, threats to biodiversity like plastic pollution, fisheries; and joining forces with the local communities) by <u>Archipelagos Institute for Marine Conservation</u> staff. Local area excursion (hike): Experience the natural environment of Samos Island with discussion about conservation along the way. 19:30 Evening Reflection and Discussion: Chapter 1 – <i>To the Ends of the Earth</i>, E.O. Wilson *Overnight accommodations onboard marine research vessel</p>
10	Wed May 29 Samos	<p>FIELD EXCURSION #1 (continued)* 08:00 Marine Conservation Fieldwork Part 1: <i>Dolphin/whale research & conservation - with training on the use of hydrophones / dolphin photo -identification techniques, behavioral assessments.</i> There will be a briefing on marine mammal species to be surveyed; the methods used for data collection; and conservation threats and issues. 19:30 Evening Q & A Round Table: CYA students and Archipelagos staff lead by faculty (60 min)</p>

		*Overnight accommodations on board marine research vessel
11	Thu May 30 Samos	<p>FIELD EXCURSION #1 (continued) 08:00 Marine Conservation Fieldwork Part 2: <i>Seagrass research with emphasis on seagrass health, ecosystem services and blue carbon.</i> There will also be a briefing on seagrass habitats, ecology; the methods used for data collection; and conservation threats and issues. **Field work for data collection will be either by boat or kayak, or both. Evening Group Work – Free time to work on PBL assignment. *Overnight accommodations on board marine research vessel</p>
12	Fri May 31 Samos	<p>FIELD EXCURSION #1 (continued) 08:00 Marine Conservation Fieldwork Part 3: <i>Zooplankton research and biodiversity followed by microplastic laboratory analysis. Plastic nurdle analysis of beach terrain.</i> Students will report out their group results. Evening Reflection: Chapter 4 – <i>The Planetary Killer.</i> E.O. Wilson PBL Milestone #2 submission due – “Group Topic Selection” paragraph/rationale *Overnight accommodations on board marine research vessel</p>
13	Sat June 1 Athens	<p>FIELD EXCURSION #1 (continued) 08:00 Departure for Athens</p>
14	Sun June 2 Athens	No class
15	Mon June 3 Athens	<p>14:00 – 16:00 Lecture (with Q & A): <i>Art as a Voice for Species and Conservation, Jeanne Dodds,</i> Multimedia Artist, Biodiversity Conservationist, Researcher and Educator, Washington, USA (60 min; in person) Overview and Group Homework Assignment (Part 1): <i>Geneva Environmental Network – Plastics and the Environment and recommended LINKS section below.</i> (60 min) Journal Prompt #3 Submission DUE</p>
16	Tue June 4 Kyparissia	<p>Field Excursion #2 08:00 Departure (chartered bus): Kyparissia (protected beach area in Kalo Nero - southern Greece). Visit: Tour of <u>The Nature Protection Area Archelon</u> - local information center for sea-turtle conservation and familiarization with the local coastal area. 19:00 -21:00 Evening Reflection and Group Report Out: <u>Archelon Conservation Data and Conservation Reports</u> *Overnight in Kyparissia</p>
17	Wed June 5 Athens	<p>5:00 Beach Patrol: Morning beach observation of Loggerhead tracks and nesting site counts. Volunteer Activity: Beach Clean-Up with Archelon staff. Afternoon Q & A Round Table: CYA students and Archelon staff lead by instructors. Return to Athens</p>
18	Thu June 6	8:00

	Athens	<p>Visit: <u>Archelon Sea Turtle Rescue Center facilities at Glyfada</u>, Athens - Tour the Sea Turtle Medical Treatment facilities</p> <p>Lunch—Free time for swimming</p> <p>Afternoon Volunteer Activity: Beach cleanup in Kavouri. From Trash2Treasure beach clean-up. Student will engage in a real citizen science activity. As such, they will collect beach litter and at the same time generate data on the geographical distribution and quantity of the litter collected. This activity will be done after an onsite briefing session on the risk connected to plastic pollution.</p> <p>PBL Milestone #3 “Peer Review” due</p>
19	Fri June 7 Athens	<p>9:00</p> <p>Field Trip: Garbage and recycling facilities in Athens</p> <p>14:00 – 16:00</p> <p>Lecture (with Q & A): <i>Plastic Pollution Data Monitoring and Citizen Science</i>, Dr. Domenico Vito and Dr. Carol Maione, <i>Metabolism of Cities Living Lab (MOC-LLAB)</i>, Center for Human Dynamics in the Mobile Age, San Diego State University, San Diego, California, United States. (60 min)</p> <p>Student Group Report Out – Mock News Broadcast from Geneva (Part 2): <i>Geneva Environmental Network – Plastics and the Environment and recommended LINKS section below.</i> (60 min)</p>
20	Sat June 8 Athens	No class
21	Sun June 9 Athens	No class
22	Mon June 10 Athens	<p>14:00 – 16:00</p> <p>Lecture (with Q & A): <i>Let the fish speak! Conservation actions for Freshwater Fish</i>, Dr. Stamatis Zogaris, Senior Researcher, Geographer-Biologist, Hellenic Centre for Marine Research, Anavyssos, Greece. (60 min) Journal Prompt #4</p> <p>Submission DUE</p>
23	Tue June 11 Athens	<p>14:00 – 16:00</p> <p>Work on PBL Presentations in Class (120 min)</p>
24	Wed June 12 Athens	<p>14:00 – 16:00</p> <p>Work on PBL Presentations in Class (120 min)</p>
25	Thu June 13 Athens	<p>14:00– 16:00</p> <p>Group Check-in (faculty review presentation)</p> <p>Time slots will be made available</p>
26	Fri June 14 Athens	<p>10:00 – 12:00</p> <p>Student Group PBL Presentations</p>

N.B.: The course schedule, in terms of subjects and readings, may be subject to change to benefit student learning and to keep up to date with current research.

COURSE BIBLIOGRAPHY

- Cózar, A., Sanz-Martín, M., Martí, E., González-Gordillo, J. I., Ubeda, B., Gálvez, J. Á., ... & Duarte, C. M. (2015). Plastic accumulation in the Mediterranean Sea. *PLoS One*, 10(4), e0121762.
- Fraisl, D., Campbell, J., See, L., Wehn, U., Wardlaw, J., Gold, M., ... & Fritz, S. (2020). Mapping citizen science contributions to the UN sustainable development goals. *Sustainability*, 15, 1735-1751.
- Fritz, S., See, L., Carlson, T., Haklay, M., Oliver, J. L., Fraisl, D., ... & West, S. (2019). Citizen science and the United Nations sustainable development goals. *Nature Sustainability*, 2(10), 922-930.

Maione, C., Fernandez, G., Vito, D., Marsaglia, L., Cortez, M., & Buurste, C. (2022). Protecting Our Oceans with Citizen Science: El Astillero, Nicaragua. In: SDGs in the Americas and Caribbean Region (pp. 1-19). New York, USA (Cham: Springer International Publishing).

Sharma, S., Sharma, V., & Chatterjee, S. (2021). Microplastics in the Mediterranean Sea: sources, pollution intensity, sea health, and regulatory policies. *Frontiers in Marine Science*, 8, 634934.

Suaria, G., Avio, C. G., Mineo, A., Lattin, G. L., Magaldi, M. G., Belmonte, G., ... & Aliani, S. (2016). The Mediterranean Plastic Soup: synthetic polymers in Mediterranean surface waters. *Scientific Reports*, 6(1), 37551.

Wilson, E.O. (2002). *The Future of Life*. New York, USA, Knopf (Random House). **(REQUIRED HARD or SOFT COPY BOOK)**

LINKS

- [Geneva Environment Network – Plastics and the Environment](#)
- [Science-Policy Interface for Plastic Pollution Full Report | GRID-Arendal](#)
- [Science needs to be the foundation of the new Plastics Treaty | GRID-Arendal Press Release | 7 November 2023](#)
- [Science Policy Interface for Plastic Pollution | GRID-Arendal](#)
- [Plastics and the Environment](#)
- [Towards Plastic Pollution INC-3](#)

Scoring Rubric for Journal Prompts

Criteria	Unsatisfactory-Beginning	Developing	Accomplished	Exemplary	Total
Content Reflection	0-6 points	7-9 points	10-12 points	13-14 points	/14
	Reflection lacks critical thinking. Superficial connections are made with key course concepts and course materials, activities, and/or assignments	Reflection demonstrates limited critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions, activities, and/or assignments Minimal connections made through explanations, inferences, and/or examples.	Reflection demonstrates some degree of critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions, activities, and/or assignments. Connections made through explanations, inferences, and/or examples.	Reflection demonstrates a high degree of critical thinking in applying, analyzing, and evaluating key course concepts and theories from readings, lectures, media, discussions, activities, and/or assignments. Insightful and relevant connections made through contextual explanations, inferences, and examples.	
Personal Growth	0-2 points	3-4 points	5-6 points	7-8 points	/8
	Conveys inadequate evidence of reflection on own work in response to the self-assessment questions posed. Personal growth and awareness are not evident and/or demonstrates a neutral experience with	Conveys limited evidence of reflection on own work in response to the self-assessment questions posed. Demonstrates less than adequate personal growth and awareness through few or simplistic	Conveys evidence of reflection on own work with a personal response to the self-assessment questions posed. Demonstrates satisfactory personal growth and awareness	Conveys strong evidence of reflection on own work with a personal response to the self-assessment questions posed. Demonstrates significant personal growth and awareness of deeper meaning through inferences made, examples,	

	negligible personal impact. Lacks enough inferences, examples, personal insights and challenges, and/or future implications are overlooked.	inferences made, examples, insights, and/or challenges that are not well developed. Minimal thought of the future implications of current experience.	through some inferences made, examples, insights, and challenges. Some thought of the future implications of current experience.	well developed insights, and substantial depth in perceptions and challenges. Synthesizes current experience into future implications.	
Writing Quality	0-2 points	3-4.4 points	4.5-5.4 points	5.5-6.5 points	/6.5
	Poor writing style lacking in standard English, clarity, language used, and/or frequent errors in grammar, punctuation, usage, and spelling. Needs work.	Average and/or casual writing style that is sometimes unclear and/or with some errors in grammar, punctuation, usage, and spelling.	Above average writing style and logically organized using standard English with minor errors in grammar, punctuation, usage, and spelling.	Well written and clearly organized using standard English, characterized by elements of a strong writing style and basically free from grammar, punctuation, usage, and spelling errors.	
Timeliness	Deduct 3 points- overall failing	Deduct 2 points	Deduct 1 point	0 points deducted	/--
	Journal reflection is submitted 2-3 days (49-72 hours) after the deadline.	Journal reflection is submitted 1-2 days (25-48 hours) after the deadline.	Journal reflection is submitted within 1 day (24 hours) after the deadline.	Journal reflection is submitted on or before deadline.	
TOTAL POINTS (sum of 4 Criteria)					/28.5

Scoring Rubric for News Broadcast and PBL Project


Oral Presentation and Critical Thinking Rubric

	4	3	2	1
Topic Selection and Central Message	Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.	Identifies a focused and manageable/usable topic that appropriately addresses relevant aspects of the topic.	Identifies a topic that while manageable/usable, is too narrowly focused and leaves out relevant aspects of the topic.	Identifies a topic that is far too general and wide-ranging as to be manageable and usable.
Existing Knowledge, Research, and/or Views	Synthesizes in-depth information from relevant sources representing various points of view/approaches.	Presents in-depth information from relevant sources representing various points of view/approaches.	Presents information from relevant sources representing limited points of view/approaches.	Presents information from irrelevant sources representing limited points of view/approaches.
Explanation of Issues	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description.
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/or is unrelated to focus.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences, implications, and limitations) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences, implications, and limitations) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences, implications, and limitations) are identified clearly.	Conclusion is ambiguous and inconsistently tied to some of the information discussed; related outcomes (consequences, implications, and limitations) are oversimplified.