CYA | Syllabus

BIOL/ENVR 354 | Conservation Issues Confronting the Mediterranean Sea and Sustainable Solutions – An Interdisciplinary, Project-Based Approach
Summer 2026, Session I

Course Instructors: Professors: Jacqueline McLaughlin, Ph.D. and Kathleen Fadigan, Ed.D.
Email: jshea@psu.edu

Course Description

Students participating in this short-term study abroad course will engage in a **Project-Based Learning (PBL)*** experience. This approach provides them with the freedom and opportunity to explore a complex, real-world problem, thereby developing a deeper and more meaningful understanding of the issues at hand.
To achieve this, participants will work in classrooms, laboratories, and field-based environments, learning from local, national, and international experts, researchers, and faculty. Through these experiences, they will explore topics such as sustainability, conservation biology, environmental science, marine biology, and international policy and law, while examining the complex anthropogenic pressures driving plastic pollution in the Mediterranean Sea.

Working in small groups, students will address the guiding question:

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

To answer this question, students will develop a **plan of action**—at any scale and for a targeted audience—and share their **research findings and knowledge gained through the course, and original ideas** through a **public product**, such as a website, scientific paper, brochure, policy presentation, or creative work of art.

The core expectation is that students will respond to the guiding question through in-depth inquiry. Final grades will reflect how effectively each group demonstrates and communicates their learning, while advocating for environmental justice through the lens of the United Nations Sustainable Development Goals (UNSDGs). Throughout the project, students will receive mentorship and structured support, completing a series of milestone assignments that culminate in the final presentation of their work (PBL Works, Gold Standard Project Design).

***Project-Based Learning** is an instructional method in which students actively engage with real-world, personally meaningful challenges. The project serves as the primary vehicle for learning key knowledge and skills, and incorporates sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, and the creation of a public product that answers a challenging driving question.

Learning Outcomes Learning Outcomes

A. Specific Competencies

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

- Demonstrate a critical understanding of key questions, vocabulary, and core concepts in conservation biology and environmental science.
- Apply scientific research skills related to data collection and analysis during their fieldwork with the Archipelagos Institute focused on microplastic pollution.
- Integrate knowledge across multiple disciplinary domains to think transdisciplinarily and address real-world conservation and sustainability challenges.
- Strengthen their scientific communication skills, both oral and written, through research dissemination and public presentations.

B. Transversal Competencies

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

- Collaborate effectively in cross-cultural, interdisciplinary teams.
- Engage in open, respectful, and effective intercultural communication.
- Apply critical thinking to analyze and address complex interdisciplinary environmental problems.
- Connect their learning to the United Nations Sustainable Development Goals (SDGs) and engage in meaningful environmental advocacy.
- Transfer and apply their knowledge and skills to real-world contexts, bridging academic learning with practice.

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, via the form available in the Student Portal.

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 (Check the Student Handbook, pg. 7).

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 and Field Work

This course meets in person several times each week to review core concepts, engage in dialogue with instructors and guest experts, and participate in field research and conservation activities through four field excursions. Class sessions and activities are outlined in the course schedule below.

Rather than relying on memorization, this course emphasizes questioning, reasoning, and critical thinking about the assigned material. You are expected to come to class fully prepared, having completed all assigned readings and activities in advance, and to participate actively in discussions and group work.

Fieldwork will begin in the second week of the course and will follow the scheduled itinerary. Please review all planned activities and assignment due dates carefully before each excursion. Detailed itineraries will be provided by CYA before departure for each field activity.

Project-Based Learning (PBL) Assignments

You will work in groups to complete a Project-Based Learning (PBL) project consisting of three milestone assignments and a final presentation. The final presentations will take place at the end of the session in a public and professional setting, where each group will showcase and communicate their work.

Throughout the process, you will receive faculty mentorship and guidance to support inquiry, knowledge acquisition, skill development, and personal growth.

Journaling

Journal writing is an important component of this course, designed to foster reflection, critical thinking, and personal expression. You will respond to a series of prompts in short entries of ~350–500 words, focusing on both personal and professional reflections. All journal entries must be your own original work and will be checked for plagiarism. Entries will be submitted to your instructors for grading.

Evaluation and Grading

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

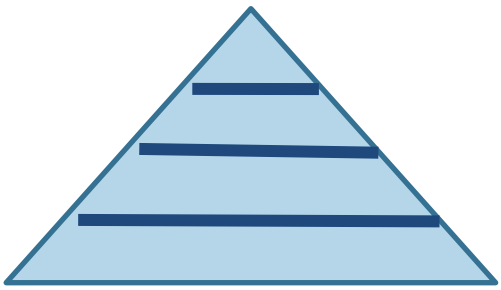
Class grades will be determined by a percentage scale based upon the total number of points available (750).

PBL Milestone Assignment #1	= 100 points
PBL Milestone Assignment PBL #2	= 100 points
PBL Milestone Assignment #3	= 100 points
Journal Prompts	= 100 points (50 points each)
Field and Laboratory Notebook/Class Participation Final Group PBL Presentation **Total**	= 100 points = 250 points **= 750 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

Class Day	Day/Date/ Place	Course Agenda and Assignments
1	Mon May 25 Athens	**Student arrival** 18:00 Orientation 19:30 Welcome dinner by CYA
2	Tue May 26 Athens	**14:00 – 16:00** **Introduction and course overview:** ● Faculty and student introductions ● Presentation: *How Undergraduate Research is Changing the World* ● *– Locally and Globally* (Dr. McLaughlin) ● Syllabus (Moodle, grading, assignments, expectations) ● Field Notebook ● Homework ● Course rules in the classroom and field: 1. Alcohol, drugs, and smoking 2. Abide by CYA rules (24 hours) 3. Buddy system and curfews 4. Additional rules per each excursion forthcoming 5. Respect and teamwork! 6. Group assignments on Wednesday **Homework:** Textbook Reading: Chapter 1 – *Understanding Our Environment* (Case Study – *Sustainable Development Goals for Kibera*, sections 1.3 -1.5; answer all questions in the Section Review in your notebook) **Cunningham**, W.P. and **Cunningham**, M.A. (2024; 17th Edition) Environmental Science **-** A Global Concern. McGraw Hill Education, New York.
3	Wed May 27 Athens	**14:00 – 16:00** **Ice breaker activity** **Lecture and interactive class discussion:** Assigned textbook readings**,** Chapter 1 **Project-Based Learning (PBL):** Overview of Assignments ● PBL Overview ● The Challenging Question: ***How can we help reduce plastic pollution in the Aegean Sea?*** ● **PBL Milestone #1** submission due **Saturday, 5/30** "The Life of Plastics" assignment ● **PBL Milestone #2** submission due **Friday, 6/5** "Group Topic Selection" paragraph/rationale ● **PBL Milestone #3** "Peer Review" on **Friday, 6/17** ● **Final PBL Presentations** on **Friday, 6/19** **PBL Milestone #1 – The Life of Plastics**

		Engage: The Problem with Single-Use Plastic Breaking the Plastic Wave Explore: 1) Make a list of everything you've used in the last 24 hours that is made of or includes plastic. 2) Circle each item that you've already thrown away. 3) Put a star next to each item you'll probably throw away or stop using within the next 12 months. 4) Ask yourself, "How did we end up with all of this plastic in the first place?" 5) Watch Brief History of Plastic video Explain: 6) 48-hour Plastic Audit: track from noon Wednesday – noon Friday) Draw or map the lifecycle of one of the plastic items in your plastic audit. **Homework:** Textbook Reading: Chapter 3 – Matter, Energy, and Life (Case Study – *Death By Fertilizer: Hypoxia in the Gulf of Mexico, sections 3.3 and 3.4*; answer all questions in the Section Review in your notebook)
4	Thu May 28 Athens	**14:00 – 16:00** **Lecture and interactive class discussion:** Assigned textbook readings**,** Chapter 3 **Classroom group activity**: What's happening in Geneva? Where do we stand on a Global Plastic Treaty? Geneva Environmental Network – Plastics and the Environment. **Homework:** Textbook Reading: *Chapter 5 – Biomes: Global Patterns of Life* (Case Study: *Shifting Biomes, Shifting Ways of Life, concepts 5-1 – 5.4;* submit answers to all questions in each Section Review in your notebook.
5	Fri May 29 Athens	**14:00 – 16:00** **Lecture and interactive class discussion:** Textbook readings**,** Chapter 5 **Classroom group activity:** Trophic Levels in the Mediterranean Sea **Marine Food Pyramid**  **https://education.nationalgeographic.org/resource/marine-food-pyramid-1/** **Field excursion #1 briefing:** Psyttaleia Wastewater Treatment Plant (EYDAP)
6	Sat May 30 Athens	No class **24:00 PBL Milestone #1 submission DUE – "The Life of Plastics" assignment**
7	Sun May 31 Athens	No class
8	Mon June 1 Athens	**No Class - Holy Spirit Day** **Journal prompt #1: required video** What Happens to Plastic in the Ocean | ENDEVR Documentary (60 minutes)
9	Tue June 2 Athens	**10:00 – 12:00** **Class discussion and review:** Water treatment in Athens – reality and microplastic pollution concerns [with reference to Prochaska and Zouboulis (2020) required reading]; **review PBL Milestone #1**. **Required reading**: Prochaska, C. & Zouboulis, A. (2020) A mini review of urban wastewater treatment in Greece: History,

		Development and Future Challenges. *Sustainability*, 12 (15); 6133 **Guest Lecturer: Andrés Del Castillo,** Senior Attorney at the Center for International Environmental Law (CIEL) and the UN authority will discuss the evolution and status of the Global Plastics Treaty. **Field excursion #1 briefing:** Psyttaleia Wastewater Treatment Plant (EYDAP)
10	Wed June 3 Pysttaleia Athens	**FIELD EXCURSION #1** **8:00 Bus departure from CYA** **9:00 – 13:00 Tour:** Psyttaleia Wastewater Treatment Plant (EYDAP) - The largest sewage treatment plant in Europe, and the third largest in the world. **14:00 – 16:00** **Class debrief and reflection:** Realities of water treatment and microplastic pollution. **Using required reading**: Prochaska, C. & Zouboulis, A. (2020) A mini review of urban wastewater treatment in Greece: History, Development and Future Challenges. *Sustainability*, 12 (15); 6133 **PBL Milestone #2**: Group work **Field excursion #2 briefing:** Athens' landfill and recycling facilities (Hyta Fyli).
11	Thu June 4 Ano Liosia-Fyli Athens	**FIELD EXCURSION #2** **9:00 Bus departure from CYA** **10:00 – 12:00 Tour:** Tour the landfill and recycling facilities (Hyta Fyli) **14:00 – 16:00** **Class debrief and reflection:** Realities of landfill and recycling in Greece. **PBL Milestone #2**: Group work **Field excursion #3 briefing:** Beach clean-up with Trash2Treasure
12	Fri June 5 Kavouri Beach Athens	**FIELD EXCURSION #3** **08:00 Departure from CYA** **9:00 – 13:00** **Citizen Science Activity:** Beach Clean-Up at Kavouri Beach, Athens Led by **Dr. Domenico Vito (University of San Diego, California)**, students will participate in a Tash2Treasure citizen science activity. During this event, they will collect beach litter while simultaneously generating data on its geographical distribution and quantity. Before the clean-up, students will receive on-site training on beach transect methods, data collection techniques, and data analysis to ensure accurate and meaningful contributions to this global initiative. **Picnic lunch:** Free time to swim and picnic, then depart for CYA. **14:00 – 16:00 (CYA Classroom; exact time TBD)** **Data analysis: Analyze data from beach clean-up** **Field excursion #4 briefing:** field research with Archipelagos NGO **24:00 PBL Milestone #2 submission DUE– "Group Topic Selection," paragraph/rationale**
13	Sat June 6 Athens	No class **24:00 Journal Prompt #1 submission DUE** **Journal Prompt #2: required reading** 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.
14	Sun June 7 Athens	No class
15	Mon June 8 Athens Samos	**FIELD EXCURSION #4** **07:00Bus departs** from in front of the Stadium (please be on time) 07:30 Check-in AGEAN counter 09:30 **Departure** of flight **A3-242** to Samos 10:30 Estimated time of arrival at Samos airport 11:00 **Bus transfer** to Archipelagos Institute – orientation and briefing by Archipelagos staff 12:00 **Informal Introduction** 13:00 **Lunch** at a nearby beach (provided by the Archipelagos Institute)

		14:30 **Presentation**: *Introduction to Marine Conservation in the Aegean Sea* by Archipelagos Institute for Marine Conservation staff 17:30 **Bus departs** for Karlovassi port (port – TBC) – settle in research vessel TBA **Evening reflection and briefing** by CYA faculty and staff. 20:00 **Dinner** on Boat (provided by the Archipelagos Institute) **Night** in Samos (on Archipelagos boat)
16	Tue June 9 Lipsi/Aegean Sea	**08:00** **Breakfast** on board (provided by the Archipelagos Institute) 09:00 **Preparation for trip to Lipsi** island and briefing for the Marine Mammal Survey and Microplastic & Plankton Lab sampling **Plankton** transects, trolls, and sample collection/preservation 3:00 **Lunch** on the boat (provided by the Archipelagos Institute) TBA **Arrival** to Lipsi Island – Aegean Marine Life Sanctuary TBA **Lecture** – *Introduction to the Aegean Marine Life Sanctuary and Dolphin Welfare* by Archipelagos Institute for Marine Conservation staff **19:30** **Evening reflection and Micro Plastic & Plankton Laboratory briefing** by CYA faculty and staff TBA **Dinner** (provided by the Archipelagos Institute) **Night in Lipsi** (at Archipelago facilities)
17	Wed June 10 Lipsi/Aegean Sea	**08:00** **Breakfast** on board (provided by the Archipelagos Institute) TBA ***Lecture*** – *Monitoring Plastic and Microplastic Pollution*, laboratory preparation by Archipelagos staff and CYA faculty 10:00 **Microplastics & Plankton Lab (part 1)** 13:00 **Lunch** (provided by the Archipelagos Institute) 14:00 **Microplastics & Plankton Lab (part 2)** 18:00-20:00 **Evening reflection on MP research data and briefing** by CYA Instructors and Staff followed by PBL Group Brainstorming Session **20:00** **Dinner** (provided by the Archipelagos Institute) **Night in Lipsi** (at Archipelagos facilities)
18	Thu June 11 Samos/Aegean Sea	**08:00** **Breakfast** on board (provided by the Archipelagos Institute) 09:00 **Preparation for departure** TBA **Departure to Samos** - Boat survey monitoring marine mammal populations TBA **Lunch** on the boat (provided by the Archipelagos Institute) TBA **Arrival in Samos** TBA **Lecture** - *How dResults of Scientific Research can be Incorporated into Conservation*? by Archipelagos staff and CYA faculty TBA **Evening reflection and briefing** by CYA faculty and staff followed by **PBL faculty and group brainstorming session** (~ 15 minutes after the above lecture) TBD **Dinner** on boat (provided by the Archipelagos Institute) **Night in Samos** (on Archipelagos boat)
19	Fri June 12 Samos/AegeanSea	**09:00** **Breakfast and preparation for departure** (provided by the Archipelagos Institute) 10:00 **Discussion of Field Data** (microplastics and mammalian datasets; Q&A f group projects) 13:00 **Lunch** on board 14:00 **Course briefing** and **final remarks** 15:30 **Bus departs for Pythagorion** 17:00 **Check-in** Hotel Princessa Hotel, Pythagorion (tel. 22730 62451) Afternoon and evening free 20:00 **Group dinner** in Pythagoreio (provided by CYA) Night in Pythagorion
20	Sat June 13 Athens	**08:00** **Breakfast at the hotel*Check out hotel rooms – Place bags on the** **09:30** **Bus departs for the airport** **10:00** **Check-in AGEAN counter** **11:00** **Departure of flight A3-243 to Athens** **12:00** **Estimated arrival in Athens and bus transfer to CYA**

21	Sun June 14 Athens	No class **24:00** **Journal Prompt #2 submission DUE**
22	Mon June 15 Athens	**14:00 – 16:00** Work on PBL presentations in class
23	Tue June 16 Athens	**14:00 – 16:00** Work on PBL presentations in class
24	Wed June 17 Athens	**14:00 – 16:00** **PBL Milestone #3 – "Peer-Review" during class time** Work on PBL presentations in class
25	Thu June 18 Athens	**14:00– 16:00** **Group Check-in (faculty review of mock presentation)** Time slots will be made available
26	Fri June 19 Athens	**10:00 – 12:00** **Student group PBL presentations** **Lunch with professors**
27	Sat June 20 Athens	**Check out CYA apartments**

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

Costello, L., Marini, C., Triossi, F., & Di Bello, A. (2025). Microplastics accumulate in all major organs of the loggerhead sea turtle (*Caretta caretta*) in the Mediterranean Sea. *Marine Environmental Research, 196*, 106399. https://doi.org/10.1016/j.marenvres.2025.106399

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. https://doi.org/10.1371/journal.pone.0121762

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 Science, 15*, 1735–1751. https://doi.org/10.1007/s11625-020-00833-7

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. https://doi.org/10.1038/s41893-019-0390-3

Maione, C., Fernandez, G., Vito, D., Marsaglia, L., Cortez, M., & Buurstee, C. (2022). Protecting our oceans with citizen science: El Astillero, Nicaragua. In *SDGs in the Americas and Caribbean Region* (pp. 1–19). Springer International Publishing. https://doi.org/10.1007/978-3-030-91124-6_1

Nawaz, F., Ul Islam, Z., Aslam Ghori, S., Bahadur, A., Ullah, H., Ahmad, M., & Khan, G. U. (2025). Microplastic and nanoplastic pollution: Assessing translocation, impact, and mitigation strategies in marine ecosystems. *Water and Environment Research.* Advance online publication. https://doi.org/10.1002/wer.70032

Segur, T., & Sonke, J. E. (2025). Terrestrial and marine plastic pollution outlook in the Mediterranean region: A box-model approach based on OECD policy scenarios. *Biogeosciences, 22*(20), 5139–5156. https://doi.org/10.5194/bg-22-5139-2025

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. https://doi.org/10.3389/fmars.2021.634934

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. https://doi.org/10.1038/srep37551

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