

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

Semester 2025 Session I, May 26 – June 21

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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.

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 and Filed Work: This course physically meets various times a week to go over core concepts, engage students in dialogue with instructors and other experts, and delve into field research and conservation efforts/activities via five field excursions. Class activities are outlined in the schedule below. Know that you will not be memorizing; but instead, you will be questioning, reasoning, and critically thinking about the assigned material.

It is expected that you come to class prepared, work-hard, and actively participate in class. You are required to complete assigned readings ahead of class, and to engage in all homework or assigned milestone activities to your fullest potential. Be ready for class and groupwork!

Field work will commence on the second week of classes and will meet as scheduled. Please check planned activities and coursework DUE DATES carefully before attending scheduled field activities. More detailed itineraries will be made available from CYA before the departure for each excursion.

PBL Assignments

You will work in a group setting to carrying out PBL 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 PBL #2	= 100 points
PBL Milestone Assignment #3	= 100 points
Journal Prompts	= 100 points (50 points each)
Reading Assignment	= 50 points
Field and Laboratory Notebook/Class Participation	= 100 points
Final Group PBL Presentation	= 250 points
Total	= 800 points

Letter grade equivalents:

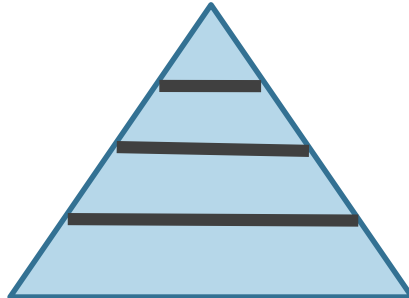
95-100	A
90-94	A-
87-89	B+
84-86	B
80-83	B-
75-79	C+
70-74	C
60-69	D
0-59	F

Class Day	Day/Date/ Place	Course Agenda and Assignments
1	Mon May 26 Athens	<p>Student Arrival 18:00 Orientation 19:30 Welcome dinner by CYA</p>
2	Tue May 27 Athens	<p>14:00 – 16:00 Introduction & Course Overview:</p> <ul style="list-style-type: none"> • Faculty and student introductions • Presentation: Conservation, Sustainability, and UN SDGs • Syllabus (Moodle, grading, assignments, expectations) • Field Notebook • Homework • Course rules in classroom and field: <ol style="list-style-type: none"> 1. Alcohol, drugs, and smoking 2. Abide by CYA rules (24-hours) 3. Buddy system and curfews 4. Additional rules per excursion forthcoming 5. Respect and teamwork! 6. Group assignments Wednesday <p>Homework: Textbook Reading: Chapter 1 – <i>Understanding Our Environment</i> (Case Study – <i>Sustainable Development Goals for Kibera</i>, sections 1.3 -1.5; submit answers to all questions in each Section Review on Moodle) What Happens to Plastic in the Ocean The Mystery of Missing Plastic ENDEVR Documentary (90 minutes)</p>
3	Wed May 28 Athens	<p>14:00 – 16:00 Ice Breaker Activity Project Based Learning (PBL): Overview of Assignments</p> <ul style="list-style-type: none"> • PBL Overview • The Challenging Question: <i>How can we help reduce plastic pollution in the Aegean Sea?</i> • PBL Milestone #1 submission due Friday, 5/30 "The Life of Plastics" assignment • PBL Milestone #2 submission due Friday, 6/6 "Group Topic Selection" paragraph/rationale • PBL Milestone #3 "Peer Review" on Friday, 6/20 • Final PBL Presentations on Friday, 6/26 <p>PBL Milestone #1 – The Life of Plastics <u>Engage:</u> The Problem with Single Use Plastic Breaking the Plastic Wave <u>Explore:</u> 1) Make a list of everything you've used in the last 24 hours that is made</p>

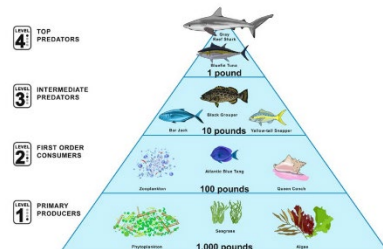
- of or includes plastic.
- 2) Circle each item that you've already thrown away.
- 3) Put a star next to each item you'll probably throw away or stop using within the next 12 months.
- 4) Ask yourself, "How did we end up with all of this plastic in the first place?"
- 5) Watch [Brief History of Plastic](#) video
- Explain:
- 6) 48-hour Plastic Audit: track from orientation (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*; submit answers to all questions in each Section Review on Moodle)

4 Thu May 29 Athens **14:00 – 16:00**
Lecture and Interactive Class Discussion: Assigned textbook readings, Chapters 1 and 2
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 on Moodle)

5 Fri May 30 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 #2 Briefing: Overview of trip to Pysttaleia Island
24:00
PBL Milestone #1 submission DUE – “The Life of Plastics” assignment

6 Sat May 31 Athens No class

7 Sun June 1 Athens No class

8	Mon June 2 Athens	<p>FIELD EXCURSION #1 8:00 Bus Departure from CYA 9:00 – 12:00 Tour: <u>Psyttaeia Wastewater Treatment Plant (EYDAP) - Europe's largest sewage treatment plant, and third largest in the world.</u> Recommended reading: <u>Prochaska, C. & Zouboulis, A. (2020) A mini-review of urban wastewater treatment in Greece: History, Development and Future Challenges. <i>Sustainability</i>, 12 (15); 6133</u> Journal Prompt #1: required video, <u>What Happens to Plastic in the Ocean ENDEVR Documentary (90 minutes)</u></p>
9	Tue June 3 Samos	<p>14:00 – 16:00 Class Debrief and Reflection: Water treatment in Athens – reality and microplastic pollution concerns Quest Lecturer: TBA (UN representative to discuss the evolution and current standing of the Global Plastic Treaty) Field Excursion #2 Briefing: Overview of trip to Pysttaeia Island</p>
10	Wed June 4 Samos	<p>FIELD EXCURSION #2 9:00 Bus Departure from CYA 10:00 – 12:00 Tour: Tour landfill and recycling facility in Athens (XYTA Fyli) 14:00 – 16:00 Class Debrief and Reflection: Landfill and recycling plant visit 24:00 Journal Prompt #1 Submission DUE</p>
11	Thu June 5 Samos	<p>14:00 – 16:00 PBL Milestone #2: Group work Presentation and Field Excursion #3 Briefing: Citizen Science and Trash2Treasure, Dr. Domenico Vito, University of San Diego, California. Journal Prompt #2: required reading, Sharma, S., Sharma, V., & Chatterjee, S. (2021). <u>Microplastics in the Mediterranean Sea: sources, pollution intensity, sea health, and regulatory policies. <i>Frontiers in Marine Science</i>, 8, 634934.</u></p>
12	Fri June 6 Athens	<p>FIELD EXCURSION #3 08:00 Departure from CYA 9:00 – 12:00 Citizen Science Activity: Beach clean-up at Kavouri beach, Athens with Dr. Domenico Vito. Students will engage in a real citizen science activity called Tash2Treasure. 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. Panel Discussion: Experts from Pysttaeia Water Treatment Facility, Athens Landfill and Recycling Facility; and Trash2Treasure will respond to student questions. Picnic Lunch: Free time to picnic then depart for CYA 14:00 – 16:00 (CYA Classroom) Panel Discussion: Experts from Pysttaeia Water Treatment Facility, Athens Landfill and Recycling Facility; and Trash2Treasure will respond to student questions. Field Excursion #4 Briefing 24:00 PBL Milestone #2 Submission DUE– “Group Topic Selection” paragraph/rationale</p>
13	Sat June 7 Athens	No class
14	Sun July 8 Athens	No class
15	Mon June 9 Athens/Samos	<p>Field Excursion #2 08:00 08:00 Bus Transfer to Airport</p>

		<p>11:00 Flight to Samos Island Am arrival Transfer to Archipelagos NGO Lunch on beach Orientation and Briefing by Archipelagos staff Island Hike by Archipelagos staff 17:30 Evening Academic Briefing by CYA Instructors and Staff Dinner in Samos Free Evening Night in Samos (on Archipelagos Boat)</p>
16	Tue June 10 Samos/Aegean Sea	<p>8:00 Breakfast on boat AM Lecture Marine Conservation Fieldwork Part I: Endangered Dolphins Cast Troll Nets for Microplastic Research Lunch on boat Marine Conservation Fieldwork Part I (continued): Endangered Dolphins Cast Troll Nets for Microplastic Research 17:30 Evening Reflection and Briefing by CYA Instructors and Staff Dinner in Samos Free Evening Night in Samos (on Archipelagos Boat)</p>
17	Wed June 11 Samos/Aegean Sea	<p>8:00 Breakfast on boat AM Lecture Marine Conservation Fieldwork Part I: Endangered Sea Grass Ecosystem Cast Troll Nets for Microplastic Research Lunch on boat Marine Conservation Fieldwork Part I (continued): Endangered Sea Grass Ecosystem Cast Troll Nets for Microplastic Research 17:30 Evening Reflection and Briefing by CYA Instructors and Staff Dinner in Samos Free Evening Night in Samos (on Archipelagos Boat) Journal Prompt #2 Submission DUE</p>
18	Thu June 12 Samos/Aegean Sea	<p>8:00 Breakfast on boat 10:00 – 12:00 Microplastic Analysis in Trolled Plankton: Laboratory Session Part I Lunch at Archipelagos Facility 1:00 – 16:00 Microplastic Analysis in Trolled Plankton: Laboratory Session Part II 18:00 – 21:30 Group Get-together – Pizza Evening Reflection and Briefing followed by PBL Faculty and Group Brainstorming Session Night in Samos (on Archipelagos Boat)</p>
19	Fri June 13 Samos/Aegean Sea	<p>8:00 Breakfast on boat Marine Conservation Fieldwork Part III: Endangered Dolphin and Whale Research; visit dolphin sanctuary Lunch on boat Marine Conservation Fieldwork Part III (continued): Endangered Dolphin and Whale Research; visit dolphin sanctuary 17:30 Evening Reflection and Briefing Dinner in Samos Free Evening Night in Samos Hotel</p>
20	Sat June 14	<p>Breakfast in Samos</p>

	Athens	Free Morning 09:30 Transfer to Airport 12:25 Flight to Athens Bus transfer from Athens to CYA
21	Sun June 15 Athens	No class
22	Mon June 16 Athens	14:00 – 16:00 PBL Milestone #3 – “Peer-Review” during class time
23	Tue June 17 Athens	14:00 – 16:00 Work on PBL Presentations in Class
24	Wed June 18 Athens	14:00 – 16:00 Work on PBL Presentations in Class
25	Thu June 19 Athens	14:00– 16:00 Group Check-in (faculty review presentation) Time slots will be made available
26	Fri June 20 Athens	10:00 – 12:00 Student Group PBL Presentations Lunch with Professors
27	Sat June 21 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

- 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. *Science*, 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., & Buursteer, 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 Reflection lacks critical thinking. Superficial connections are made with key course concepts and course materials, activities, and/or assignments	7-9 points 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.	10-12 points 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.	13-14 points 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.	/14
Personal Growth	0-2 points 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 negligible personal impact. Lacks enough inferences, examples, personal insights and challenges, and/or future implications are overlooked.	3-4 points 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 inferences made, examples, insights, and/or challenges that are not well developed. Minimal thought of the future implications of current experience.	5-6 points Conveys evidence of reflection on own work with a personal response to the self-assessment questions posed. Demonstrates satisfactory personal growth and awareness through some inferences made, examples, insights, and challenges. Some thought of the future implications of current experience.	7-8 points 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, well developed insights, and substantial depth in perceptions and challenges. Synthesizes current experience into future implications.	/8
Writing Quality	0-2 points Poor writing style lacking in standard English, clarity, language used, and/or frequent errors in grammar, punctuation, usage, and spelling. Needs work.	3-4.4 points Average and/or casual writing style that is sometimes unclear and/or with some errors in grammar, punctuation, usage, and spelling.	4.5-5.4 points Above average writing style and logically organized using standard English with minor errors in grammar, punctuation, usage, and spelling.	5.5-6.5 points 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.	/6.5
Timeliness	Deduct 3 points-overall failing Journal reflection is submitted 2-3 days (49-72 hours) after the deadline.	Deduct 2 points Journal reflection is submitted 1-2 days (25-48 hours) after the deadline.	Deduct 1 point Journal reflection is submitted within 1 day (24 hours) after the deadline.	0 points deducted Journal reflection is submitted on or before deadline.	/--
TOTAL POINTS (sum of 4 Criteria)					/28.5

Scoring Rubric for News Broadcast and PBL Project

PennState Lehigh Valley		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.	