Cetacean Ecology
SFS 3722

Syllabus
4 credits

The School for Field Studies (SFS) & Blue World Institute (BWI)
Center for the Conservation of Marine Megafauna
Veli Lošinj, Lošinj Island, Croatia

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

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COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that may present. In other words, the elephants are not always where we want them to be, so be flexible!

Course Overview

The goal of this course is to provide students with in-depth theoretical knowledge and practical, applicative skills in research and conservation management of marine megafauna.

Marine megafauna, such as marine mammals, sea turtles, elasmobranchs and other large predatory fishes share a similar life history characterized by long life span, late maturation, and low reproduction. Such evolutionary traits make them particularly sensitive to perturbations in population's vital rates due to increased human-induced mortality, which caused severe decline across different species and populations over the last century. As keystone species, these animals occupy high trophic levels in marine food webs and are crucial for shaping structure, diversity, and dynamics of marine ecosystems through top-down processes.

Even though these animals are difficult to study, the knowledge on most species has increased significantly in the last two decades thanks to employment of new research methods and technologies. This course will provide in-depth knowledge on the biology of cetaceans and their ecological roles in marine ecosystems. Special attention will be given to ecology, synergistic impacts of human-caused threats, and contemporary conservation approaches, with emphasis on Mediterranean species. Moreover, the course will practically introduce students to state-of-the-art techniques and quantitative methods for research and conservation of cetaceans. Students taking this course will be able to focus on particular subjects and/or taxonomic groups, depending on their scientific interests.

Learning Objectives

After taking this course, students will:

1. Knowledge and understanding:
    a. Understand evolutionary history, systematic and diversity of cetaceans.
    b. Adopt knowledge on biology, adaptations, and ecology of cetaceans.
    c. Understand status, threats and ecosystem-based conservation approaches related to cetaceans.
    d. Be able to independently plan and perform research on cetaceans by applying state of the art methodologies and techniques.

2. Reflection:
    a. With completion of this course students will be able to develop research projects and evidence-based conservation strategies.
    b. Prioritize conservation decision making for cetaceans, adopting the ecosystem-based approach.

3. Application:
    a. Selection and application of the appropriate state-of-the-art methodologies for studying ecology and habitat use of cetaceans.
    b. Identification and quantification of anthropogenic threats to cetaceans.
    c. Development and implication of ecosystem-based conservation management plans for cetaceans.

Assessment

The evaluation breakdown for the course is as follows:

Assessment Item	Value (%)
Participation	10
Quiz 1 (cetacean biology and ecology)	10
Quiz 2 (research methods and bottlenose dolphins)	20
Field Exercise: Photo Identification Survey Report	30
Field Exercise: Boat Survey Report	30
TOTAL	**100**

Participation (10%)

Everybody should be prepared for each academic session. This implies reading the materials for each session with enough detail to be able to ask relevant questions; and to participate in analytical discussions about the key issues. Active participation during lectures, discussions, field lectures and lab exercises is expected.

Quiz 1 (10%)

This quiz will comprise multiple-choice and short answer questions, covering cetacean biology and ecology. Students will receive literature to read in advance to prepare for this quiz.

Quiz 2 (10%)

This quiz will comprise multiple-choice and short answer questions, covering methods in cetacean research and bottlenose dolphin ecology and conservation status in the Mediterranean and Adriatic seas, which will be covered during lectures.

Field Exercise: Photo Identification (30%)

Students will be assessed based on the results of photo-identification. For this, they will learn photo-identification techniques during lectures and workshops, after which they will work in groups to analyze a photo-identification dataset.

Field Exercise: Boat Survey Report (20%)

Students will be assessed based on the report which is submitted. The report should show the ability to define a research goal, plan a survey, collect data, perform analyses, and present results. For this, students will be guided through introductory lessons and field lectures. During boat-based surveys they will collect photo-identification data which they will have to analyze and use to base their report upon.

Grading Scheme

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Honor Code/Plagiarism – SFS places high expectations on students, and we hold students accountable for their behaviors. SFS students are held to the honor code below. SFS has a zero-tolerance policy towards student cheating, plagiarism, data falsification, and any other form of dishonest academic and/or research practice or behavior. Using the ideas or material of others without giving due credit is cheating and will not be tolerated. Any SFS student found to have engaged in or facilitated academic and/or research dishonesty will receive no credit (0%) for that activity.

> *"SFS does not tolerate cheating or plagiarism in any form. While participating in an SFS program, students are expected to refrain from cheating, plagiarism and any other behavior which would result in a student receiving credit for work which they did not accomplish on their own. Students are expected to report any instance of cheating or plagiarism by others."*

Deadlines – Deadlines for written and oral assignments are instated to promote equity among students and to allow faculty ample time to review and return assignments before others are due. As such, deadlines are firm; extensions will only be considered under extreme circumstances. Late assignments will incur a penalty of 10% of your grade for each day you are late. After two days past the deadline, assignments will no longer be accepted. Assignments will be handed back to students after a one-week grading period. Grade corrections for any assessment item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

Content Statement – Every student comes to SFS with unique life experiences, which contribute to the way various information is processed. Some of the content in this course may be intellectually or emotionally challenging but has been intentionally selected to achieve certain learning goals and/or showcase the complexity of many modern issues. If you anticipate a challenge engaging with a certain topic or find that you are struggling with certain discussions, we encourage you to talk about it with faculty, friends, family, the HWM, or access available mental health resources.

Participation – Since we offer a program that is likely more intensive than you might be used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. Participation in all components of the course is mandatory, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and class activities, and simply get involved.

AI Usage in Assignments – SFS acknowledges the growing role of artificial intelligence (AI) tools in education and professional settings. While AI can be a valuable resource for learning and productivity, its use must align with the learning goals and integrity of each assignment. For this reason, students are encouraged to discuss the acceptable uses of AI for each assignment with the instructor. If you wish to use AI for any part of an assignment, consult with the instructor beforehand to ensure that its use adheres to the academic expectations of the course. Let's work together to navigate this evolving landscape responsibly!

Course Content

Type: O: Orientation, **D**: Discussion, **L**: Lecture, **FEX**: Field exercise, **DEX**: Desk exercise (workshop)

No	*Title and outline*	*Type*	*Time (hrs)*	*Required Readings*
	Predeparture reading - Intro to cetaceans	L		**Berta, et al. (2015 a, b, c, d, e).**
1	Course Introduction	O	0.5	
2	Boat Introduction, Safety and Procedures	L	1.0	
3	Boat and waterfront orientation	O	2.0	
4	Bottlenose dolphin - spatial and social ecology, population dynamics	L	1.0	**Natoli, et al. (2021).** Pleslić, et al. (2019).
5	Common methods in cetacean research	L	2.0	Buckland, et al. (2015).
6	Common methods in cetacean research - practical	DEX	3.0	
7	Introduction to Photo-identification	L	1.0	Pleslić, et al. (2015).
8	Photo-identification - Labwork	DEX	3.0	Urian, et al. (2015).
9	Photo ID Practical	FEX	2.0	
10	Boat based surveys - Photo identification & abundance training (20 hours/five weeks)	FEX	20.0	
11	Desk exercise - Cetacean species identification	DEX	2.0	
12	Theodolite - intro and practical	L	1.0	
13	Land-based surveys - theodolite practical	FEX	2.0	
14	Boat surveys report - instructions and Q&A - time to discuss the assignment.	D	1.0	
15	Quiz Review	D	0.5	
16	Acoustics introduction - equipment, principles, results	L	2.0	Rako, et al. (2013).
17	Acoustics practical	DEX	2.0	
18	Cetacean vocalization and underwater noise – practical fieldwork, boat-based	FEX	3.0	
19	Debrief & Course Wrap-up	D	1.0	
	Total		**50**	
	UMN Instructional Hours		**60**	

**UMN defines an instructional hour as a 50-minute block. SFS syllabi are written in full 60-minute hours for programming purposes. Therefore 50 full hours = 60 UMN instructional hours (for four credit courses) and 25 full hours = 30 UMN instructional hours (for two credit courses).*

Reading List

1. **Berta A., Sumich J. & Kovacs K. (2015a).** Chapter 4. Cetacean Evolution and Systematics. In: Marine mammals: Evolutionary biology. Third edition. Elsevier Academic Press, London.

2. **Berta A., Sumich J. & Kovacs K. (2015b).** Chapter 6. Evolution and Geography. In: Marine mammals: Evolutionary biology. Third edition. Elsevier Academic Press, London.

3. **Berta A., Sumich J. & Kovacs K. (2015c).** Chapter 11. Sound Production for Communication, Echolocation, and Prey Capture. In: Marine mammals: Evolutionary biology. Third edition. Elsevier Academic Press, London.

4. **Berta A., Sumich J. & Kovacs K. (2015d).** Chapter 13. Reproductive Structures, Strategies, and Patterns. In: Marine mammals: Evolutionary biology. Third edition. Elsevier Academic Press, London.

5. **Berta A., Sumich J. & Kovacs K. (2015e).** Chapter 14. Population Structure and Dynamics. In: Marine mammals: Evolutionary biology. Third edition. Elsevier Academic Press, London.

6. Buckland, S. T., Rexstad, E. A., Marques, T. A., & Oedekoven, C. S. (2015). Distance sampling: methods and applications (Vol. 431). New York: Springer.

7. **Natoli, A., Genov, T., Kerem, D., Gonzalvo, J., Lauriano, G., Holcer, D., Labach, H., Marsili, L., Mazzariol, S., Moura, A.E., Öztürk, A.A., Pardalou, A., Tonay, A.M., Verborgh, P. & Fortuna, C. (2021).** Tursiops truncatus (Mediterranean subpopulation) (errata version published in 2022). The IUCN Red List of Threatened Species 2021: e.T16369383A215248781. Accessed on 24 December 2024.

8. Pleslić G., Rako Gospić N., Mackelworth P., Wiemann A., Holcer D., Fortuna C., (2015). The abundance of common bottlenose dolphins (Tursiops truncatus) in the former special marine reserve of the Cres-Lošinj Archipelago, Croatia. Aquatic Conservation: Marine and Freshwater Ecosystems 25 (1): 125-137

9. Pleslić, G., Rako-Gospić, N., Miočić-Stošić, J., Blazinić Vučur, T., Radulović, M., Mackelworth, P., ... and Holcer, D. (2019). Social structure and spatial distribution of bottlenose dolphins (Tursiops truncatus) along the Croatian Adriatic coast. Aquatic Conservation: Marine and Freshwater Ecosystems, 29(12), 2116-2132.

10. Rako, N., Fortuna, C. M., Holcer, D., Mackelworth, P., Nimak-Wood, M., Pleslić, G., ... & Picciulin, M. (2013). Leisure boating noise as a trigger for the displacement of the bottlenose dolphins of the Cres–Lošinj archipelago (northern Adriatic Sea, Croatia). Marine pollution bulletin, 68(1-2), 77-84.

11. Urian K., Gorgone A., Read A., Balmer B., Wells R.S., Berggren P., Durban J., Eguchi T., Rayment W., Hammond P.S., (2015). Recommendations for photo-identification methods used in capture-recapture models with cetaceans. Marine Mammal Science 31 (1): 298-321.