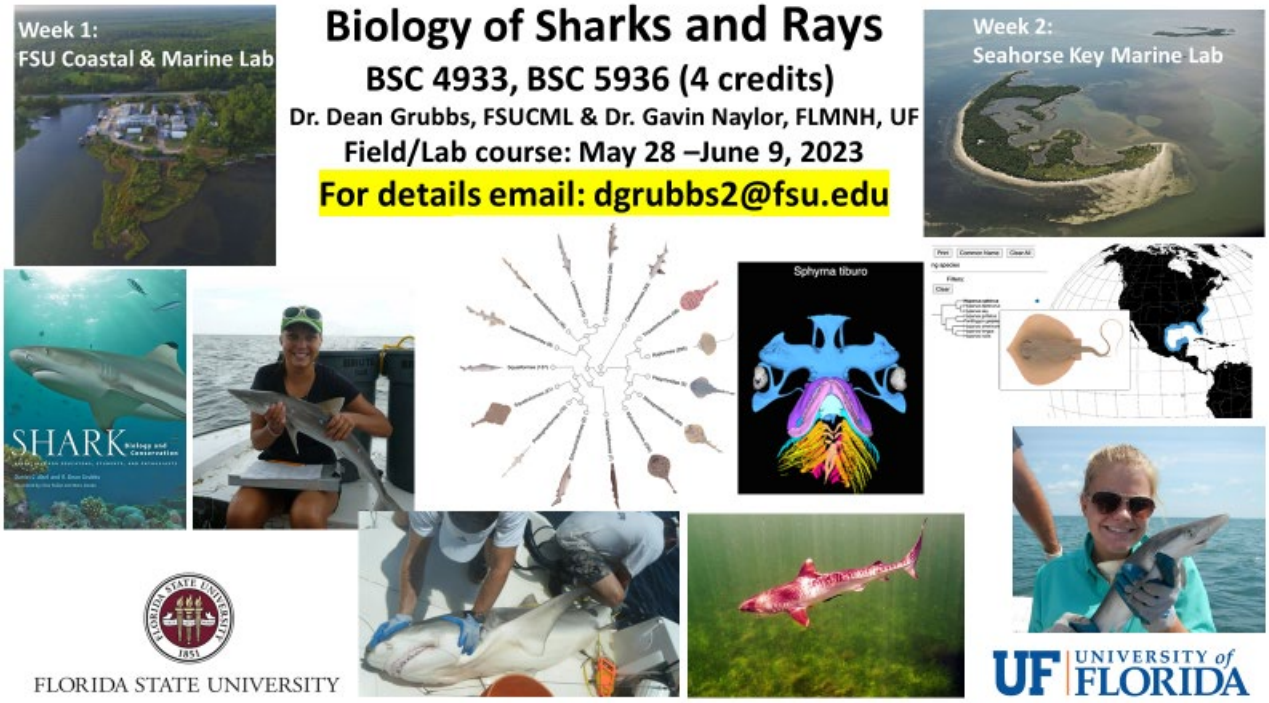

BIOLOGY OF SHARKS & RAYS: May 28 – June 9, 2023, 4 credit hours
FSU students: ZOO4407 (undergraduate); ZOO6409 (graduate) Biology of Sharks and Rays:
UF students: ZOO4926 (undergraduate); ZOO6927 (graduate) Biology of Sharks and Rays:
Instructors: Dr. Dean Grubbs, (FSUCML) and Dr. Gavin Naylor, (UF)

PRE-REQUISITES: BSC 2011, or equivalent. This course is open enrollment targeted toward upper level undergraduates and beginning graduate students.

FEES: There will be a program fee TBD per student in addition to fees for 4 credit hrs. The program fee covers dorm costs, vessel and vehicle rental and fuel, lab supplies, and some meal costs.

DATES: MAY 28-JUNE 9, 2023. (May 28-June 3: FSU Coastal & Marine Lab; June 3-9 Seahorse Key Marine Lab.)

FLORIDA STATE UNIVERSITY COASTAL & MARINE LABORATORY -
3618 Coastal Highway 98 St. Teresa, FL 32358 850-697-4120 www.marinelab.fsu.edu

SEAHORSE KEY MARINE LAB, NATURE COAST BIOLOGICAL STATION
552 1st Street Cedar Key, FL 32625 352-325-6078 https://ncbs.ifas.ufl.edu/seahorse-key-marine-laboratory/facilities/

COURSE DESCRIPTION: Biology of Sharks and Rays is an immersion course geared towards upper level undergraduates and graduate students wishing to pursue research involving sharks, skates, rays and chimaeras. Information will be disseminated through a combination of lectures, laboratory assignments, and field exercises. The course will focus on the extant diversity of elasmobranch fishes, their evolution, zoogeography and ecology. We will cover form, function, physiology and ecology of different species of elasmobranchs emphasizing adaptations to different habitats. Toward the end of the course we will

cover contemporary challenges associated with fisheries management of elasmobranch populations and their conservation. The course will have a strong field component, introducing students to some of the species of elasmobranchs that inhabit the varied estuarine, marine, and deep-sea habitats of the northern Gulf of Mexico. Students that complete this course will gain an understanding of (1) The evolutionary history of sharks and rays (2) The forces that have shaped their diversity and biogeographic patterns, (3) The variation in life history and ecology that is exhibited across the group (4) The physiological, behavioral and morphological adaptations that have allowed elasmobranchs to colonize different habitats. At the conclusion of the course, students will be able to identify the species that occur in the Gulf of Mexico, become familiar with a variety of sampling and tagging methods that are used to study their biology, and explain major environmental and historical influences that have shaped species abundances and distributions.

RECOMMENDED TEXT: Shark Biology and Conservation by Abel and Grubbs
https://www.amazon.com/Shark-Biology-Conservation-Essentials-Enthusiasts/dp/1421438364?asin=1421438364&revisionId=&format=4&depth=1

Students will be given reading assignments which will be ether posted on the course website or handed out in class. The lecture presentation outlines will be posted on the website.

FISH IDENTIFICATION: Students will be expected to be able to identify and understand the taxonomy and phylogenetic relationships among species studied in the lab.

FIELD TRIPS: We will sample marine and estuarine habitats over a series of field trips (weather permitting) based out of FSU Coastal and Marine Lab (May 28 -June 3) and Seahorse Key (June 3-9)

LAB ASSIGNMENTS: Laboratory assignments will center around two main topic areas: (1) species identification and (2) comparative anatomy. Students will carry out dissections to understand anatomy and make skeletal preps of jaws and chondrocrania that will be added to the FSUCML comparative teaching collection. Students will learn how to interpret the utility of anatomical features for studying adaptation, ontogeny, and evolutionary relationships. These are time consuming projects that will take up most of the assigned lab time during the first half of the course.

SKELETAL PREPARATIONS AND PRESENTATIONS: comparative skeletal collection of jaws and chondrocrania is housed Zoological Collection at the FSU Coastal and Marine Lab. The skeletal preparation you carry out during the course will contribute toward this collection. You will be assigned a jaw or chondrocranium specimen for your preparation, based on availability, during the first lab. You will be expected to review the primary literature associated with the species you work on. At the end of the class, you will present your preparation to the class describing the features that are distinctive and interpret these considering the evolutionary history, life history, ecology, physiology, and behavior of the species.

LAB PRACTIAL: Lab practical format will be short answer / fill in the blanks. You are expected to be able to identify any shark or ray examined in lab to species. Also, you should be able to identify internal and external structures and their basic functions. Questions about habitats and ecology may also be asked.

EXAMS: There will be one final exam, that will cover all the material covered over the entire course.

GRADING: Grading will be based on the final exam score (30 pts), lab practical (30 pts), skeletal presentation (20 pts), and participation (20pts).

STAYING AT FSUCML

The first week of the course will take place at the FSU Coastal Marine Lab, 50 miles from the main FSU campus in St. Teresa, Florida. Students will drive to St. Teresa in their own vehicles (or carpool) to arrive at the lab by 2:00pm on May 28, 2023. Accommodation at the FSU Marine Lab will be dormitory living. Linens, twin sheets, pillow case, blanket, towel, and washcloth will be provided. Dorm quiet hours are from 10 PM to 7 AM. The lab is remotely located from any shopping - no fast food, no pharmacy, or major grocery stores within a 30 minute drive. DINING -- All the cooking and meals will take place in the housing, where you will have access to a kitchen. All students and faculty will be responsible for their own breakfast and lunch. We will have a communal dinner in the evening. Students will rotate, with a different group assisting with the cooking each night. Bring your own food sufficient for breakfast and lunch for 6 days and whatever you want to drink (no alcohol). There is a visitor's guide in the dorms with a list and directions to restaurants and grocery stores if you need to resupply.

STAYING AT SEAHORSE KEY

The second week of the course (3-9 June) will be taught at the Seahorse Key Marine Laboratory, which is only accessible by boat. Students will drive down from FSU Marine lab in St. Teresa on June 4th to Cedar Key in their own vehicles and meet at the dock at Cedar Key at 2:00pm. Students can park in the parking lot near the dock at Cedar Key. A boat will be provided to ferry students out to Cedar Key. Both students and the instructors will live in ***dormitories*** on Seahorse Key in the Lighthouse. You will need to bring a sleeping bag, pillow, towel and linens. (Note linens are NOT provided at Seahorse Key) All the cooking and meals will take place in the housing, where you will have access to a kitchen. Each student and faculty member will fend for him/her/self for breakfast and lunch. We will cook a communal evening meal each night for which there will be a nominal charge. Students will rotate, with a different group assisting in the cooking each night, as at the FSU marine lab. Bring your own food sufficient for breakfast and lunch for 6 days and whatever you want to drink (no alcohol). Please mark everything with your name since you will be sharing refrigerator and cooler space.

CLOTHING AND FIELD GEAR -- Field clothes, rain jacket, bathing suit, shoes that can get wet and dirty (flip flops are NOT acceptable; only close-toed shoes are worn in the field and on boats), hat, sun block, and insect repellent. Bring towels with you that you can take in the field. Seahorse Key is very rudimentary with few facilities. However, there will be a washer and drier at the FSUCML (located outside dorm 5 on the waterfront) during the first part of the course. You must bring your own laundry supplies (Please ONLY use HE detergent in the washer)

WIFI: There will be WiFi via the GUEST connection at the FSUCML for the first part of the course. There is limited Wifi on Sea Horse Key. No TV is available at either of the 2 field stations.

RESTRICTIONS: Pets are not permitted on either of the two marine labs.