DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus
Department of Biology
MARI 3627.03 - Biology and Conservation of Sharks, Skates and Rays
Dalhousie University, Seaside Summer Course, **Summer 2017**

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Demonstrator: Kirsti Burnett, burnettkirsti@gmail.com

Lectures: Aug14th-Aug31st, 9:05am - 4:55pm, Studley LSC-COMMON AREA C234.

Laboratories: Studley LSC lab B2102. For dates see schedule

Field trips: Aug 22th – Aug 25th full day. Boat tagging trip. Each student will only be able to go on one of these dates (limited space on boat). See schedule for details.

Course Description

This course offers a combination of lectures, labs, and field trips that explore the elementals of elasmobranches (shark, skate and ray) biology and conservation. Students are introduced to current methods used in shark research, such as tagging, and learn about the role of sharks in ecosystems.

Course Prerequisites

Biology 2060.03 (or BIOA 3001.03) (Introductory Ecology) and Biology 2003.03 (Diversity of Life)

Overview

This course will introduce students to the diversity of elasmobranchs and how they can be identified using mostly visible features (focus on Atlantic Canada species). Furthermore, the anatomy, physiology and function of different organs will be studied in detail, including dissections of sharks and skates. This also contains an aging module where students will learn how to age elasmobranchs. Current threats, the status and tools for protection of this group will be discussed in detail. Students will in particular learn why elasmobranchs react to exploitation the way they do and will be introduced into methods that are used to assess the status. The role of elasmobranchs in the ecosystem and tools for protection will also be presented. The students will learn how to tag elasmobranchs, assist with blue shark tagging off the coast of Halifax, and also be introduced theoretically about how to work with sharks in the water.

Course Objectives/Learning Outcomes

CLASSROOM:
By the end of this course, students will be able to:
1. Identify the roles elasmobranchs play in marine ecosystems.
2. Identify the conservation status of elasmobranchs on a global, national, and regional scale.
3. Describe basic shark anatomy and physiology.
4. Identify common species of elasmobranchs.
5. Define and discuss the varying types of field methods for shark research.
6. Analyze and discuss important topics on shark biology, life history, population dynamics and assessments, effects of human impact, management and conservation, and shark conservation concerns.
7. Define and discuss the different types of policies/regulations that apply to the management and conservation of sharks.
8. Investigate, analyze, interpret, and report on an issue related to shark biology, conservation or management.

FIELD:
By the end of this course students will be able to:
1. Demonstrate working and collecting data in the field on sharks.
2. Recognize the basics on how to properly tag and release a shark.
3. Identify defining characteristics of sharks' anatomy, physiology, and make field observations.

LAB:
By the end of this course students will be able to:
1. Identify anatomical features of several species of shark, skate, or ray.
2. Demonstrate hands on experience with necropsy of cartilaginous fish.
3. Demonstrate experience in applying age-determination techniques.

Course Materials

- Required: Lecture handouts, including papers from primary literature. Literature may also be available through Brightspace, as will be all course material.
- Suggested: 'Biology of Sharks and Their Relatives', by J.C. Carrier, J.A. Musick, M.R. Heithaus (Eds.) CRC Press

Course Assessment

For preliminary dates and times of tests, quizzes, assignments and exams see schedule below.

Component	**Weight (% of final grade)**	**Date**
Tests		
Species presentation	10%	
Species identification quiz	5%	

Dogfish lab quiz 5%

Skate lab quiz 5%

Group project work 15%

Final exam 30%

Assignments

Research Paper 30%

Other course requirements

The students should be ok with working on dead animals and should be ok to spend several hours on a boat.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	**B+** (77-79)	**C+** (65-69)	**D** (50-54)
A (85-89)	**B** (73-76)	**C** (60-64)	**F** (<50)
A- (80-84)	**B-** (70-72)	**C-** (55-59)	

Course Policies

Missed assignments or exams will count 0%, unless the student is excused previous to the exam or assignment due to circumstances out of his or her control (e.g. illness, death in the family). In case of illness, a doctor's note is needed to avoid lower marks and repeat the exam.

Attendance is mandatory- You are expected to attend all lectures, field, and lab sessions. It is your responsibility to ask the Instructor for notes, or missed lecture material, and to reschedule exams if absolutely necessary.

Schedule Changes- The student is responsible for knowing when a schedule change takes place, by emailing or asking the teacher, or writing down announcements in class.

Preparation for Field Trips- Excluding transportation, the student is expected to prepare for all field trips, see below for details.

Course Schedule (tentative – may change due to weather, etc.)

Schedule, may change do to availability of guest speakers and weather conditions.

DRAFT Schedule: Biology and Conservation of Sharks, Skates and Rays (Summer, 2017)

LC= Lecture; **GS**= Guest Speaker; **FT**= Field Trip; **LB**=Lab; **PW**=Project Work; **OT**=Other; **SP**= Species Presentation; **QZ**= Quiz; **R**=Review; **FE**= Final Exam

Room Locations:

-All regular lectures or computer work will be held in Studley LSC-COMMON AREA C234.

-All labs will be held in BIOL 2102, 2nd floor of the LSC or in Studley LSC-BIOL&EARTH B2102

Date	Day	AM Time	AM	PM Time	PM	Location
AUG 14th	**M**	9:00-10:00 **C234** 10:00-11:00 **C234** 11:00-12:00 **C234** 12:00-1:00	**(LC)** Introduction to Course **(LC)** Explanation of assignments **(LC)** The IUCN and the Red List Break	1:00-2:00 2:00-2:30 2:30-3:30 3:30-4:00	**(GS)** Chris Harvey-Clark Diversity and Evolution of Elasmobranchs **(OT)** Chris Harvey-Clark Species ID-Exercise **(OT)** Racing Extinction Form groups for final project	**C234** **C234** **C234** **C234**
AUG 15th	**Tu**	9:00-10:00 **C234** 10:00-11:00 **C234** 11:00-12:00 12:00-1:00	**(LC)** Introduction to Biology/Ecology **(LC)** Global status, threats and fisheries **(GS)** Joseph Pratt Canadian status, threats and fisheries Break	1:00-2:00 2:00-4:00	**(GS)** Heike Lotze Ecosystem role of sharks and consequences of their decline **(LC)** Chris Harvey-Clark Animal Ethics and Shark Conservation	**C234** **C234**
AUG 16th	**W**	9:00-9:30 **C234** 9:45-10:45 **C234** 11:00-12:00 12:00-12:15 **C234** 12:15-1:00	**(R)** Chris Harvey-Clark Review of Species ID **(GS)** Boris Worm Sharks and Humans **(LC)** Chris Harvey-Clark Shark Physiology and Anatomy I **(LC)** Spiny Dogfish Break	1:00-2:30 2:30-3:00 3:00-4:00	**(LB)** Dogfish Dissection **(LB)** Spiral Valve Casts **(QZ)** Species ID Quiz	**B2102** **B2102** **C234**
AUG 17th	**Th**	9:00-9:30 **C234** 9:30-10:30 **C234** 10:30-11:30 **C234**	**(R)** Chris Harvey-Clark Dogfish Dissection Review **(GS)** Dave Kulka Skates and rays **(LC)** Chris Harvey-Clark Shark Physiology and Anatomy II	1:30-2:30 2:30-3:00 3:00-4:00	**(LB)** Skate Dissection **(LB)** Spiral Valve Casts **(QZ)** Dogfish Lab Quiz	**B2102** **B2102** **C234**

		11:30-1:00 **C234** 1:00-1:30	**(LC)** Chris Harvey-Clark Skate and Ray Physiology/Anatomy Break			
AUG 18th	**F**	9:00-12:00 **C234**	Vemco Acoustic Telemetry Workshop	1:00-4:00	Vemco Acoustic Telemetry Workshop	**C234**
AUG 19th	**Sa**	OFF		OFF		
AUG 20th	**Su**	OFF		OFF		
AUG 21st	**M**	9:00-10:30 **C234** 10:30-11:00 **C234** 11:00-12:00 **C234** 12:00-1:00	**(R)** Open Review **(R)** Chris Harvey-Clark Skate Dissection Review **(GS)** Brendal Townsend Sharks and The Ocean Tracking Network Break	1:00-2:00 2:00-2:30 2:30-3:30 3:30-4:30	**(LC)** Chris Harvey-Clark Sharksmart-all about field work aspects of working with sharks **(LC)** The Blue Shark **(QZ)** Skate Lab Quiz **(GS)** Art Geatan Blue Shark Charters	**C234** **C234** **C234** **C234**
AUG 22nd	**Tu**	All day **Eastern Passage** **C234**	**(FT)** Shark Tagging-Group A x 5 **(GW)** Group work B, C and D	All day	**(FT)** Shark Tagging-Group A x 5 **(GW)** Group work B, C and D	**Eastern Passage** **C234**
AUG 23rd	**W**	All day **Eastern Passage** **C234**	**(FT)** Shark Tagging-Group B x 5 **(GW)** Group work A, C and D	All day	**(FT)** Shark Tagging-Group B x 5 **(GW)** Group work A, C and D	**Eastern Passage** **C234**
AUG 24th	**Th**	All day **Eastern Passage** **C234**	**(FT)** Shark Tagging-Group C x 5 **(GW)** Group work A, B and D	All day	**(FT)** Shark Tagging-Group C x 5 **(GW)** Group work A, B and D	**Eastern Passage** **C234**
AUG 25th	**F**	All day **Eastern Passage** **C234**	**(FT)** Shark Tagging-Group D x 5 **(GW)** Group work A, B and C	All day All day	**(FT)** Shark Tagging-Group D x 5 **(GW)** Group work A, B and C Last day to drop off of assignments for review	**Eastern Passage** **C234** **4134**
AUG 26th	**Sa**	OFF		OFF		

AUG 27th	**Su**	OFF		OFF		
AUG 28th	**M**	9:00-10:00 **C234** 10:00-11:00 **C234** 11:00-12:00 **C234** 12:00-1:00	**(LC)** Kirsti Burnett ShARCC and The Cabo Verde Elasmobranch Project **(GS)** Megan Bailey Elasmobranch conservation and management: A global survey **(GS)** Christine Ward-Paige Shark sanctuaries and MPAs Break	1:00-2:30 2:30-3:00 3:00-4:00	**(GS)** Robert Fairweather Population and Conservation genetics in sharks **(LC)** Length-weight relationship, statistics and model fitting **(LC)** Life history I Growth and reproduction	**C234** **C234** **C234**
AUG 29th	**Tu**	9:00-10:00 **C234** 10:00-11:00 **C234** 11:00-11:15 **C234** 11:30-12:30 **C234** 12:30-1:00	**(LC)** Life history II Longevity and natural mortality **(LC)** Population biology and assessment methods **(LC)** Intro FishBase and Exercise **(GS)** Heather Bowlby White Sharks in the NW Atlantic Break	1:00-2:00 2:00-4:00	**(GS)** Warren Joyce Aging methods **(LB)** Warren Joyce Aging lab	**C234** **B2102**
AUG 30th	**W**	9:00-12:00 **C234** 12:00-1:00	**(SP)** Species presentations Break	1:00-2:00 2:00-4:00 4:00	**(SP)** Species presentations **(OT)** SHARKWATER **(OT)** Questions and Exam study	**C234** **C234** **C234**
AUG 31st	**Th**	9:00-12:00 **C234** 12:00-1:00	**(PW)** Group Project Presentations Break	1:00-4:00	Final Exam Drop off of assignments September 2nd	**C234** **4134**

What to bring on field trips

Appropriate footwear for wet conditions, camera, lunch, water snacks, pencils, notebook, sunscreen, sunglass, head, jacket for wind or rain.

ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie's Student Accommodation Policy can be accessed here: http://www.dal.ca/dept/university_secretariat/policies/academic/student-accommodation-policy-wef-sep--1--2014.html

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the **Advising and Access Services Centre (AASC)** prior to or at the outset of the regular academic year. More information and the ***Request for Accommodation*** form are available at www.dal.ca/access.

ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie's ***Policy on Intellectual Honesty*** and ***Faculty Discipline Procedures*** is available here:

http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

"The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members."

The full text of the code can be found here:
http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

Service	Support Provided	Location	Contact
General Academic Advising	Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties	**Killam Library Ground floor** Rm G28 ***Bissett Centre for Academic Success***	In person: Killam Library Rm G28 By appointment: - e-mail: advising@dal.ca - Phone: (902) 494-3077 - Book online through MyDal
Dalhousie Libraries	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	**Killam Library Ground floor** Librarian offices	In person: Service Point (Ground floor) By appointment: Identify your subject librarian (URL below) and contact by email or phone to arrange a time: http://dal.beta.libguides.com/sb.php?subject_id=34328
Studying for Success (SFS)	Help to develop essential study skills through small group workshops or one-on-one coaching sessions Match to a tutor for help in course-specific content (for a reasonable fee)	**Killam Library 3rd floor** Coordinator Rm 3104 Study Coaches Rm 3103	To make an appointment: - Visit main office (Killam Library main floor, Rm G28) - Call (902) 494-3077 - email Coordinator at: sfs@dal.ca or - Simply drop in to see us during posted office hours **All information can be found on our website: www.dal.ca/sfs**
Writing Centre	Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster) - Learn to integrate source material into your own work appropriately	**Killam Library Ground floor** Learning Commons & Rm G25	To make an appointment: - Visit the Centre (Rm G25) and book an appointment - Call (902) 494-1963 - email writingcentre@dal.ca - Book online through MyDal We are open six days a week **See our website: writingcentre.dal.ca**

	- Learn about disciplinary writing from a peer or staff member in your field		