Underwater Exploration Syllabus

Spring 2023

General Information

Class Days:	Wednesday 2-5; TWO weekends (if SCUBA cert)
Instructor:	Dr. Deanna Soper
Office, Phone, and e-mail:	HSC 140, 972-721-5245, dsoper@udallas.edu
Books:	Laboratory Manual (Bookstore) Open Water eLearning Course (for SCUBA students only - You will obtain through the SCUBA shop)

Course Description

The underwater environment is not one that most people have the opportunity to encounter. Most people that are submerged in an aquatic environment do so via snorkel. Only 1% of all people in the United States are certified SCUBA divers. But, SCUBA offers the possibility of complete submersion in this underwater world. Even so, SCUBA is limited in that one can only recreationally dive to 130 feet. The ocean is vast and deep and beyond that depth several other techniques are used to explore the underwater world. One of them is by using unmanned submersibles called Remotely Operated Vehicles (ROVs). This course will introduce students to the deep-sea via video and photographs collected from a ROV funded by the National Oceanic Atmospheric Administration (NOAA). Students will also be involved with helping to develop a software program that is aimed at automatic organism detection. In order to do this, students are required to learn taxonomic hierarchy, animal identification, and Tator (the software program developed by CVision AI) use. The FathomNet Animal guide, hosted by the Monterey Bay Aquarium Research Institute (MBARI), will be utilized to assist with species identification. Along the way, questions about biodiversity, organism distribution and abundance will be addressed. This course also provides the opportunity for SCUBA certification as part of the course. For those that have physical or financial limitations (See Here for SCUBA requirements and information), an alternative independent project will be developed in collaboration with the course instructor and T.A. Students who will complete an open water SCUBA diving course (including an eLearning portion) will do so through a certified dive shop in the Dallas area (which entails the completion of an online course (*eLearning*) and preparation for two days of pool dives, two days of open water dives). Students will be required to obtain their dive license through an internationally recognized certifying agency by the last weekend of the semester and submit proof of licensure. Students who choose to develop an independent project instead will utilize the skills they develop throughout the semester to ask their own question, develop an experimental design, collect data, and write a

laboratory report on the project. For more details on the laboratory report requirements see below.

Course Objectives

- Understand biological taxonomy
- Be able to identify and classify marine organisms into major taxonomic groups
- Learn to use Tator to assist with animal identification recording
- Learn to use Tator to collect data
- Learn to use the FathomNet Database for animal identification, question development, and experimental design

For Those Completing the SCUBA Requirement

- Introduce basic diving principles including Boyle's Law.
- Learn how to use all required diving equipment
- Learn all diving safety procedures including, but not limited to:
    - Regulator recovery
    - Mask flooding and clearing
    - Buoyancy skills
    - Equalization techniques
    - Ascents and descents
    - Out of air procedures
    - Buddy assistance
- Be able to successfully complete both pool dives and open-water dives to obtain an internationally recognized dive certification
- Learn about ecological impacts of humans on the aquatic environment and how to ensure ecologically mindful diving procedures

Assessment and Requirements

Item	**Points**
Weekly Labs (7)	175
Lab 8 & Final Laboratory Report & Presentation (Independent Project Track)	225
OR	
Dive Certification (eLearning Course and participation in required dives)	225
Total	400

Description of Assessment Tools

Weekly Labs

All students will complete seven hands-on labs on the University of Dallas campus. These labs will focus on learning biological taxonomic hierarchy, animal identification, and Tator use. Basic data collection will occur during the first portion of the semester. For those continuing on into the independent project, advanced experimental design and data collection will be taught. Lab 8 will instruct students completing the independent project on how to calculate a biodiversity index, which can be used for quantification in their independent project.

eLearning Course (For SCUBA students only)

This online course will provide all the necessary background learning prior to getting in the pool. It teaches students the basic jargon associated with SCUBA diving, necessary safety procedures, and equipment needs. This course requires the completion of quizzes and passing a final online test in order to be eligible to enter the next phase of SCUBA training, which is pool dives (see below).

Dive Certification & Participation (For SCUBA students only)

Students are required to obtain their open-water (or advanced if the student already has an open-water license) diving certification. This requires FOUR 8-9 hour days over the course of two weekends. Students will be required to successfully perform all skills underwater in both pool and open-water environments.

Final Laboratory Report & Presentation (For Independent Project Students Only)

Students will turn in a final laboratory report that will mimic a scientific paper. Students will develop a question that can be answered using the FathomNet Database. Data collection and analysis will answer the question the student posed. The laboratory report will detail this in the five traditional sections of a scientific paper, which are: Introduction, Methods, Results, Discussion, and Literature Cited. See here for the report guidelines. Students will also complete a 10 - 15 minute presentation of their project during Lab 13. See here for presentation guidelines.

Course Schedule

January 25th - Lab 1 - Library and Syllabus Day

February 1st - Lab 2 - Introduction to Taxonomy

February 8th - Lab 3 - Animal Diversity

February 15th - Lab 3 - Animal Diversity (Continued)

February 22nd - Lab 4 - Tator Basics

March 1st - Lab 5 - Advanced Tator I; Advanced Tator II

March 8th - Lab 6 - Extending to Novel Dive

March 22nd - Lab 7 - Independent Project Development/SCUBA students begin eLearning Course

March 29th - Lab 8 - Biodiversity Analysis/SCUBA students complete eLearning Course

April 5th - Lab 9 - Independent Project Data Collection/SCUBA pool dives

April 12th - Lab 10 - Independent Project Data Collection/SCUBA pool dives

April 19th - Lab 11 - Independent Project Data Analysis/SCUBA open water dives

April 26th - Lab 12 - Independent Project Draft Due/SCUBA open water dives

May 3rd - Lab 13 - Independent Project Presentations & Final Lab Drafts Due/SCUBA open water license due

ATTENDANCE
Attendance is **required.** Missing any part of the course may result in a failure of the course. This means that you should be careful about your activities both on and off campus and be mindful of who you interact with. *There is no virtual alternative for this lab.*

Academic Honesty
Students are expected to maintain academic honesty through avoiding plagiarism and cheating. See the University of Dallas' policy on Academic Honesty at: http://www.udallas.edu/about/university-policies/academic_policies/academic-honesty.php

Change of Final Grade
The only reason for which a change of final grade may be requested **is an error** in the original recording of the grade. (THIS MEANS DO NOT E-MAIL ME AFTER FINAL GRADES HAVE BEEN GIVEN REQUESTING EXTRA CREDIT OR A GRADE BUMP.) Students should check their transcripts and consult with the instructor if there is a question of error. The appeal for a change of grade must be made in the first three weeks of the semester following that in which the course was taken.

General Rules and Expectations for the Course

1. Students are required to read the assigned readings.
2. Assignments will be completed by the specified deadlines. The instructor is under no obligation to accept unexcused late assignments and can assign a score of zero points. Late assignments accepted by the instructor may be penalized 50% of the assignment's total value.
3. Students will conduct themselves in a courteous and responsible manner in class and keep scholastic integrity (see Academic Honesty).
4. Students have one week to challenge the grade earned on an assignment, presentation, exam, or quiz. After one week, the grade is final.
5. Students are expected to check their University E-mail accounts and Brightspace on a regular basis for additional messages related to the course. Please use University E-mail accounts when communicating with the instructor electronically.
6. Students who are performing unsatisfactorily in the course are expected to discuss their performance with the instructor. The instructor is available by appointment outside of class to review course material and discuss strategies to improve performance.
7. The course schedule is subject to change. Deletions and substitutions in the syllabus schedule may occur.