

Biology 461- Spring 2009 - “Living Schedule” Underwater Research Methods and Techniques

Instructor: Mark Flahan, Diving Safety Officer
Office: Physics 240
Office Hours: Thursdays 1 PM or by appointment
Phone: 619-594-6799 direct and messages, (619-977-6275 Cellular)
Recorded dive site, activity, information: 594-5867
Weather, surf and dive conditions: 619-221-8824
E-mail: mflahan@sciences.sdsu.edu

Course Objective:

While meeting all CSU and American Academy of Underwater Sciences (AAUS) requirements, train and certify a knowledgeable, effective, competent and safe Scientific Diver.

Prerequisites:

- NAUI Master Scuba Diver or equivalent knowledge and skills.
- Minimum of 12 dives within the previous year not including formal class training and evaluation dives. Dives shall be in cold (San Diego) water conditions, varied in environment, depth and activities.
- Successfully complete pool watermanship evaluation to include 400 yard swim in less than 10 minutes, 880 yard snorkel kick in less than 20 minutes and transport another diver 100 yards on the surface in less than 4 minutes.
- Medical Exam Approval for SCUBA Diving. Be physically fit to scuba dive as indicated by completing the Medical History Form and passage of a NAUI acceptable CSU/AAUS medical exam for scuba diving within the previous 6 months.
- Students must provide their own suitable personal open water scuba equipment. Dive computer highly recommended. (Special arrangements can be made for limited use of SDSU equipment.)
- Complete application including waiver for SCUBA Diving.
- Be able and prepared to make all the scheduled class meetings, pool sessions and dives.
- Rescue Diver, CPR, First Aid and Oxygen Administration Certification. (Must be current to receive Certification.)

Special Considerations:

- Physical exams for scuba must be completed within the first 4 weeks.
- Students should be prepared to spend the entire time at the dive site.
- Students should not dive 24 hours prior to ocean dives.
- Students should not fly or go to altitude (over 1000ft) within 24 hours after diving.
- There may be some boat diving and field trips involved. Students will be required to pay the appropriate costs for any rentals, field trips, etc.
- Students may be contacted through e-mail regarding announcements, assignments, activities, schedule changes, etc. You must check your email regularly.
- Messages for Mark must be left at 619-594-6799. Do not call my cell after 10pm.
- Each student must maintain a personal dive log to be submitted at the end of the course.
- CPR, First Aid, Oxygen Administration certification must be current at end of semester. These courses may be made available during the semester.
- Enriched Air (Nitrox) training and certification as part of this course.
- This course requires additional meetings TBA.

Equipment Requirements:

Mask, snorkel, fins, boots, gloves, wetsuit/dry suit, weight system, scuba cylinder, regulator, submersible pressure gauge, BC with power inflator or combination power inflator /alternate air source, AAS, timing device, depth gauge, dive computer highly recommended, compass, plastic dive tables, log book, dive knife or tool.

Meetings:

Lectures: Thursdays 2-3:40 PM. Ocean sessions: Fridays 7-11 AM at various dive sites. Plus additional times TBA. Best to avoid Friday noontime classes. Class will make 2 dives when feasible. We will make 2 night or limited visibility dives, most likely on Friday nights at 1900. There will be at least one weekend meeting and field trip most likely to the Wrigley Catalina Marine Science Center (WIES). There may be one half-day boat trip.

Schedule: This is a proposed "living" schedule.

- **Actual activity, dive site, dive objective or meeting time may vary with the dive activity and environmental conditions.** La Jolla shores or Mission Bay may be used as an alternate dive sites.
- This class meets regardless of the weather conditions. Dives are not canceled.
- Call the 619-594-5867 early Friday mornings to confirm location and activity
- San Diego dive information at 619-221-8824 for local beach and weather conditions.
- Night Dives will be scheduled for Fridays as schedule and water conditions permit.
- Midterm Exam TBA. Final according to finals schedule.

<u>Week</u>	<u>Date</u>	<u>Day</u>	<u>Activity</u>
1	1-22	Thu	Classroom
	1-23	Fri	Ocean Qualification Dive
2	1-29	Thu	Classroom
	1-30	Fri	Ocean Dive
3	2-5	Thu	Classroom
	2-6	Fri	Ocean Scuba
4	2-12	Thu	Classroom
	2-13	Fri	Ocean Scuba
5	2-19	Thu	Classroom
	2-20	Fri	Ocean Scuba
6	2-26	Thu	Classroom
	2-27	Fri	Ocean Scuba - Rescues?
7	3-5	Thu	Classroom
	3-6	Fri	Ocean Scuba - Night dive?
8	3-12	Thu	Classroom
	3-13	Fri	Ocean Scuba
9	3-19	Thu	Classroom
	3-20	Fri	Ocean Scuba
10	3-26	Thu	Classroom
	3-27	Fri	Ocean Scuba
11	4-2	Thu	Spring Break
	4-3	Fri	Spring Break
12	4-9	Thu	Classroom
	4-10	Fri	Ocean Scuba
13	4-16	Thu	Classroom
	4-17	Fri	Ocean Scuba - Catalina? May move sooner.
14	4-18	Sat	Catalina
	4-19	Sun	Catalina
15	4-23	Thu	Classroom
	4-24	Fri	Ocean Scuba
16	4-30	Thu	Classroom
	5-1	Fri	Ocean Scuba
17	5-7	Thu	Classroom, Exam Reviews, Administrative Paperwork
	5-8	Fri	No Meeting
17	5-21	Thu	Final Exam Schedule (1300 – 1500)

Lecture Topic Areas:

scientific techniques	data collection techniques	field identification of local marine life
EAD (Nitrox) diving	AAUS and SDSU regulations	hyperbaric conditions/chamber orient.
lead diver responsibilities	briefings/debriefings	search and recovery
underwater mapping	small boat diving	underwater photography
dive planning	hunting and collecting	rescue and emergency procedures
underwater navigation	diving fitness	diving medicine and physiology
night diving	decompression theory and therapy	dive tables and dive computers
CPR and diving first aid	deeper diving	diving equipment
O2 administration	cold and diver performance	diving environment

Lecture/discussion will also be included as part of the open water meetings. You will be responsible for information presented at the dive site. Lecture materials will be supplemented with handouts and outside assignments and readings.

Possible Practical Activities/Dives:

underwater photography	data collection techniques	field identification of local marine life
search and salvage	airlift sampling	transects and kelp bed observations
deeper diving	night diving	rescues and emergency procedures
collecting techniques	wreck diving	behavioral observations
underwater navigation	canyon mapping	beach entries and exits
small boat diving	surveying techniques	limited visibility diving
skills enhancement	rocks, rips and reefs	physical conditioning
enriched air diving	briefings/debriefings	

Practical Objectives: Be able to:

1. Follow dive plans and complete assigned dive objectives.
2. Demonstrate acceptable underwater data collection techniques and procedures for the sampling techniques taught and utilized in class
3. Identify at least 100 commonly encountered local marine animals and plants.
4. Properly assemble, use and maintain specialized scientific equipment.
5. Demonstrate safe and effective scientific dive planning including briefings/debriefings and dive activity organization.
6. Safely complete a variety of dives including deep, night, 3R's, search and recovery and limited visibility under a range of water conditions.
7. Complete an open water rescue of a SCUBA diver including EMS activation, scene management and preparation for transportation.
8. Demonstrate proper diving skill at all times including, effective budding techniques, weighting, buoyancy control and the ability to navigate while underwater.
9. Demonstrate safety and emergency skills including all out-of-air skills.
10. Kick in full snorkeling equipment a distance of one mile.
11. Demonstrate one person CPR, First Aid and oxygen administration skills.
12. Safely and effectively enter and exit the water from a variety of beach types and conditions.

Grading:

1. Midterm Examinations	200 points
2. Final Examination	160
2. Assignments, results or short reports	100
3. Practical tests	100
4. Completion of the dives objectives 12@20 pts	<u>240</u>
A = 720 pts B = 640 pts C = 560 pts D = 480 pts	Total 800 points

Certification as a SDSU Scientific Diver:

1. Minimum 80% on written examination(s).
2. Completion of at least 12 class dives. Must complete night, deep, rescue, 3R's, conditioning and limited visibility dives.
3. Demonstration of acceptable diving skills and fitness to dive
4. Ability to complete dive objectives in a safe and efficient manner
5. Demonstration of acceptable data collection techniques
6. Current Physical Exam Approval
7. Current certification in CPR, FA and O2
8. Completion of all administrative details
9. Log of monthly dives
10. Successfully complete AAUS/CSUC swim test, diver training, dive activity and certification requirements as specified in AAUS/CSUC Diving Manuals.
11. Ability to assess a dive site for its suitability for the conduct of diving operations and the ability to provide a dive site/activity/objectives briefing (SEABAG) to the members of a dive team
12. Demonstration of mature judgment necessary to plan and conduct dives in a safe and effective manner in accordance with the "CSUC Minimal Standards for SCUBA Diving Certification and Operation of SCUBA Diving Programs" and a willingness to follow SDSU Scientific Diver Regulations.
13. **Instructor's subjective evaluation.**

Textbooks:

1. Required:
 - Gotschall. Guide to Marine Invertebrates Alaska to Baja California. Sea Challengers. 2004.
 - Gotschall. Pacific Coast Inshore Fishes of the Pacific. 4th ed. Sea Challengers. 2001.
 - Mondragon & Mongragon. Seaweeds of the Pacific Coast. Sea Challengers. 2003.
 - NAUI, NAUI Nitrox Text, 2004.
 - NAUI, NAUI Nitrox Workbook, 2004
 - NAUI Nitrox Dive Tables
 - CPR, First Aid, CPR Materials
 - Flahan. Handouts, etc.
2. Recommended:
 - A. Marine Identification Guides and Books
 - Michael. Reef Sharks & Rays of the World. Sea Challengers. 1993.
 - Wrobel and Mills. Pacific Coast Pelagic Invertebrates. Sea Challengers. 1998.
 - Jensen. Pacific Coast Crabs and Shrimps. Sea Challengers. 1995.
 - Behrens, D. W. Pacific Coast Nudibranchs. Sea Challengers. 1991.
 - Sept, Beachcombers Guide to Seashore Life of California, Harbour Publishing. 2002.
 - McConnaughey. Pacific Coast Audobon Society Nature Guide Series. 1986.
 - Audobon Society. The Audobon Society Field Guide to North American Seashore Creatures. 1981.
 - B. Diving Textbooks
 - Heine. Scientific Diving Techniques. A Practical Guide for the Research Diver. Best Publ., 1999.
 - NOAA. Diving Manual. 4th Edition. Best Publishing. 2001.
 - NAUI. NAUI Master Scuba Diver, 2004.
 - NAUI. NAUI Master Scuba Diver Workbook, 2004.
 - NAUI Plastic Dive Tables
 - NAUI. Scuba Rescue: Skills and Techniques, 2000.

Fees:

1. Laboratory fee to support pool rental, NAUI textbooks and materials.
2. NAUI registration fees \$38
3. Physical exam for SCUBA Diving. Available from the SDSU Health Services.

4. Books.
5. Field trips, boat dives at personal expense. (Catalina \$200)
6. Expendable supplies and sampling equipment

Special Equipment: Underwater slate and pencils; float, line and anchor. Log Book to record each dive and observations for permanent record.