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# Marine Diving Technologies

Our world increasingly relies upon the resources and knowledge gained from the ocean and marine environment, our last frontier. This reality requires the Marine Diving Technologies Program to continue to provide the highest quality divers and marine technicians worldwide. The program serves the needs of entry-level students, employees in the workforce and students seeking personal enrichment. Students can attend full-time or part time on a space available basis, both diving and non-diving marine-related classes. Graduates can pursue multiple marine career paths in marine and underwater technology, working above and below the water with many types of sophisticated marine data collection instruments, diving and life-supporting equipment.

Santa Barbara City College's Marine Diving Technologies Program is recognized worldwide for its vocational excellence. It is the only community college degree program in the nation which is accredited by the Association of Commercial Diving Educators (ACDE), the International Diving Schools Association (IDSA) and the National Association of Underwater Instructors (NAUI). Santa Barbara City College pioneered formalized diver and technician education with the A.S. Degree curriculum in 1968. It was the recipient of the Exemplary Program Award in 1998 from the State of California Community Colleges Chancellor's Office.

Students who enroll in the Marine Diving Technologies Program have options to obtain an Associate in Science Degree or Certificate in marine technology. Industry-based certifications meeting the American National Standards Institute (ANSI) "Commercial Diver Training – Minimum Standard ANSI/ACDE-01-2009" and the International Diving Schools Association (IDSA) standards are also available for the field of commercial diving. The training is designed to meet the needs of the marine construction, research and tourism industries. These multi-billion dollar marine technology industries are dynamic and require personnel who have a broad training base involving technical skills above and below the water.

The Associate in Science Degree curriculum includes instruction in all phases of commercial diving, hyperbarics, bell/saturation diving, emergency

medicine, boating and marine science, to name but a few. Teamwork and safety are the prime emphasis of the training.

There are virtually unlimited opportunities and challenges for the individual who desires an exciting and rewarding future researching the world's needs for resources, medicine, transportation, recreation, national defense and the extension of man's ability to work on and under the sea.

## Program Student Learning Outcomes

1. Meet the qualifications of an entry-level commercial diver established by the United States Occupational Safety and Health Administration, the United States Coast Guard, the American National Standards Institute and the Association of Diving Contractors
2. Comprehend physical laws governing hyperbaric and industrial operations in a marine environment
3. Conduct hyperbaric and industrial-related activities safely and in accordance with recognized agency and industry standards
4. Apply knowledge of diving techniques and associated capabilities to determine proper operational procedures for diverse marine-related construction, inspection, maintenance, repair and decommissioning projects
5. Perform the assigned duties of an entry-level diver as an individual or member of a support team in a safe, effective and efficient manner

## Facility

The MDT Program offers a most unique training environment. The college's state-of-the-art diving and welding facility provides students with a safe and comfortable training environment. SBCC is ideally situated on California's south-central coast, which facilitates open sea training in the Pacific Ocean.

## Career Opportunities

Career opportunities and announcements are channeled directly through the Marine Diving Technologies Department, via an extensive contact system. Many employers solicit graduates during campus visits. The faculty are available directly for career counseling, and advice may also be obtained from the campus Career Center for job preparation and planning purposes.

## Honors and Awards

The department is fortunate to be able to award several scholarships each year. The Ramsey Parks Memorial Scholarship was established to recognize an outstanding student majoring in Marine Diving Technologies. It is named in memory of Ramsey Parks, founder and Director of the MDT Program, 1968-1980. The Tom Devine Memorial Scholarship, sponsored by the Association of Diving Contractors (ADC), and the Nejat Ezal Memorial Scholarship are available for students who qualify. The Dr. Hugh Greer Memorial Scholarship Foundation was established in 2002 in memory of SBCC's long-time medical review officer. Financial aid is also available through the Financial Aid Office at 965-0581, ext. 2716.

## Alumni Association

The Marine Diving Technologies Alumni Association was established by the department in 1995 to provide a communication and human resource link between graduates and the MDT Program. The Association was established to disseminate information about graduates, jobs, equipment and training issues related to diving technology. All students and graduates are eligible to join.

## Department Office

Marine Technology Building  
Administrative Assistant: Judy Lough (ext. 2426)

## Faculty and Offices

Geoff Thielst, *Chair and Program Director*  
(MDT, ext. 2718)

Don Barthelmess (MDT, ext. 2427)

Dan Vasey (MDT, ext. 2992)

## Degree and Certificates

Associate in Science Degree: Marine Diving Technician

Certificate of Achievement: Marine Diving Technician

Skills Competency Award: Commercial Diving

Department Award: Marine Science

The Department also offers:

ANSI Certification: Commercial Diver Training

ADC Certification: Commercial Diving

## Skills Competency Award: Commercial Diving

### Department Requirements (18.3 units)

MDT 107 — Hyperbaric Chamber Operations .....	1.5
MDT 108 — Rigging .....	1.6
MDT 109 — Seamanship and Small Boat Handling.....	2.1
MDT 111 — First Aid for the Diving Professional.....	1.3
MDT 112 — Introduction to Marine Welding.....	1.1
MDT 140 — Principles of Surface-Supplied Diving .....	1.2
MDT 141 — Commercial Diving Equipment.....	2.2
MDT 142 — Surface-Supplied Ocean Diving .....	1.8
MDT 143 — Mixed Gas Diving .....	1.7
MDT 145 — Principles of Underwater Cutting and Welding .....	1.3
MDT 146 — Advanced Underwater Cutting and Welding .....	0.6
MDT 152 — Underwater Tools and Inspection.....	1.9

*Students must complete the above courses with a grade of "C" or higher or credit in all courses.*

## Certificate of Achievement: Marine Diving Technician

### Department Requirements (30.3-31.8 units)

MDT 101 — Information and Introduction to MDT.....	0.3
MDT 104 — Fundamentals and Practices of Diving.....	3.8
MDT 105 — Advanced Scuba Techniques .....	1.7
MDT 106 — Open Water Navigation and Rescue.....	0.5
MDT 107 — Hyperbaric Chamber Operations .....	1.5
MDT 108 — Rigging .....	1.6
MDT 109 — Seamanship and Small Boat Handling.....	2.1
MDT 111 — First Aid for the Diving Professional.....	1.3
MDT 112 — Introduction to Marine Welding.....	1.1
MDT 140 — Principles of Surface-Supplied Diving .....	1.2
MDT 141 — Commercial Diving Equipment.....	2.2

MDT 142 — Surface-Supplied Ocean Diving .....	1.8
MDT 143 — Mixed Gas Diving .....	1.7
MDT 145 — Principles of Underwater Cutting and Welding .....	1.3
MDT 146 — Advanced Underwater Cutting and Welding .....	0.6
MDT 147 — Ocean Structures .....	0.9
MDT 148 — Hydraulics I .....	1.3
MDT 152 — Underwater Tools and Inspection .....	1.9
MDT 154 — Bell and Saturation Diving Procedures .....	2.2
MDT 179 — NITROX Diving .....	0.8
MDT 190 — Assessment and Development of Diving Competence .....	0.5-2.0

**Recommended Electives:**

BIOL 124 — Biological Oceanography <b>or</b> .....	
BIOL 142 — Marine Science <b>or</b> .....	
ERTH 151 — Physical Oceanography .....	3.0-4.0
BIOL 125 — Marine Biology .....	4.0
CNEE 150 — Concepts of Electronics .....	4.0
CS 101 — Computer Concepts .....	3.0
DRFT 101 — Basic Drafting <b>or</b> .....	3.0
DRFT/ENGR 105 — Engineering Graphics <b>or</b> .....	4.0
DRFT 130 — Drafting and Design I .....	5.0
EMT 110 — Emergency Medical Technician-Basic .....	5.2
MDT 162 — Professional Involve. in Marine Tech.....	0.5-2.0
MDT 174 — Diving in Contaminated Environments .....	0.9
MDT 180 — Diver Medical Technician .....	3.0
MDT 181 — Heavy Gear Diving .....	0.3
MDT 182 — Underwater Crime Scene Investigation.....	1.0
MDT 183 — Water Survival Training .....	0.5
MDT 290 — Work Experience in MDT .....	1-4
MDT 299 — Independent Study in MDT .....	1-4
PE 134 — Swimming for Conditioning .....	1.0
PHYS 101/101L — Conceptual Physics <b>or</b> .....	
PHYS 101H — Conceptual Physics, Honors .....	4.0

**Department Award:  
Marine Science**

**Department Requirements (21 units)**

BIOL 124 — Biological Oceanography .....	4.0
BIOL 125 — Marine Biology .....	4.0
ERTH 151 — Physical Oceanography .....	3.0
ERTH 151L — Physical Oceanography Lab .....	1.0
ERTH 152 — Weather and Climate <b>or</b> GEOG 152 — Weather and Climate .....	3.0
HE 103 — Responding to Medical Emergencies .....	2.0
MDT 101 — Information and Introduction to MDT.....	0.3
MDT 108 — Rigging .....	1.6
MDT 109 — Seamanship and Small Boat Handling.....	2.1

*Plus completion of a Basic SCUBA Diving Certification.*

**Associate in Science Degree:  
Marine Diving Technician**

The Associate Degree will be awarded upon completion of both department and college requirements.

**Department Requirements (49.5-54 units)**

BIOL 124 — Biological Oceanography <b>or</b> BIOL 142 — Marine Science <b>or</b> ERTH 151 — Physical Oceanography .....	3.0-4.0
BIOL 125 — Marine Biology .....	4.0
DRFT 101 — Basic Drafting <b>or</b> .....	3.0
DRFT/ENGR 105 — Engineering Graphics <b>or</b> .....	4.0
DRFT 130 — Drafting and Design I.....	5.0
EMT 110 — Emergency Medical Technician Basic .....	5.2
MDT 101 — Information and Introduction to MDT.....	0.3
MDT 104 — Fundamentals and Practices of Diving.....	3.8
MDT 105 — Advanced Scuba Techniques .....	1.7
MDT 106 — Open Water Navigation and Rescue.....	0.5
MDT 107 — Hyperbaric Chamber Operations .....	1.5
MDT 108 — Rigging .....	1.6
MDT 109 — Seamanship and Small Boat Handling.....	2.1

MDT 111 — First Aid for the Diving Professional.....	1.3
MDT 112 — Introduction to Marine Welding.....	1.1
MDT 140 — Principles of Surface-Supplied Diving.....	1.2
MDT 141 — Commercial Diving Equipment.....	2.2
MDT 142 — Surface-Supplied Ocean Diving.....	1.8
MDT 143 — Mixed Gas Diving.....	1.7
MDT 145 — Principles of Underwater Cutting and Welding.....	1.3
MDT 146 — Advanced Underwater Cutting and Welding.....	0.6
MDT 147 — Ocean Structures.....	0.9
MDT 148 — Hydraulics I.....	1.3
MDT 152 — Underwater Tools and Inspection.....	1.9
MDT 154 — Bell and Saturation Diving Procedures.....	2.2
MDT 179 — NITROX Diving.....	0.8
MDT 190 — Assessment and Development of Diving Competence.....	0.5-2.0
PHYS 101/101L — Conceptual Physic <i>or</i> PHYS 101H — Conceptual Physics, Honors.....	4.0

**Recommended Electives:**

CS 101 — Computer Concepts.....	3.0
MDT 162 — Professional Involve. in Marine Tech.....	0.5-2.0
MDT 174 — Diving in Contaminated Environments.....	0.9
MDT 180 — Diver Medical Technician.....	3.0
MDT 181 — Heavy Gear Diving.....	0.3
MDT 182 — Underwater Crime Scene Investigation.....	1.0
MDT 183 — Water Survival Training.....	0.5
MDT 290 — Work Experience in MDT.....	1-4
MDT 299 — Independent Study in MDT.....	1-4
PE 134 — Swimming for Conditioning.....	1.0

**College Requirements**

For complete information, see “Graduation Requirements” in the *Catalog* Index.

**Admission Requirements for Marine Diving Technician**

Acceptance by the college does not guarantee acceptance into programs. Non-diving marine technology classes are open to all SBCC students. All of the following must be complied with for diving students:

1. Minimum age: 18.
2. Completion of required forms for admission to Santa Barbara City College — contact the Admissions Office.
3. Completion of special application forms from Marine Diving Technologies for the programs.
4. Complete an annual department diving physical exam approved by a physician.
5. Certificate of Achievement from a basic Scuba course from a nationally recognized agency.
6. Provide full Scuba equipment for ocean diving.
7. Attend an MDT orientation session on campus.
8. Completion of required waiver and release form.
9. Successful performance of the swimming tests in the presence of the college diving officer.

**Marine Science Certificate**

The Marine Science curriculum trains students interested in the fields of mariculture, boating and recreation, skin and Scuba diving, physical and biological oceanography, scientific research and marine science education. Satisfactory completion of the two-semester curriculum earns the student a Biological Sciences Departmental Marine Science Certificate. See the “Biological Sciences” section of this *Catalog*.

**Advising**

In addition to the college counseling staff, the Marine Diving Technologies Department Chairperson and staff are available to advise persons interested in this field. Information may be obtained by visiting or calling the department.

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## Marine Diving Technician Course Descriptions

### **MDT 100 — Skin and Scuba Diving (1.8) — CSU, UC\***

*Skills Advisories: Eligibility for ENG 110 or ENG 110H*

Introductory Scuba diving certification course taught under the standards of the National Association of Underwater Instructors (NAUI). Students obtain skills in basic diving techniques, physiology, skin and Scuba equipment. Laboratory sessions focus on acquisition and application of necessary water skills in skin and Scuba diving in a confined water (pool) environment. Practical application of diving skills evaluated in a minimum of five open sea dives. Successful students receive a lifetime certification as a Scuba diver from NAUI. (\*UC Transfer Limit: MDT 100 and 105 combined with PE activity and HE 213: maximum credit, 4 units)

### **MDT 101 — Information and Introduction to Marine Diving Technology (0.3)**

*Skills Advisories: Eligibility for ENG 110 or ENG 110H*  
*Course Advisories: CNEE 153*

Overview of marine diving and the SBCC Marine Diving Technologies modular curriculum. Assessment of swimming, diving and mathematical skills. Primary purpose is to provide information on the modular concepts, equipment requirements, fees and application process required for enrollment in the MDT Program.

### **MDT 104 — Fundamentals and Practices of Diving (3.8)**

*Skills Advisories: Eligibility for ENG 110 or ENG 110H*

Modular study of diving physics, physiology, dive planning and safety; stresses the importance of environmental and equipment-related situations. Computations utilizing various decompression profiles emphasized.

### **MDT 105 — Advanced Scuba Techniques (1.7) — CSU, UC\***

*Corequisites: MDT 101*

*Limitation on Enrollment: National Scuba certification by a recognized agency.*

Practical application of Scuba diving techniques and skill building in the confined water and open ocean environments. (\*UC Transfer Limit: MDT 100 and 105 combined with PE activity and HE 213: maximum credit, 4 units)

### **MDT 106 — Open Water Navigation and Rescue (0.5)**

*Corequisites: MDT 105*

*Limitation on Enrollment: National Scuba certification by a recognized agency.*

Practical application of navigation and rescue skills in the ocean environment.

### **MDT 107 — Hyperbaric Chamber Operations (1.5)**

*Corequisites: MDT 101*

Theoretical and practical application of hyperbaric chambers and treatment of diving and non-diving related accidents. Hands-on practice utilizing department's recompression chamber facility is the focus of laboratory activities.

### **MDT 108 — Rigging (1.6)**

*Corequisites: MDT 101*

Introduction to and practical application of basic rigging techniques, including knots, splices, block and tackle, and marlin spike.

### **MDT 109 — Seamanship and Small Boat Handling (2.1)**

*Corequisites: MDT 101*

Modular study and application of small boat handling, maritime rules of the road and navigational principles and practices.

### **MDT 111 — First Aid for the Diving Professional**

(1.3)

*Skills Advisories: Eligibility for ENG 110 or ENG 110H*

A modular certification program in oxygen administration, first aid for hazardous marine life injuries CPR and AED use, with emphasis as a first responder to diving-related accidents. Certification available through appropriate agencies, which include the American Red Cross and the Divers Alert Network (DAN).

### **MDT 112 — Introduction to Marine Welding**

(1.1)

Introductory module on the theory, practical application and procedures of cutting and welding in the topside environment. Skills acquired and developed in welding shop environment. Prepares students for MDT 145 techniques, which are applied in the welding booth and underwater training tank environment.

### **MDT 140 — Principles of Surface-Supplied Diving**

(1.2)

*Corequisites: MDT 105*

*Limitation on Enrollment: Must be a certified diver by a nationally recognized scuba diving agency.*

Introductory module which exposes students to the various types of diving apparatus and procedures in confined water training tanks. Emphasis on tending, dress-in and operational procedures which parallel a surface-supplied diving operation.

### **MDT 141 — Commercial Diving Equipment**

(2.2)

*Corequisites: MDT 140*

Modular course which presents principles of operation and maintenance as applied to diesel engines, diving compressors and pneumatic tools. Particular emphasis is placed upon identification of the various fittings used in an industrial environment. In addition, the maintenance and repair practices and procedures relating to surface-supplied diving head gear and diving umbilicals are presented and applied.

### **MDT 142 — Surface-Supplied Ocean Diving**

(1.8)

*Corequisites: MDT 140*

*Course Advisories: MDT 141*

Study and practical application of advanced tethered diving working procedures and operational theory. Particular emphasis is placed on charting dive profiles, computing decompression schedules and organizing field operations. All lab activities conducted in open sea environments which simulate actual working conditions likely to be encountered in commercial diving. Students assessed an additional field trip fee for boat charters.

### **MDT 143 — Mixed Gas Diving**

(1.7)

*Corequisites: MDT 142*

Advanced modular study of the physics and application of specialized gas mixtures, gas diving apparatus, decompression tables and operational procedures.

### **MDT 145 — Principles of Underwater Cutting and Welding**

(1.3)

*Corequisites: MDT 112 and MDT 140*

Introductory module on the theory, practical application and procedures of welding and burning in the underwater environment. Skills are acquired and developed in a wet diving training tank. Prepares students for advanced techniques which are applied in the open sea environment.

### **MDT 146 — Advanced Underwater Cutting and Welding**

(0.6)

*Corequisites: MDT 142*

Advanced practical application in the use of underwater cutting and welding techniques in the ocean and open water environment. Students utilize foundational techniques in advanced surface-supplied ocean diving to perform a multitude of individual and team projects.

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**MDT 147 — Ocean Structures  
(0.9)**

*Course Advisories: MDT 101*

Modular study of ocean structures likely to be encountered in the marine industry. Focuses on nomenclature and types and construction of offshore platforms, pipelines and other subsea structures.

**MDT 148 — Hydraulics I  
(1.3)**

*Corequisites: MDT 101*

Study of industrial fluid power mechanics with a practical laboratory component as related to marine equipment. Emphasis placed upon schematic design, interpretation and the role of hydraulic equipment and control systems as applied to subsea work systems, tools and work class remotely-operated vehicles.

**MDT 152 — Underwater Tools and Inspection  
(1.9)**

*Corequisites: MDT 140*

Modular study of techniques and tools used to collect data and perform work in underwater environments. Students utilize a variety of equipment in hands-on application including remotely-operated vehicles, subsea video cameras, ultrasonic equipment and other non-destructive testing devices. Students apply advanced diving skills in assembling and disassembling various underwater projects in an open sea environment. Special emphasis placed on inshore construction practices.

**MDT 154 — Bell and Saturation Diving  
Procedures  
(2.2)**

*Corequisites: MDT 143*

Intensive exposure to saturation diving theory and a practical application of skills in bell/saturation diving. Practical training in bell and saturation diving operations, equipment and procedures. Culminates with the performance of a round-the-clock saturation diving run in the department's saturation diving complex.

**MDT 162 — Professional Involvement in  
Marine Technologies  
(0.5-2.0)**

*Corequisites: MDT 101*

Open-entry module designed to allow students enrolled in the MDT Program a means to access and participate in outside professional activities with the faculty and staff. Such activities include community educational outreach, professional diving demonstrations, seminars and related presentations.

**MDT 174 — Diving in Contaminated  
Environments  
(0.9)**

*Course Advisories: MDT 142*

Seminar for experienced diving professionals utilizing specialized surface-supplied gear for working in contaminated waters. Lecture sessions focus on presenting principles and practices of contaminated diving practices and procedures, as well as federal, state and local laws and regulations.

**MDT 179 — NITROX Diving  
(0.8)**

*Corequisites: MDT 101*

*Limitation on Enrollment: Certification as an advanced Scuba diver by a nationally recognized agency.*

Modular study of EANx NITROX mixtures used in diving. Two optional open water dives may be made upon successful completion of classroom portion. Certification through the International Association of NITROX and Technical Divers (IANTD) as a NITROX diver is available upon completion of the course.

**MDT 180 — Diver Medical Technician  
(3)**

*Corequisites: AH 110*

Theoretical and practical application of hyperbaric chambers and treatment of diving and non-diving related accidents. Hands-on practice utilizing the department's recompression chamber facility is the focus of laboratory activities. Certification as a Diver Medic Technician (DMT) available through the National Board of Diving and Hyperbaric Medical Technology.

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**MDT 181 — Heavy Gear Diving  
(0.3)**

*Skills Advisories: MATH 100 and eligibility for ENG 100*  
*Limitation on Enrollment: Student must be a certified diver from a nationally recognized agency and provide a current physical examination report to the MDT Department using the department physical examination form.*

Introductory exposure to heavy gear diving using traditional heavy gear, including the U.S. Navy Mark-V and Kirby Morgan diving helmets in the confined water environment. Emphasis placed on tending, dress-in and operational procedures of surface-supplied heavy gear diving equipment.

**MDT 182 — Underwater Crime Scene Investigation  
(1)**

*Limitation on Enrollment: Student must provide the following: (1) appropriate medical history form attesting to the trainee's fitness for diving; (2) execution of required release and waiver; (3) proof of membership in a law enforcement or public safety agency; and (4) proof of diving certification from a nationally recognized training agency.*

Introductory P.O.S.T.-certified course designed to provide law enforcement personnel training in principles and practices of underwater crime scene investigation and evidence recovery. Satisfactory completion of the course results in certification sanctioned by the National Association of Underwater Instructors (NAUI) in underwater crime scene investigation.

**MDT 183 — Water Survival Training  
(0.5)**

Short-term intensive certification program for marine employees and trainees in water survival techniques. Training conforms to industry standards API RP T7, T4, and UCSG Title 33 regulations for participants working in offshore marine environments. Trainees receive classroom and pool training in water survival techniques.

**MDT 190 — Assessment and Development of Diving Competence  
(0.5-2.0)**

Open-entry assessment module designed to provide evaluation and placement of students enrolled in the MDT Program. Students allowed to continue development of diving skills while enrolled in this module. Students use the module as a means to control self-paced instruction and skill mastery.

**MDT 290 — Work Experience in Marine Diving Technology  
(1-4)**

*Course Advisories: MDT 101*

*Limitation on Enrollment: Must be a currently enrolled MDT student with a current physical exam (within one year).*

Supervised employment for MDT and related technologies majors whose career objectives, course study and employment complement each other. The student must be employed in an occupation directly related to the Marine Diving Technologies major. The student must also be enrolled in no less than seven (7) units, including Work Experience.

**MDT 299 — Independent Study in Marine Diving Technology  
(1-4)**

*Course Advisories: MDT 101*

*Limitation on Enrollment: Student must have completed 12 units at SBCC with a G.P.A. of 2.5 and a minimum of 6 units with a G.P.A. of 3.0 in the MDT Department.*

Advanced study of marine technology and related fields under the direction and supervision of MDT Department faculty.

For complete information, see "Independent Study" in the *Catalog* Index.