

**Saddleback College
Program Review for
Marine Science/Oceanography**



Submitted Spring 2007

Table of Contents

Team Members and Approval Page.....	3
Program Review Checklist.....	4
Program Overview.....	5
Review Report.....	9
Needs Assessment.....	24
Appendices.....	27

Program Review Team Members and Approvals

Program Review Team Chair:

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Approvals:

Division Dean

Program Review Chair

Academic Senate President

Vice President of Instruction

Program Review Checklist

Date Completed	Action
	Contact Program Review Chair for orientation
<i>February 10, 2007</i>	Form Program Review Team
<i>February 2007</i>	Gather documents (Org Chart/Staffing Profile/SLO Assessment Forms/Data Sets)
<i>February 2007</i>	Solicit Input from faculty and students
<i>March 6, 2007</i>	Determine if additional research is needed
<i>March 6, 2007</i>	Contact College Research Analyst if necessary
<i>March/April 2007</i>	Write Program Review report
<i>June 12, 2007</i>	Submit report to Dean and Program Review Chair for approval
	Report submitted to Academic Senate for approval
	Report submitted to Office of Instruction for approval
	Report submitted to College President and Office of Institutional Effectiveness
	Report posted to the IE web site
	Open, formal presentation to the Program Review Committee and other interested parties

I. Program Overview

The mission of the South Orange County Community College District requires a systematic review of the Marine Science Program to ensure quality and relevance, and the effective use of resources. This program review is used for making judgments about the effectiveness of the program and to improve student learning. It is a means of ensuring that the Marine Science Program is effective and responsive to the local college community.

The results of the Marine Program Review will be incorporated into the strategic planning process. This program review will also support the WASC accreditation standards, interface with the college Enrollment Management Plan and most importantly, provide information for program planning and improvement.

This document begins with an overview of the Marine Science Program and key recommendations. The overview begins with the mission and goals of Saddleback College, the Mathematics, Science and Engineering Division, and the Department of Earth and Ocean Science. It describes the historical background and unique characteristics of the Marine Science Program, and its current strengths, opportunities and challenges. The main document describes and provides recommendations for: curriculum, instruction, student success, faculty and staff, staff development, facilities and community outreach.

A. The Mission of the Program and its link to the College's Mission and Goals

1. College Mission Statement and Goals

a. College Mission Statement

To provide access to learning opportunities that promote student success; to foster intellectual growth, individual expression, and character development; and to support a dynamic environment of innovation and collegiality.

b. College Goals

The primary goal of Saddleback College is to provide a comprehensive post secondary education and a full range of student services. Emphasis is placed on open access to all students, including a changing and diverse student population. Academic success and student achievement are joint responsibilities of the students, the staff, and the college. To this end, the college will:

- i.* Provide educational programs leading to the Associate in Arts and Associate in Science Degrees.
- ii.* Provide a comprehensive, broad range of high quality courses and programs to enable students to pursue their educational objectives and career goals.
- iii.* Provide a meaningful general educational program including baccalaureate-level transfer and occupational curricula.

- iv.* Provide necessary developmental, remedial, and basic skills instruction so that students may be successful in their chosen course of study.
- v.* Provide access for the community to the educational, cultural and recreational resources of the college.
- vi.* Provide counseling and other support services that are responsive to the needs of the students.
- vii.* Provide opportunities in continuing education and community services, including courses for skill upgrading, retraining for professionals, and life long learning for older adults.
- viii.* Provide opportunities for the promotion of economic development within the scope of the mission of the District and the College.

2. Math, Science and Engineering Division Mission Statement and Goals

a. MSE Mission Statement

To instruct and inspire all students in rigorous, high quality post-secondary education in lower division courses in mathematics, science and engineering with a vision for tomorrow.

b. MSE Goals

- i.* Review and revise, as necessary, the division Mission Statement.
- ii.* Facilitate and implement retention and enrollment management with a focus on outreach, student success, access, increased productivity, growth, higher WSCH/FTEF and sound course management.
- iii.* Increase student enrollment and retention in distance education classes, including classes offered in a hybrid instructional mode where appropriate.
- iv.* Initiate program review per established process, instrument(s) and timeline with a focus on improving student learning outcomes, persistence, retention and student success.
- v.* Increase student transfer rate.
- vi.* Provide division resources for the completion and submission of the accreditation self-study.
- vii.* Improve internal and external communication
- viii.* Recommend, monitor and complete new construction and renovation of college facilities per the Five-Year Facilities and Master Plan including a new Science-Math Building.
- ix.* Participate in needs assessments and discussions of programs, services and uses for new educational sites.
- x.* Provide increased administrative, technological and maintenance support and services to students and the departments by prioritizing expenditures.
- xi.* Improve respect, consideration of and sensitivity for diverse groups and perspectives.
- xii.* Manage and maintain board-approved budget to reach division and college goals.

3. Marine Science/Oceanography Program Mission and Goals

a. Marine Science/Oceanography Program Mission Statement

To educate students about the oceans, ocean basins and atmosphere and their processes so they may apply this knowledge to problems concerning the environment, natural disasters, and ocean resources. To provide educational opportunities for the diverse community of Saddleback College students through: general education courses; K-12 teacher training and professional development; a rigorous curriculum for students seeking to transfer to 4-year institutions as Marine Science/Oceanography majors.

b. Marine Science/Oceanography Program Goals

- i.* Provide quality lower-division lecture/laboratory courses for transfer students in Marine Science/Oceanography and related fields. We offer for Oceanography majors: MS 20 – Introduction to Oceanography, a requirement for the Associates Degree in Oceanography. Related to College goals i, ii, iii, vii.
- ii.* Provide general education courses in Marine Science/Oceanography for transfer students in all majors. We offer lecture/laboratory courses such as: Marine Science 4 (Southern California Coastal Ecology), Biology 20 (Introduction to Biology), Biology 19 (Marine Biology), Geology 2 (Historical Geology), Geology 5 (Marine Geology), and Geology 20 (Introduction to Earth Sciences). Science lecture classes include Geology 7 (Weather and Climate), Geology 3 (Geology of California), Geology 4 (Geologic Hazards) and Geology 10 (Geology of the National Parks). In addition, we offer several Geology, Biology and Marine field studies courses. These courses have no prerequisite requirements and can be taken by any student. Related to College goals i, ii, iii, vii.
- iii.* Increase student retention rate and transfer rate to universities by offering quality instruction with a diverse schedule. Related to College goals i, ii, iii, v, vii.

4. Historical Background and Unique Characteristics of the Program

a. Historical Background

The Oceanography Program at Saddleback College is one of two academic disciplines within the Earth and Ocean Science Department, the other being the Geology Program. Saddleback College has offered Marine Science/ Oceanography classes since the school was founded. A decade ago the Oceanography department merged with the Geology program, creating the Earth and Ocean Science Department. Since then we have been gradually expanding our course offerings to reflect greater public attention on human interactions with Earth's environment and ocean, interest in what makes the surface of our planet an ideal niche in which life can take hold and flourish, and the issues surrounding the search for, and acquisition of, the resources necessary to supply an increasing population.

b. Unique Characteristics

The Oceanography Program serves three populations of students: Marine Science/Oceanography majors, Education majors, and General Education students.

The Saddleback College Oceanography Majors program is structured after programs offered at universities and 4-year colleges such as the University of California and California State Universities. A majority of our students transfer to the UC or to CSU systems, thus the Majors Program must be compatible with the programs offered at these institutions.

However, unlike the courses offered at these major universities, Saddleback College offers relatively small class sizes. For example, the lower division Oceanography courses offered at the UC and CSU campuses often have enrollments of 100-200 students. While the lecture sections of these courses are often taught by professors, the laboratory sections are usually taught by graduate students. At Saddleback College, our enrollments in Oceanography sections are capped at 32 students, and the same faculty member generally teaches both the lecture and the laboratory portions of the course. This allows the faculty member more contact time with the students, leading to more interaction and better focus on individual learning styles and objectives.

In addition, while our faculty members are experts in their fields, they are fully dedicated to undergraduate instruction. Many of our transfer students praise the quality of education they received at Saddleback College.

In general the laboratory courses offered in the Oceanography Program have state-of-the-art equipment available for student use. Equipment is available for use by instructors for classroom demonstrations and for use by students for hands-on instruction during laboratory sessions.

5. Progress Since the Last Program Review

This is the first formalized Program Review in which the Oceanography Department has participated.

6. Current Strengths, Opportunities, and Challenges

a. Current Strengths

Courses taught within the Oceanography Program are rigorous and demanding. Students who transfer from Saddleback College to a four-year institution having completed the program are well-qualified to handle upper division coursework. Anecdotal reports from students who have transferred in the past reaffirm the strength of their grounding in lower division coursework, whether in oceanography, in mathematics or in the other core sciences.

The Oceanography/Marine Science Program is fortunate to have two excellent and dedicated full-time instructors, supported by a full-time Geology instructor who also teaches Oceanography classes, a full-time Biology instructor who also teaches Oceanography and several bright and energetic part-time instructors. Also we are fortunate to have the services of an intelligent and hard-working laboratory technician.

b. Current Opportunities

Advances in the field of Oceanography today are coming from disciplines studying energy resources, natural disasters, global climate change, sea-air interaction and planetary surface science. Students are fascinated to learn about Hurricane Katrina and the flooding of New Orleans, the Indian Ocean earthquake and tsunami, El Nino and La Nina events, rogue waves, black smokers and the depletion of Earth's fish and fossil fuel resources. Topics such as these are ubiquitous in the news today, leading to many "teaching opportunities" in our classes.

c. Current Challenges

The most important challenge the Oceanography Program faces is the perception that the only jobs available in Marine Sciences are in energy, fisheries, and biological oceanography.

II. Review Report

A. Faculty and Staff

1. Faculty

Within the Department of Earth and Ocean Science (which includes the Oceanography Program) we have four full-time instructors, two geologists and two oceanographers. One of our oceanography instructors teaches geology courses when the need presents itself. Our range of expertise includes marine geology, physical oceanography, micropaleontology, field geology, engineering geology, sedimentary petrology, petroleum geology, tectonic and landscape geomorphology, fluvial processes, meteorology, and coastal processes.

In addition we have several part-time instructors who have specialties in engineering geology, hydrogeology, marine geology, historical geology, vertebrate paleontology and fossil preparation.

2. Staff

The Oceanography Program shares one staff member with the Geology Program: John Robinson who is our Senior Lab Technician. Our department is also very appreciative of the extensive help we receive from the division staff.

The department currently offers 13 lab sections (6 Geology labs and 7 Oceanography labs) and 2 weekend field trip courses each semester. The vast majority of the lab sections are equipment-heavy, and require extensive preparation beforehand and clean-up afterward. Each field course involves several days of advance preparation, including inventorying equipment, shopping and packing of food, and several days of subsequent clean-up. In addition to the two field courses, the majority of our lecture courses have a required one-day local field trip for which the technician must prepare.

B. Curriculum and Instruction

1. Curriculum

Table B.1-1 on the next page lists the Oceanography/Marine Science courses offered within the Earth and Ocean Science Department, the date of the most recent course outline and the curriculum update, and the transferability of the courses to the U.C. and CSU systems. Saddleback College offers an Associate of Science Degree in Oceanography. The contents of each course are evaluated every five years and on an as needed basis. The curriculum is revised and sent to the curriculum committee for approval at that time. Over the past five years the Oceanography course outlines have been updated to reflect Title V guidelines.

Table B.1-1: Oceanography Courses offered

Course #	Course Title	Last Curriculum Review	Transferability
Marine Science 20	Introduction to Oceanography	07/22/02	<ul style="list-style-type: none"> • AA G. E. breadth requirement • IGETC area 5A • CSU area B1, B3 • UC Credit
Biology 19	Marine Biology	09/01/05	<ul style="list-style-type: none"> • IGETC area 5A • CSU area B1, B3 • UC Credit
Marine Science 4	Southern California Coastal Ecology	08/20/01	<ul style="list-style-type: none"> • IGETC area 5A • CSU area B1 • UC Credit
Geology 5	Marine Geology	08/20/01	<ul style="list-style-type: none"> • IGETC area 5A • CSU area B1, B3 • UC Credit
Geology 7	Weather and Climate	09/17/02	<ul style="list-style-type: none"> • IGETC area 5A • CSU area B1 • UC Credit
Geology 7-DE	Weather and Climate <i>Distance Ed.</i>	04/07/04	<ul style="list-style-type: none"> • IGETC area 5A • CSU area B1 • UC Credit
SPSW 1	Fossil Preparation Workshop <i>Beginning</i>	09/22/94	<ul style="list-style-type: none"> • none
SPSW 1	Fossil Preparation Workshop <i>Intermediate</i>	04/26/06	<ul style="list-style-type: none"> • none

2. Instruction

The Saddleback College Oceanography Program consists of three sub-programs:

- General Education courses
 - Lecture-Lab courses
 - Lecture-only courses
 - Workshop courses
- Oceanography Major courses
- Field courses

Learning objectives are documented in the curriculum for each course and are included in the course syllabi. Objectives are re-evaluated by the faculty each time a course is reviewed.

In order to maintain consistency within courses:

- All faculty (including associate faculty) are kept up-to-date on course curriculum;
- Full-time faculty actively participate in curriculum updates;
- Textbooks are reviewed and discussed by all faculty before adoption;
- Course syllabi from previous terms are available for review;
- Course materials from previous terms are available for review

Assessment methods vary from course to course but generally include regular quizzes, written exams, laboratory/homework assignments, and classroom presentations. Student Learning Outcomes (SLOs) were developed and implemented by the faculty for MS-20 in the spring term of 2006 and will be developed and implemented for the rest of the courses over the next school year.

All of our full-time faculty are computer literate and make use of available technologies in lecture presentations. Faculty members have their own websites (or they use Blackboard) where syllabi, course objectives, lecture outlines, study guides and additional handouts are regularly posted.

While a small percentage of our enrollment is in lecture-only courses, Oceanography is, at least in part, a tactile science. A philosophy shared by our faculty is that *all* of our students should spend some class time with hands-on activities normally associated only with lab classes, such as sea wave and tidal currents analysis, sediment transport, identification of minerals and rocks and interpretation of bathymetric and navigation maps.

a. General Education Courses

These courses are designed for non-major, general education students. Each course fulfills either a science lecture requirement or a lecture/lab requirement for transfer to the California State University or to the University of California. Table B.2-1 lists the department's general education courses and their enrollments for the period beginning in Fall 2000.

Table B.2-1: Enrollment in General Education courses

	Course Name	S01	Su01	F01	S02	Su02	F02	S03	F03	S04	Su04	F04	S05	Su05	F05	S06
MS 20	Intro Oceanography	142	22	169	143	30	232	176	180	195	19	188	127	17	197	138
	SPSW 1 Fossil Preparation	1		10	7					12		4	7		5	
	Total	143	22	179	150	30	232	176	180	207	19	192	134	17	202	138

MS 20 Oceanography Enrollments 2001-2006

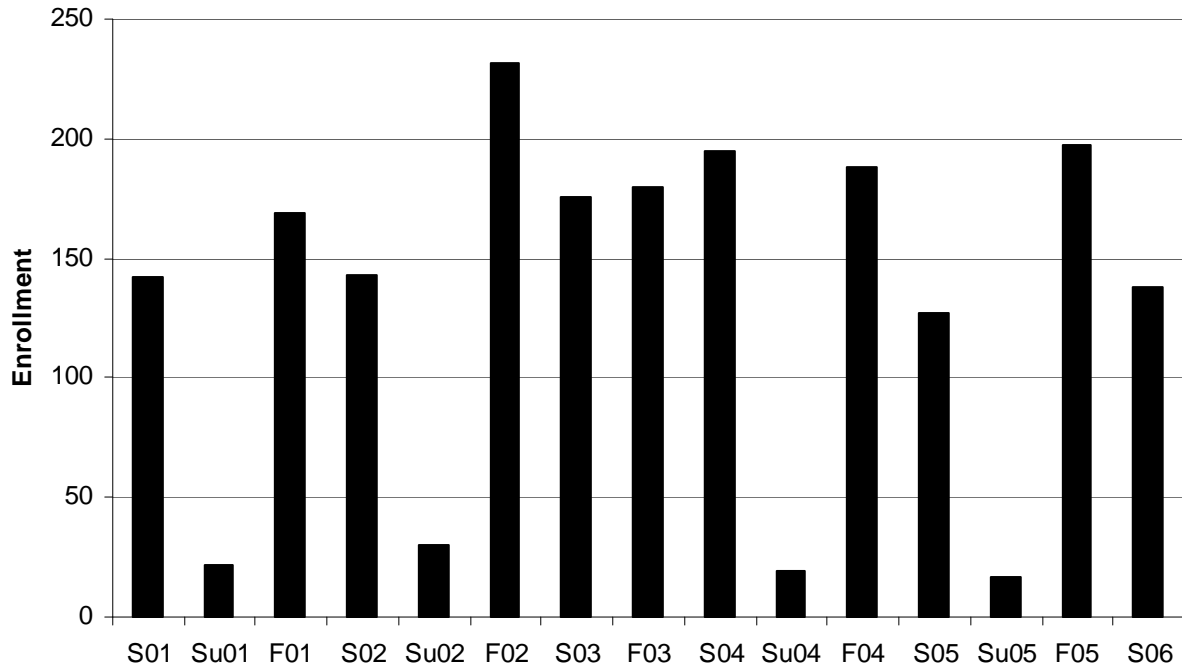


Figure B.2-1: MS 20 General Education enrollment for 2001-2006

i. Laboratory courses

Marine Science 20, Biology 19, Marine Science 4 are lecture/lab courses that fulfill the lab course requirement in most degree and transfer programs. Students completing the course are required to demonstrate a mastery of the stated learning objectives measured by the ability to recall basic oceanographic information, explain physical, chemical and biological processes, and tie disparate concepts together to demonstrate critical thinking skills. Learning outcomes are assessed through lecture and lab exams, quizzes, laboratory/homework assignments, and oral presentations.

Marine Science 20 (Introduction to Oceanography) is a survey course that covers the basic principles of oceanography. This course also is one of a core group of science classes recommended for the Associate Degree in Oceanography and to students planning on entering the teaching credential program in the CSU system.

We have made major curriculum changes to this class. We have begun, to present the material from the perspective of Earth-Ocean-Atmosphere System Science, emphasizing the interactions among the various sciences covered. In addition we have begun to incorporate new lab exercises, developed in-house, that require

students to collect and interpret real-world data. A short oceanographic cruise is a requirement of the class.

ii. Lecture courses

These general education courses are designed for non-major students who need transferable units in science without a laboratory. They are also designed to be attractive to general education students who are interested in learning more about the natural world. Successful completion of any of these courses requires students to demonstrate a mastery of the stated learning objectives as measured by standard metric tools. Students are tested on their ability to recall basic oceanographic and meteorological information, explain physical processes, and tie disparate concepts together to demonstrate critical thinking skills. Learning outcome assessments are determined by each instructor and may include written exams, quizzes, homework assignments, and oral presentations.

Weather and Climate (Geol 7) have been offered each semester. Marine Geology (Geol 5, also listed as MS 5) has not been offered during the study period.

iii. Workshop courses

The fossil preparation workshop was established a decade ago as a result of an agreement between Saddleback College and the City of Mission Viejo wherein the City would lend the College fossil jackets obtained from various excavations and the College would train students to extract, clean and curate the fossils.

Five years ago the workshop was improved when we hired Sarah Siren, a fossil preparation expert from The Keith Companies, to supervise. Sarah works with our faculty and with Larry Barnes, an expert in vertebrate paleontology with the LA County Museum of Natural History, to train the students in extraction, preservation and Identification of fossils typically found in south Orange County. This class has been run as a Special Studies Workshop (SPSW 1) with a small number of students, as training requires a lot of individual attention and some of the specimens are of high scientific value.

This workshop has already resulted in the identification of a new dolphin species and a peer-reviewed article co-authored by Dr. Barnes and Dr. Anthony Huntley of Saddleback College's Department of Biology.

We have recently moved the workshop to the PA building (Paleontology Lab) located at the campus entrance across from Medical Center Drive. The site is being renovated to create space for storage of additional fossils and workspace.

This fall we will be adding a second section (SPSW 2) to allow advanced students to begin training in preparing museum-quality displays of specimens. These displays will be visible to the public in the front of the lab, as well as at various public facilities within the city.

iv. Recommendations

- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Develop new general education courses to meet student needs or interests. Courses under development include:*
- *Begin offering weekend sections of general education courses.*
- *Expand availability of internet-based materials to include all course syllabi, some notes and presentations, online quizzes and laboratory handouts.*
- *Create more field- or observation-based laboratory assignments and exercises to replace or supplement workbook-based assignments.*

b. Oceanography Major Courses

These courses are designed for students who intend to transfer to a four-year institution and major in Oceanography. MS-20 (Introduction to Oceanography) is the only course required for an Associate Degree. The other four courses are electives within the program but represent important knowledge and skill sets for students who intend to transfer.

At the university level, most Oceanography majors classes are offered only as upper-division courses, with Calculus, Calculus-based Physics, and Inorganic chemistry as pre-requisites. Our Oceanography major program is designed to cater to these programs, emphasizing the math/chemistry/physics sequence so that students are prepared for upper-division work when they transfer.

Table B.2-2: Enrollment in Oceanography Major courses

	Course Name	S01	Su01	F01	S02	Su02	F02	S03	F03	S04	Su04	F04	S05	Su05	F05	S06
MS 4	Coastal Ecology				34			19				26				
MS 5	Marine Geology															
Bio 19	Marine Biology			13			16			12			11			13
Geol 7	Weather/Climate								22	22		26	65		77	20
	Total	0	0	13	0	0	16	0	22	34	0	26	76	0	77	33

Geology 7 Weather and Climate Enrollments

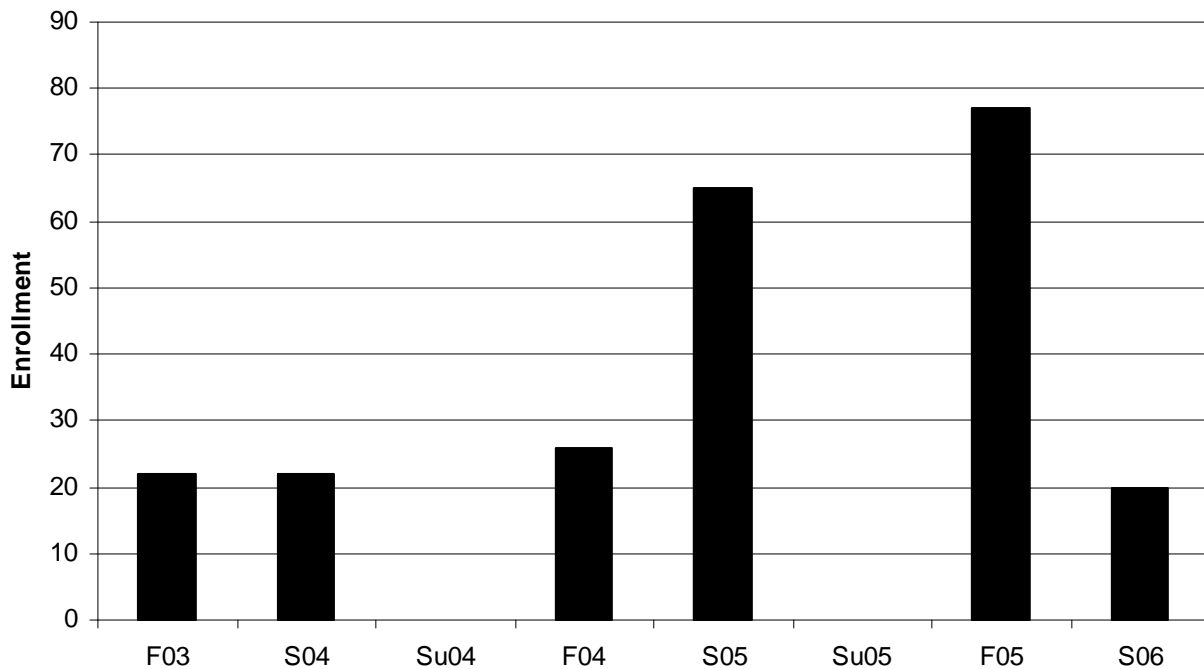


Figure B.2-2 Geology 7 (oceanography major) course enrollment for 2001-2006

- i. **Marine Science 4 (Southern California Coastal Ecology)** is a survey course that covers the relationship between nearshore marine flora and fauna. In the first third of the class students are introduced to basic biological and Ecological principles, materials and processes. The rest of the course emphasizes processes and interactions that affect nearshore and intertidal to supratidal communities, invertebrates, vertebrates, plant and plankton communities. Field trips are a required portion of the course
- ii. **Marine Science 5 (Marine Geology)** is also listed as Geology 5. This course has not been offered during the study period.
- iii. **Biology 19 (Marine Biology)** is a course that studies the description, distribution, and natural history of marine organism. The Marine life of southern California is studied with an emphasis on ecology and adaptations. Field trips are a required portion of the course.
- iv. **Geology 7 (Weather and Climate)** is a course that studies the atmosphere and ocean interaction. Short term weather forecasting and long term climatic changes are studied along with oceanic phenomena such as El Nino and La Nina events.

v. Recommendations

- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Expand availability of internet-based materials to include all course syllabi, some notes and presentations, online quizzes and laboratory handouts.*
- *Create more field- or observation-based laboratory assignments and exercises to replace or supplement workbook-based assignments.*

c. Marine Science Field Courses

Oceanography is concerned entirely with materials and processes that occur outside the classroom. These courses give students the opportunity to spend three days learning oceanography in field settings throughout southern California.

MS 171 (Marine Science Field Study-Santa Catalina Island-Lee side) introduces student to oceanographic concepts and techniques practiced in the field on the island and nearshore waters of Santa Catalina. This course has not been offered over the period of study.

Learning objectives for these courses vary with location, but all courses require students to maintain field notebooks with site-specific information, sketches or pictures of significant features and interpretations. Students are assessed on their field notebook and on their participation in field activities.

iv. Recommendations

- *Review existing courses.*
- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Include more introductory material, perhaps by separating the pre-trip meeting into two meetings.*

C. Student Success

1. Demographic Trends

It is interesting that over the past five years there has been very little change in the overall demography of the student population served by the Oceanography Department. The student enrollment has increased slightly; however, the ratio of male to female students and the distribution by age has remained essentially unchanged. Small changes in ethnicity and zip code of enrolled student are seen.

a. Gender (appendix, table IV-D-3)

Analysis of the gender figures for all classes for the past five years indicate that there have been no trends or changes (chi-square, $P > 0.79$). In addition, the ratio of male to female students over the past five years is not significantly different from 1:1 (chi square, goodness of fit, $P > 0.51$). These data are interesting, since the college regularly reports that there has been a positive shift in the number of female students over the past few years.

b. Age (appendix, table IV-D-6)

Typically, 18-21 year olds make up 74.82% of all classes for the past five years. In summer this group makes up slightly less of the student population. As might be expected, 22-25 year olds are the second most populous group in our courses (13.1%).

c. Ethnicity (appendix, table IV-D-5)

Stated ethnic background of our students has also been remarkably stable over the past five years. The "White" category makes up 71.86% of all enrolled students. The only unstable enrollment figures based upon ethnicity seem to be the "Hispanic" category which varies unpredictable between 6.8 and 23.3%. Some of this variation may be accounted for by the "unknown," or failure to state category figures.

2. Student Success (appendix, table IV-D-2)

Student retention in all oceanography courses averages 88.93% for the past three years. The overall student success rate for the same period for all courses taught at Saddleback College was $88.9 \pm 0.19\%$; an unpaired t-test shows no significant difference between the geology retention rate and the college as a whole ($P=0.11$).

Student success measured as the number of students receiving a grade divided by all students enrolled at any time in the class averages 72.01% for MS 20. The overall Saddleback College average retention rate for the past three years is $72.0 \pm 0.37\%$; there is no significant difference between the oceanography course success rate and the overall Saddleback College success rate for the past three years ($P=0.10$, one-tailed t-test).

Student retention and success is consistently very high in the majors' area. Retention and success in the general education area is more variable. We perceive a need to increase student retention and success in these courses.

There is a general conception that science courses are "difficult." If this were true, then one would expect that grades in oceanography courses would reflect this difficulty. Overall, A's make up between 21.88% of the total grades given in all sections over the past five years, while F's make up only 9.38%.

3. Strengths, Weaknesses and Changes

Over the past five years we made many changes that should affect the success of students in our classes. These include:

- Writing laboratory exercises that are specific to our students and our area.
- Creating web-based course support sites that aid in note taking, study guides and lab support
- Creation of new courses or alteration of existing courses to meet student need or assist in articulation
 - Geology 7 – Weather and Climate

D. Facilities, Technical Infrastructure and Resources

1. Laboratory Teaching Space

Oceanography currently has one dedicated teaching laboratory, SM105. Room SM105 is used exclusively for Oceanography lab classes. When the need arises, SM129 and SM130 are used for the teaching of Oceanography laboratory courses and Geology 7, Weather and Climate. In addition, SM106 and 107 are also used for small group laboratory teaching. SM 106 is the x-ray diffraction lab and SM 107 is the soils and sediment testing lab. These rooms are used as extensions to the main laboratory room.

2. Laboratory Preparation and Storage Space

At this time, the Geology/Oceanography department maintains laboratory preparation and support in rooms SM 112 and 114. Room SM 114 serves as an office for the laboratory technician, as well. SM 112 has storage lockers and a computer workstation with slide and paper scanning, and color printing capability. Connected to SM 114 is a small contained space referred to as the lapidary area. This is used for storage of rock and mineral specimens, assembly of rock and mineral kits for Geology and Oceanography class use, and equipment for the cutting, polishing and display of rock and mineral samples. SM 108 is used for field trip storage and preparation, and storage of classroom and laboratory materials and equipment. In addition, a loading dock field trip storage locker is maintained for larger equipment used during field courses.

3. Technical Resources

a. Equipment

At this time, the Oceanography/Geology department maintains a very good collection of state-of-the-art equipment. Many of these items are unique at the community college level. These include

- Rigaku X-Ray Diffraction Unit
- Nikon Petrographic microscope
- GeoMetrics Seismic Refraction Unit
- Direct residual shear box
- Sediment consolidation tester
- Unconfined sediment compression tester
- Sieve shaker

In addition, our laboratories are well-equipped with Leica microscopes, USGS topographic maps, and numerous demonstration devices.

b. Collections

Being an oceanography department requires the maintenance of a large collection of marine equipment, biologic specimens, navigation and bathymetric maps, chemicals and rocks and minerals. At this time, we have an extensive teaching collection that constantly needs replenishment and update.

A large collection of fossils and a small collection of worldwide sediments are also maintained jointly with the geology department

Paleontological specimens prepared in the fossil preparation courses are stored in the paleontology building until they are displayed or transferred to the city of Mission Viejo.

III. Needs Assessment

A. Human Resources Needs

1. Full-Time Faculty

At this time our teaching needs are met by the current full time faculty complement. However, we anticipate the retirement of Dr. Peter Borella within the next two years. To maintain the quality of instruction, it will be critical to re-hire for this position as soon as this retirement takes place.

2. Classified Staff

We currently have one full-time senior lab technician, John Robinson. This position is responsible for laboratory preparation for oceanography and geology as well as field trip and field course preparation and support of the paleontology laboratory. After careful assessment of the workload we have determined that no further classified assistance is need at this time.

B. Instructional/Service Needs

1. Night and Weekend Sections

At this time, we offer most courses at evening times, however, only field courses are offered on weekends. Marine Science 20 and Marine Biology 19 sections are offered on Fridays and in the future on Saturdays to meet the need of non-traditional students.

2. Distance Education Courses

There are no distance education courses in the Oceanography department at this time. Discussion of the development of a DE version of the Marine Science 20 course, with a post course field trip fulfilling the laboratory requirement, has taken place. This would most likely take place during the summer session.

Weather and Climate (Geology 7) is offered once a year as a distance education three unit non laboratory course.

3. Honors courses

While MS 20 has not been offered as an honors class during the study period, Geology 7 has been offered twice as a honors lecture course.

4. New Courses

We are currently developing two three-unit general education courses that will be cross-referenced with the Geology Department:

- Water and Water Resources
- Global Climate Change

C. Research Needs

1. Faculty and Course Evaluations

We should develop on-line department faculty and course evaluation to assist us in our mission to improve instruction and meet student needs.

2. Triennial Survey

We should develop an online student survey regarding course offerings, faculty performance, and student demographics. These data could be used in determining section days and times and course offerings that better fit our student's needs.

D. Technical, Equipment and Other Resource Needs

1. Laboratory Equipment Needs

At this time, the most pressing need is a new seismograph and seismometer. This device should be installed at an appropriate place on campus with on-line internet access to its output.

Up to this point, the current budget has been sufficient for the replacement of expendable materials used in the Oceanography laboratory program.

2. Field Trip and Field Course Equipment Needs

Equipment and material used for field trips and field courses are continually replaced. The greatest expenditure for the Oceanography program is the cost for rental of the ship that is used each semester for several days. It is expected that costs for the rental of this ship will rise, so the budget should reflect this rise in cost.

3. Technical Needs

Our most pressing need at this time is upgrade of classroom technology. Since all instructors use PowerPoint, DVD, and internet resources in the laboratory and lecture, it is imperative that we have the most up-to-date computer hardware, software and video projectors. These requests have been made to the technology committee.

E. Facilities Needs

1. Paleontology Laboratory Building

The acquisition of the Paleontology Laboratory building (PA) has greatly enhanced that part of our marine program. However, this building has required expensive renovation carried through our budget. At this time, we still need to fence the yard at this facility, to provide space for the marine fossils still stored on lower campus. We anticipate installation of this fence by Fall of 2007.

We have ordered paleontology cabinets to provide appropriate storage for the fossils completed by this program.

The front room of this building (PA2), will become a museum display space. We will need to develop this area and the display facilities.

2 Other Facilities Needs

At this time, we see no other facilities needs.

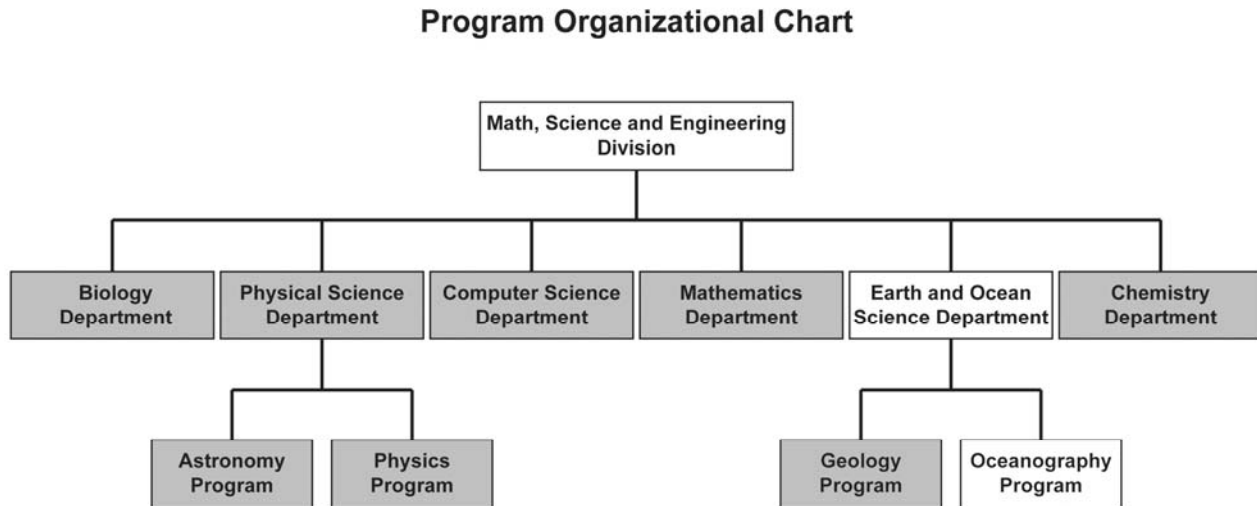
F Marketing and Outreach Needs

4. Brochure

We should develop a brochure that advertises the Oceanography program, its courses and its faculty. In particular, this brochure should showcase the Oceanographic cruises and field trips associated with each class. The marine fossil preparation program should also be highlighted.

IV. Appendices

A. Five-Year Program Staffing Profile



B. Five-Year Oceanography Program Staffing Profile

Staffing for Oceanography/Marine Science classes:

Position	Staffing Levels for Each of the Previous Five Years					% Change from Year 1 to Year 5
	2001	2002	2003	2004	2005	
Bargaining Classified Staff FT	1	1	1	1	1	0%
Faculty FT	2	2	2	2	2	0%
Faculty PT	2	1	1	2	2	0%

In the Fall of 2005 we hired Dr. Merton Hill as an Oceanography instructor.

SLO Assessment Forms

The Earth Science Department has developed Student Learning Outcomes for the Oceanography Program. SLO assessment forms are currently being developed by the department.

C. Data Sets

**Marine Science Courses
Summary of All Courses by Grade/Success/Retention**

		Grades										success	retention	
		A	B	C	CR	D	F	I	NC	W	XX	Total		
		Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
2001	Spring	13	25	41	1	11	19	2	0	23	7	142	56.3%	83.8%
	Summer	6	8	6	0	0	1	0	0	0	1	22	90.9%	100.0%
	Fall	34	48	39	3	11	19	0	0	18	10	182	68.1%	90.1%
2002	Spring	27	51	35	2	16	17	1	0	12	16	177	65.0%	93.2%
	Summer	8	5	8	0	0	3	0	0	1	5	30	70.0%	96.7%
	Fall	61	58	47	0	12	28	1	0	18	23	248	66.9%	92.7%
2003	Spring	52	56	27	0	15	20	1	0	19	5	195	69.2%	90.3%
	Fall	42	65	47	0	16	14	2	0	11	5	202	76.2%	94.6%
2004	Spring	66	53	48	1	10	17	0	0	17	21	233	72.1%	92.7%
	Summer	5	10	2	1	0	1	0	0	0	0	19	94.7%	100.0%
	Fall	88	68	35	0	15	19	1	0	24	29	279	68.5%	91.4%
2005	Spring	21	26	34	0	28	29	1	0	13	5	157	51.6%	91.7%
	Summer	4	2	8	0	1	0	0	0	0	2	17	82.4%	100.0%
	Fall	58	46	62	0	25	19	3	1	36	24	274	60.6%	86.9%
2006	Spring	26	39	43	3	9	13	2	0	15	8	158	70.3%	90.5%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

**Marine Science Courses
Courses by Grade/Success/Retention**

			Grades										success	retention	
			A	B	C	CR	D	F	I	NC	W	XX	Total		
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
BIO 19	2001	Fall	2	2	2	0	0	5	0	0	1	1	13	46.2%	92.3%
	2002	Fall	2	3	1	0	1	7	0	0	2	0	16	37.5%	87.5%
	2004	Spring	0	0	0	0	0	0	0	0	1	11	12	.0%	91.7%
	2005	Spring	1	5	2	0	1	1	0	0	1	0	11	72.7%	90.9%
GEOL 7	2003	Fall	3	9	1	0	5	1	0	0	2	1	22	59.1%	90.9%
	2004	Spring	9	5	3	0	0	3	0	0	4	2	26	65.4%	84.6%
		Fall	21	7	6	0	0	0	0	0	13	18	65	52.3%	80.0%
	2005	Spring	5	4	4	0	2	4	0	0	0	0	19	68.4%	100.0%
		Fall	20	14	4	0	2	3	3	0	15	16	77	49.4%	80.5%
	2006	Spring	7	6	2	0	0	1	1	0	3	0	20	75.0%	85.0%
MS 4	2002	Spring	5	11	5	0	4	5	0	0	1	3	34	61.8%	97.1%
	2003	Spring	2	5	3	0	2	5	0	0	1	1	19	52.6%	94.7%
	2004	Fall	5	10	4	0	4	2	0	0	0	1	26	73.1%	100.0%
MS 20	2001	Spring	13	25	41	1	11	19	2	0	23	7	142	56.3%	83.8%
		Summer	6	8	6	0	0	1	0	0	0	1	22	90.9%	100.0%
		Fall	32	46	37	3	11	14	0	0	17	9	169	69.8%	89.9%
	2002	Spring	22	40	30	2	12	12	1	0	11	13	143	65.7%	92.3%
		Summer	8	5	8	0	0	3	0	0	1	5	30	70.0%	96.7%
		Fall	59	55	46	0	11	21	1	0	16	23	232	69.0%	93.1%
	2003	Spring	50	51	24	0	13	15	1	0	18	4	176	71.0%	89.8%
		Fall	39	56	46	0	11	13	2	0	9	4	180	78.3%	95.0%
	2004	Spring	57	48	45	1	10	14	0	0	12	8	195	77.4%	93.8%
		Summer	5	10	2	1	0	1	0	0	0	0	19	94.7%	100.0%
		Fall	62	51	25	0	11	17	1	0	11	10	188	73.4%	94.1%
	2005	Spring	15	17	28	0	25	24	1	0	12	5	127	47.2%	90.6%
		Summer	4	2	8	0	1	0	0	0	0	2	17	82.4%	100.0%
		Fall	38	32	58	0	23	16	0	1	21	8	197	65.0%	89.3%
	2006	Spring	19	33	41	3	9	12	1	0	12	8	138	69.6%	91.3%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

**Marine Science Courses
Gender by Year/Term
Duplicated Headcount**

		F		M		X		Total	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
2001	Spring	70	49.3%	71	50.0%	1	.7%	142	100.0%
	Summer	9	40.9%	13	59.1%	0	.0%	22	100.0%
	Fall	78	42.9%	103	56.6%	1	.5%	182	100.0%
2002	Spring	82	46.3%	95	53.7%	0	.0%	177	100.0%
	Summer	14	46.7%	16	53.3%	0	.0%	30	100.0%
	Fall	121	48.8%	127	51.2%	0	.0%	248	100.0%
2003	Spring	82	42.1%	112	57.4%	1	.5%	195	100.0%
	Fall	98	48.5%	104	51.5%	0	.0%	202	100.0%
2004	Spring	115	49.4%	118	50.6%	0	.0%	233	100.0%
	Summer	12	63.2%	7	36.8%	0	.0%	19	100.0%
	Fall	150	53.8%	129	46.2%	0	.0%	279	100.0%
2005	Spring	67	42.7%	89	56.7%	1	.6%	157	100.0%
	Summer	9	52.9%	8	47.1%	0	.0%	17	100.0%
	Fall	141	51.5%	133	48.5%	0	.0%	274	100.0%
2006	Spring	73	46.2%	85	53.8%	0	.0%	158	100.0%

**IV-D-4: Oceanography/Marine Science courses
By Zip Code**

**Marine Science Courses by Zip Code
Duplicated Headcount**

		Saddleback		Irvine		Out of District		Total	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
2001	Spring	128	90.1%	1	.7%	13	9.2%	142	100.0%
	Summer	22	100.0%	0	.0%	0	.0%	22	100.0%
	Fall	163	89.6%	7	3.8%	12	6.6%	182	100.0%
2002	Spring	164	92.7%	4	2.3%	9	5.1%	177	100.0%
	Summer	25	83.3%	1	3.3%	4	13.3%	30	100.0%
	Fall	227	91.5%	5	2.0%	16	6.5%	248	100.0%
2003	Spring	178	91.3%	2	1.0%	15	7.7%	195	100.0%
	Fall	179	88.6%	7	3.5%	16	7.9%	202	100.0%
2004	Spring	221	94.8%	4	1.7%	8	3.4%	233	100.0%
	Summer	17	89.5%	1	5.3%	1	5.3%	19	100.0%
	Fall	256	91.8%	10	3.6%	13	4.7%	279	100.0%
2005	Spring	146	93.0%	3	1.9%	8	5.1%	157	100.0%
	Summer	14	82.4%	1	5.9%	2	11.8%	17	100.0%
	Fall	247	90.1%	4	1.5%	23	8.4%	274	100.0%
2006	Spring	153	96.8%	1	.6%	4	2.5%	158	100.0%

IV-D-5: Oceanography/Marine Science courses

**Marine Science Courses
Ethnicity by Year/Term
Duplicated Headcount**

		Ethnic Groups																	
		Asian		African American		Hispanic		American Indian/Alaskan Native		Other		Pacific Islander		White		Unknown		Total	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
2001	Spring	11	7.7%	1	.7%	13	9.2%	0	.0%	5	3.5%	1	.7%	100	70.4%	11	7.7%	142	100.0%
	Summer	1	4.5%	1	4.5%	3	13.6%	0	.0%	0	.0%	0	.0%	16	72.7%	1	4.5%	22	100.0%
	Fall	8	4.4%	5	2.7%	18	9.9%	0	.0%	1	.5%	1	.5%	139	76.4%	10	5.5%	182	100.0%
2002	Spring	11	6.2%	4	2.3%	12	6.8%	0	.0%	2	1.1%	1	.6%	135	76.3%	12	6.8%	177	100.0%
	Summer	1	3.3%	0	.0%	7	23.3%	1	3.3%	0	.0%	0	.0%	16	53.3%	5	16.7%	30	100.0%
	Fall	14	5.6%	2	.8%	24	9.7%	2	.8%	2	.8%	2	.8%	182	73.4%	20	8.1%	248	100.0%
2003	Spring	10	5.1%	1	.5%	18	9.2%	3	1.5%	3	1.5%	1	.5%	149	76.4%	10	5.1%	195	100.0%
	Fall	13	6.4%	2	1.0%	24	11.9%	1	.5%	5	2.5%	3	1.5%	142	70.3%	12	5.9%	202	100.0%
2004	Spring	23	9.9%	5	2.1%	29	12.4%	3	1.3%	4	1.7%	3	1.3%	144	61.8%	22	9.4%	233	100.0%
	Summer	1	5.3%	1	5.3%	2	10.5%	0	.0%	0	.0%	0	.0%	14	73.7%	1	5.3%	19	100.0%
	Fall	14	5.0%	5	1.8%	30	10.8%	2	.7%	2	.7%	4	1.4%	201	72.0%	21	7.5%	279	100.0%
2005	Spring	7	4.5%	4	2.5%	16	10.2%	0	.0%	4	2.5%	1	.6%	112	71.3%	13	8.3%	157	100.0%
	Summer	1	5.9%	0	.0%	3	17.6%	0	.0%	0	.0%	0	.0%	11	64.7%	2	11.8%	17	100.0%
	Fall	15	5.5%	4	1.5%	29	10.6%	3	1.1%	3	1.1%	3	1.1%	200	73.0%	17	6.2%	274	100.0%
2006	Spring	12	7.6%	0	.0%	17	10.8%	0	.0%	1	.6%	1	.6%	117	74.1%	10	6.3%	158	100.0%

**IV-D-6: Oceanography/Marine Science courses
Age Group Distribution by Year/Term**

**Marine Science Courses
Age Group Distribution by Year/Term
Duplicated Headcount**

		Age Groups															
		Below 17		18-21		22-25		26-35		36-50		51-65		Over 65		Total	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
2001	Spring	2	1.4%	110	77.5%	20	14.1%	9	6.3%	0	.0%	1	.7%	0	.0%	142	100.0%
	Summer	0	.0%	16	72.7%	5	22.7%	0	.0%	1	4.5%	0	.0%	0	.0%	22	100.0%
	Fall	5	2.7%	138	75.8%	24	13.2%	8	4.4%	4	2.2%	1	.5%	2	1.1%	182	100.0%
2002	Spring	2	1.1%	132	74.6%	21	11.9%	12	6.8%	9	5.1%	1	.6%	0	.0%	177	100.0%
	Summer	2	6.7%	16	53.3%	6	20.0%	4	13.3%	0	.0%	2	6.7%	0	.0%	30	100.0%
	Fall	3	1.2%	168	67.7%	40	16.1%	19	7.7%	12	4.8%	5	2.0%	1	.4%	248	100.0%
2003	Spring	2	1.0%	154	79.0%	21	10.8%	13	6.7%	5	2.6%	0	.0%	0	.0%	195	100.0%
	Fall	5	2.5%	160	79.2%	22	10.9%	7	3.5%	5	2.5%	3	1.5%	0	.0%	202	100.0%
2004	Spring	2	.9%	180	77.3%	34	14.6%	14	6.0%	2	.9%	0	.0%	1	.4%	233	100.0%
	Summer	0	.0%	11	57.9%	4	21.1%	2	10.5%	1	5.3%	1	5.3%	0	.0%	19	100.0%
	Fall	8	2.9%	212	76.0%	23	8.2%	22	7.9%	8	2.9%	5	1.8%	1	.4%	279	100.0%
2005	Spring	4	2.5%	117	74.5%	21	13.4%	7	4.5%	5	3.2%	2	1.3%	1	.6%	157	100.0%
	Summer	2	11.8%	12	70.6%	1	5.9%	2	11.8%	0	.0%	0	.0%	0	.0%	17	100.0%
	Fall	3	1.1%	198	72.3%	38	13.9%	18	6.6%	16	5.8%	1	.4%	0	.0%	274	100.0%
2006	Spring	1	.6%	123	77.8%	26	16.5%	5	3.2%	3	1.9%	0	.0%	0	.0%	158	100.0%

**IV-D-7: Oceanography/Marine Science courses
Educational Goals by Year/Term**

**Marine Science Courses
Educational Goals by Year/Term
Duplicated Headcount**

	2001				2002				2003				2004				2005				2006	
	Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		Spring	
	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
AA/AS and transfer	53	37.3%	70	38.5%	62	35.0%	110	44.4%	75	38.5%	69	34.2%	92	39.5%	121	43.4%	64	40.8%	107	39.1%	62	39.2%
Transfer w/o AA/AS	17	12.0%	20	11.0%	16	9.0%	34	13.7%	26	13.3%	28	13.9%	31	13.3%	29	10.4%	22	14.0%	41	15.0%	28	17.7%
AA/AS w/o transfer	1	.7%	0	.0%	2	1.1%	2	.8%	2	1.0%	2	1.0%	0	.0%	2	.7%	1	.6%	5	1.8%	0	.0%
2-yr Voc. w/o transfe	1	.7%	4	2.2%	2	1.1%	3	1.2%	2	1.0%	1	.5%	3	1.3%	2	.7%	1	.6%	8	2.9%	0	.0%
Voc. certif. w/o transf	20	14.1%	21	11.5%	27	15.3%	27	10.9%	26	13.3%	35	17.3%	41	17.6%	45	16.1%	27	17.2%	38	13.9%	24	15.2%
Discover interests	16	11.3%	14	7.7%	14	7.9%	14	5.6%	9	4.6%	12	5.9%	14	6.0%	7	2.5%	5	3.2%	14	5.1%	6	3.8%
Acquire job skills	7	4.9%	12	6.6%	14	7.9%	12	4.8%	16	8.2%	10	5.0%	15	6.4%	10	3.6%	8	5.1%	16	5.8%	5	3.2%
Update job skills	0	.0%	3	1.6%	3	1.7%	3	1.2%	2	1.0%	2	1.0%	2	.9%	3	1.1%	3	1.9%	0	.0%	1	.6%
Maintain cert. or lisc.	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%	1	.4%	0	.0%	0	.0%	0	.0%
Ed. development	6	4.2%	10	5.5%	8	4.5%	8	3.2%	1	.5%	5	2.5%	1	.4%	5	1.8%	2	1.3%	6	2.2%	3	1.9%
Basic Skills	0	.0%	0	.0%	0	.0%	1	.4%	1	.5%	0	.0%	1	.4%	1	.4%	0	.0%	0	.0%	1	.6%
HS or GED	1	.7%	1	.5%	0	.0%	0	.0%	2	1.0%	6	3.0%	0	.0%	1	.4%	2	1.3%	1	.4%	1	.6%
Undecided	20	14.1%	27	14.8%	29	16.4%	34	13.7%	33	16.9%	32	15.8%	33	14.2%	52	18.6%	22	14.0%	38	13.9%	27	17.1%
Total	142	100.0%	182	100.0%	177	100.0%	248	100.0%	195	100.0%	202	100.0%	233	100.0%	279	100.0%	157	100.0%	274	100.0%	158	100.0%