Skyline College
(Earth Sciences)
Program Review
Executive Summary

Short Summary of Findings

The Dept. of Earth and Oceanographic Sciences has one full time faculty member and a number of adjunct faculty. Curriculum continues to be quite diverse and topical as is appropriate for predominantly general education students.

Three Strengths of the Program

a. Outstanding instructors with unique pedagogical skills , tools and resources. Outreach to the surrounding community through television broadcasts on public access television stations.

b. A constantly evolving and technically updated curriculum that keeps pace with research and academic advances in the sciences.

c. Popular large classes for general education students that traditionally sustain full enrollments.

Three Suggestions for Improvement

a. Provide more suitable , useful and reliable equipment for instruction through budget decisions and allocations that involve faculty input .

b. Provide increased and more appropriate storage and preparation facilities for instructional supplies and technology.

c) Designate lab facility unique to geology/oceanography with released or flex time for curatorial duties now performed by instructors and some contributions from a designated classified support staff.

Full-Time Faculty Signatures

_____	_____	_____
Mel Zucker	*Highlight this text & type in name*	*Highlight this text & type in name*
_____	_____	_____
Highlight this text & type in name	*Highlight this text & type in name*	*Highlight this text & type in name*

Submitted on: Highlight this text & type in date

SKYLINE COLLEGE
PROGRAM REVIEW SELF STUDY

PART A: Overview of Program

1. State the goals/ focus of this program and how the program contributes to the mission and priorities of the College and District.

The goals of the Earth Science program at Skyline College are consistent with the stated goals of the School. These goals include:

- **a. Provide a breadth of educational opportunities and experiences which encourage students to develop their general understanding of human effort and achievement.**
  - **i. This is accomplished by providing a range of science classes that are approachable and understandable even by those with no mathematical background or scientific inclination.**
  - **ii. The subjects of the earth sciences have demonstrably direct application to everyday life for most Californians.**
- **b. Provide lower division programs to enable students to transfer to baccalaureate institutions.**
  - **i. All of Skyline's earth science offerings are transferable to four-year institutions.**
  - **ii. The classes can form the foundation for a major in the discipline.**

2. Discuss how this program coordinates, impacts, and/or interacts with other programs in the College.

Courses in geology and oceanography compliment other programs at the college by providing an accessible approach to science, with topics that have application to every-day life. The instructors strive to connect earth science class material to other courses across Skyline's curriculum whenever possible by making reference to related disciplines in math, physics, chemistry, and biology. Even references to classic literature, foreign languages, and the fine arts find their way into these classes.

3. If the program utilizes advisory boards and/or professional organizations, describe their roles.

Although no formal advisory boards oversee the Earth Science program, the instructors are guided by professional relationships with organizations such as the National Association of Geoscience Teachers, the Geological Society of America, and the United States Geological Survey.

4. Explain how this program meets the needs of our diverse community.

Students from widely varied cultural and socioeconomic backgrounds thrive in earth sciences, where the subject matter itself is so diverse and international. In part it is because many of the concepts are typically not as abstract as in other sciences, but are quite visual, perceptible, and concrete. This factor is exploited with the extensive use of audio-visual media in the classroom. Topics are often taken from everyday experience, news reports, and other areas of common interest. It is also significant to note that much of the technical vocabulary used in geology and oceanography is appropriated from other languages. This fact is used to good advantage in the classroom. Many of these topics are issues of global significance that incorporate multi-cultural awareness.

5. If the program has completed a previous self-study, evaluate the progress made toward previous goals.

Previous program goals have focused on helping the division support and maintain a large, well-served student population. While earth science instructors have always stressed the quality of education, and continue to maintain high academic standards, they have also been willing to accept and sustain high enrollments. Furthermore, they have worked hard to produce very high rates of retention while trying to maintain a large selection of basic classes at a variety of scheduled times.

PART B: Curriculum

1. Describe how the courses offered in the program meet the needs of the discipline(s) and the students. (This may be answered through descriptive narrative evaluation or quantitative research).

The earth science curriculum offers a range of courses that include lecture, combined lecture-lab, and field classes. Courses cover a wide variety of topics within the subject area. The present curriculum can satisfy the needs of all students attending Skyline. Science majors can begin with U.C./C.S.U. transfer lecture-lab courses. Transfer students seeking general education requirements can also satisfy their lab or lecture science areas. Students seeking their A.A. degree have a wide choice of classes and scheduled times. The program's commitment to the evening college and the diverse student population it serves remains evident by the continuous and coordinated participation of the daytime faculty in evening general education classes.

2. *State how the program has remained current in the discipline(s).*

Two members of the earth science faculty, Mel Zucker and Richard Lambert, continue to work in close cooperation for the benefit of the program and their students. In addition to a regularly scheduled weekly department meeting, they meet frequently to discuss common concerns . They collaborate in the development of new media materials for their television series used in the classroom and broadcast to the community.
Regular meetings are also held with colleagues from San Francisco State University, and valuable professional relationships have been developed with members of the United States Geological Survey in Menlo Park. In addition, Skyline earth science instructors have participated in numerous local and national conferences and field trips where scientists and educators gather to share new ideas and methods. Examples include the field trips and meetings of the National Association of Geoscience Teachers, Earthquake Preparedness Conferences and fairs, professional lectures and seminars, and conferences of the American Association for the Advancement of Science.

3. *If the student population has changed, state how the program is addressing these changes.*

The student population has clearly changed in terms of a perceptible decline in general educational background, scholastic aptitude, socialization skills, and general audienceship. Nevertheless the earth science instructors have attempted to maintain a high level of scientific rigor and critical thinking in the courses, while at the same time developing new methods of information delivery. This has been accomplished by optimizing the visual aspects of the sciences, through locally developed, innovative video programs produced expressly for Skyline College students.
Essentially lectures delivered from the field, these productions often include interviews of leading scientists, timely topics, and carefully designed illustrative graphics. This methodology reaches media-oriented students in a way that lecture alone cannot.
The availability of these video productions in our learning (media) center serve as a field trip alternative for students who are disabled, ill, injured or miss classes or trips due to extenuating problems in their personal lives.
They also provide a convenient pedagogical technique of reinforcement since relevant material can be reviewed in the learning center. Students who prefer self-paced learning, or need repetition of material covered in class are given an alternative study opportunity.

4. *All courses in this program should be reviewed and, if appropriate, modified every six years. If this has not occurred, please list the courses and explain.*

A review of the catalog of earth science listings has shown that for a number of reasons, an advanced course, Geology 220 (Historical Geology) has not been offered. Because this course has a prerequisite, enrollments have traditionally been low since most students come to geology late in their community college career, and transfer to a university before they are required to take this more advanced class.

Geology 612 (Field Geology-2 units), has historically been allowed to operate with a smaller number of students traveling to distant locations, but budget considerations have severely limited its range. This is coupled with the fact that fewer students are willing or able to set aside time outside of the classroom to attend extended field trips, in part, due to work schedules. Geology 611 (Field Geology-1 unit) presents shorter field trips to nearby localities, and has been modified to allow students to repeat it for credit.

5. *If external accreditation or certification is required, please state the certifying agency and status of the program.*

Not applicable.

6. Discuss plans for future review and program modification.

Geology 611 and 612 remain in the catalogue as inactive until an adjunct faculty member coordinates their re-introduction to the schedule after consulting with the Dean of Science.

Geology 220 will be retained in "inactive" status for possible use in the future. It is to be expected that this course, when offered, might have a low enrollment because of its prerequisite, and intended for science majors.

PART C: Faculty and Staff

1. List major development activities completed by faculty and staff in this program in the last six years and state what development is needed or proposed by faculty in this program.

Professor Mel Zucker has over 35 years of dedicated service as an instructor for Skyline College. In conjunction with his teaching in a wide range of subject areas, Professor Zucker produces an educational video series that illustrates topics in geology, oceanography, and marine biology. The video series has been made available to everyone on campus in the Skyline College Media Center . The videos serve as virtual field trips to off-campus locations, provide interviews with leading scientists in the various fields, and present timely information in an accessible manner. The series is also regularly televised as a community service throughout the San Francisco Peninsula by Peninsula Television, Pacifica Community Television, and Mid-Coast Community Television stations.

Programs are produced on a wide variety of topics ranging from geology ("Lookin' For A Landslide") to seismology ("Risky Business") to marine biology ("Changes") to Environmental Science ("Algorithms") and Oceanography (" Rip Currents"). They have been honored with awards from the EarthVision International Film and Video Festival and from the Western Access for Video Excellence competition.

Prof. Zucker was a long-time member of the Board of Directors of the Fitzgerald Marine Reserve in Moss Beach, and the technical advisory Committee for the San Mateo County Master Plan for the Fitzgerald Reserve. He is the editor of the "Docent Field Guide" to the reserve, and presents specialized docent enrichment programs for the organization. Professor Zucker also makes presentations to the "Friends of San Pedro Park" in Pacifica, and has taught classes in the Bay Area for the Senior Summer School program.
Zucker has served as a reviewer of textbooks in Oceanography, Marine Biology, and Environmental Geology.

Prof. Zucker was an active member of the planning committee of the regional "1906 Earthquake Centennial Alliance," which was involved with designing activities to commemorate the anniversary of the1906 earthquake and fire. He was an invited speaker at one of their conferences and produced a number of video productions on behalf of the Alliance.

He is also a song – writer whose original music productions about the earth sciences have been used in many educational and entertainment venues in the S.F. Bay area and across the country. Live performances were held in the Bay area and recordings have been used at more distant locations as an educational and entertainment resource.

As part of the 1906 Centennial commemoration for Skyline College , Prof. Zucker worked in conjunction with the U. S. Geological Survey to design and develop an informative plaque that is now in place at our campus vista point. Funding was provided by the President's Innovation Fund.
He also organized a guest speaker to make presentations to a campus-wide forum and in classes about his novel and television production that center around the 1906 earthquake. It served to further connect the sciences as taught at Skyline to the creative arts and celebrities in our community.

Mel has been a very active member the "1868 Hayward Earthquake Alliance" for the past two years. He worked closely with the U.S. Geological steering committee and produced a series of television episodes for the commemoration. He also produced original music to accompany presentations and presented his own original music videos at one of the Alliance meetings.

Prof. Zucker is involved with a series of new U.S.G.S. media productions about tsunami hazards for the offices of Emergency Services for the west coast of North America . He is working with the U.S.G.S. as script consultant and voice-over narrator for these recorded programs that will be posted on linked internet sites .

In the spring of 2006 the San Francisco Exploratorium developed a public awareness program about earthquakes. Prof. Zucker and colleague Richard Lambert were invited to produce a special event for the San Francisco Exploratorium on earthquakes, volcanoes and plate boundaries for Exploratorium visitors.

Prof. Zucker worked with the S.F. Exploratorium to develop an on-line program of podcasts about the history of science. His podcast is available on the Exploratorium website as a featured discussion on the history of sea-floor spreading, continental drift and the use of evidence as a tool to test and develop the innovative ideas of Alfred Wegener.

These activities and productions are frequently used to supplement and continuously update class instruction with connections to the surrounding community.

He continues his education by attending science and emergency services meetings and conferences, participation in discussions with leading professionals, extensive reading, and lessons in music, song- writing, video production, and voice-overs .

Professor Richard Lambert formally retired in June of 2008 after 35 years of teaching geology both at Skyline College and San Francisco State University. He continues to teach at Skyline on a post-retirement contract, and also continues to be involved in the support of the department.

Lambert is an active member of the " Bay Area Earthquake Alliance," an outgrowth of the "1906 Earthquake Centennial Alliance," and the " 1868 Hayward Earthquake Alliance ." He and Professor Zucker represent the only community college in an elite group that includes top earthquake scientists, seismic safety professionals, and geology professors from the major California universities.

A creator of educational multimedia throughout his career, Professor Lambert has produced media based programs for major conferences such as the Seismological Society of America
and the American Association for the Advancement of Science, as well as diverse groups such as the Northern California Geological Society and the California Academy of Sciences.
Community service presentations at local venues include lectures to docents at Woodside's FILOLI estate, the Coyote Point Museum, and the Peninsula Environmental Volunteers.

Lambert has had the honor of presenting media demonstrations and poster sessions at several national conferences, as well as co-chairing a technical session at the national meeting of the Geological Society of America with a colleague from San Francisco State. There he again teamed with Professor Zucker in presenting talks relating to the delivery of scientific information in the classroom.

Continuing in development is a series of video programs for students and the general public based on historically important geological events. One of the programs, " The San Francisco Earthquake, " has been awarded the Western Access Video Excellence (W.A.V.E.) Awards for outstanding documentary. Other programs in the series have had

wide distribution in the seismologic community, including the national headquarters of the U.S. Geological Survey , the state of California's Seismic Safety Commission, and the regional Association of Bay Area Governments.
The video production team of Zucker and Lambert has been the subject of numerous laudatory newspaper and magazine articles, both on a local and national level. This can only help to promote a positive public impression of Skyline.

2. Describe the orientation process for new faculty and staff (include student workers such as tutors and aides).

Earth Science has never had any directly assigned classified staff member, and the instructors have taken the responsibility of preparing, organizing, curating, and storing all of the materials needed for the program.
New faculty, such as summer session instructors or evening part-timers, have been mentored by the full time instructor with the class(es) most like that of the new teacher.
Our new adjunct instructor for physical geology was provided with a detailed preview of departmental supplies and equipment and participated in a number of flex –supported geology field trips oriented for preparation of classes at Skyline.

3. If recruitment of new and/or diverse faculty is needed, suggest recruitment techniques.

The abundance of high caliber, diverse college graduates from private universities, the University of California and the California State University system, plus the proximity of the United States Geological Survey would provide a wealth of possible contacts to insure a wide range of qualified candidates.

PART D: Facilities, Equipment, Materials and Maintenance

1. Discuss the effectiveness of the facilities, equipment, equipment maintenance, and materials for the program to meet its goals and focus. Include if they impact success and if they are accessible to all students.
The new lecture classroom and prep room design for the renovated building 7 is very disappointing for earth science instruction. There has been a significant overall loss of storage space for collections and demonstration materials and equipment from the older building 7 facility.
The crucial loss of a large adjacent storage room attached to the lecture room, as has been repeatedly emphasized, greatly undermines the quality of instruction for lecture classes . It compromises the use of visual and tactile supplies and equipment and precludes an immediate response to unexpected questions or review of subject matter that is not specifically allocated before class begins. Large and or heavy samples and demonstration equipment must be gathered and loaded onto a cart prior to class and then rolled down the hall and assembled in the classroom during the short time between classes.
The loss of a hard, durable and chemically resistant lab-type table in front (with a sink) is a distinct loss from the previous facility that was provided in the older building 7 lecture room.

There is now a much more awkward and limited provision of audio-visual capabilities built into the new classroom compared to the opportunities presented in the former classroom facility .
The earth science instructors will continue to be more and more self-reliant on providing their own audio – visual supplies and equipment for instruction and preparation of teaching materials.

Geology and Oceanography lab classes continue to share a laboratory with chemistry in the newly renovated building 7 lab. Most of the internal design elements from furniture to fixtures are intended for chemistry classes, and are ill- suited to the earth sciences. Pre-class prep time is critical for instructors since a small storage room is across the hall and there is no staff assigned to assist with lab preparations. Equipment and supply problems as well as the disruption of experiments have recurred as a result of sharing lab facilities with chemistry classes. Many of the geoscience lab activities suffer from awkward logistics due to the chemistry concept dominating the design.

Campus media services are generally unreliable, bureaucratized, slow and generally unresponsive to the media and pedagogical needs of the earth science instruction program. We have become increasingly more reliant on ourselves for checking and maintaining supplies and equipment. Despite requests in previous program reviews, we continue to purchase equipment and teaching resources at our own expense to be certain that we are prepared to give students the best instruction possible.

As an example, during the move to the Pacific Heights swing-space, two high quality professional S-video player-recorders were lost in spite of our specific request to make sure they would be available for continued use. They have never been found or replaced with a comparable unit for which we have purchased and produced dozens of high quality S-video productions.

2. List projected needs.

Earth Science instructors have repeatedly and strongly put forth request after request for the single most important need in the forthcoming reformulation of the science complex, viz. sufficient, accessible <u>storage space</u> for lab materials, sample collections, and field trip equipment, as well as <u>prep rooms</u> for instructional materials directly adjacent to lecture rooms and lab areas. This is an unaddressed need that was emphasized in our last program review.
It is important that earth science media needs be taken into account in the design of the new classrooms, rather than a "one size fits all" approach as was the case in the recent electronic classroom makeover. With new, limiting restrictions for office furniture in the newly renovated building 7 facility, storage and preparation facilities outside of faculty offices is more important than ever to maintain high quality instructional programs.

3. Describe the use of technology in the program and discuss if technology is current and comparable to other college and business or industry.

The basic supplies for teaching geology and oceanography are decidedly low tech: rocks, minerals, seawater samples, sieves, etc. For this reason the Earth Science department has been very frugal over the years in budget requests. Compared to other sciences the Earth Science budget spending is miniscule. Perhaps because so little is requested, it might appear that the program could survive with even less. One area of difficulty is in technology. In order to maintain their high standards of educational quality, the Earth Science faculty members have often been forced to purchase instructional equipment at personal expense when budget request items were denied.

4. If appropriate, describe the support the program receives from industry. If the support is not adequate, what is necessary to improve that support?

Although the Earth Science program receives no regular direct support from commercial industries, the Western Regional Office of the United States Geological Survey has been an ongoing source of data, maps, media, and other valuable materials to the program. They have also been very generous in making many top scientists available to Skyline College for interviews, and research assistance for the instructor-produced television program, "Down To Earth." Other agencies have provided similar assistance including the California Geological Survey, the Association of Bay Area Governments, and the California Seismic Safety Commission.

PART E: Budget Request

1. What resources (staff, facilities, equipment and/or supplies) will be needed in the next six years?

The decision about whether to replace Prof. Richard Lambert's position with a full time or adjunct professors remains with the appropriate administrators . There has been no discussion of these matters with the current faculty other than well known information about the district budget
problems and the reluctance to open new hiring positions at the present time.

Instructional media equipment is selected and ordered by the media staff and administrators. Classroom media design is determined and designed by the media staff with little or no input from the appropriate instructors.
Supplies for media presentation are produced or purchased by individual faculty members as well as equipment to change media to adapt to changes in media technology chosen by the media staff.

We can continue to operate on a minimal budget with replacement of small amounts or rock and mineral supplies and materials for use in oceanography lab instruction.

With the loss of storage and working space and a frantic move to a swing space during the final weeks of a semester, collections have been greatly reduced. Additional file cabinets and book cases are of high priority for the new building 7.

Requests for equipment to begin digitizing extensive collections of instructional materials have been turned down but remain a high priority to adjust to administrative and media staff decisions as to which types of instructional equipment will be available in classrooms.

2. If appropriate, discuss methods the program could share resources with other programs in the College and District.

One of the basic issues in sharing resources is that many items, consumer electronic equipment in particular, tend to become unreliable with multiple users. Equipment often experiences mechanical problems that are unrecognized, or go unreported. Shared equipment might not be available on short notice, or during school breaks. The issue of sharing was mentioned in regard to several of the program's recently requested equipment budget items. Although many items may well be shared productively, it is the opinion of Earth Science that when a carefully considered request is made for a needed, fragile item, that it not automatically be considered as something to be shared.

Skyline College Program Review
Worksheet for Enrollment, Performance and WSCH/FTE

Weekly Student Contact Hours – WSCH

Report the 3 previous **Fall** semesters with the most recent on the right.

Year	2006	2007	2008
WSCH	1,137	864	1020

Please comment on program enrollment and expected trends.

The program enrollment dropped as did the LOAD for academic year 07-08 as all classes were offered in the smaller classrooms of Pacific Heights.

FTE and WSCH/FTE (LOAD)

Report the previous 3 **Fall** semesters with the most recent on the right

Year	2006	2007	2008
FTE	1.84	1.84	1.68
WSCH/FTE	620	470	607

Please comment on the comparison of this program to College trends.

Earth Science is typically a very efficient program for the College and slightly above the College LOAD. As mentioned above the dip in 2007 was due to all classes being held in the smaller classrooms of Pacific Heights.

Retention and Success

Report data on program retention and success rate with the most recent on the right.

Year	2005-06	2006-07	2007-08
Retention	83	81	80
Success	72	70	69

Please comment on the programs success and retention rate. Include factors that affect the rates and how college services are used to provide multiple avenues for student success.

Retention and and success are in-line with that of the College as a whole. There is no difference between gender with women having slightly higher success. Filipino students have had the lowest rate of retention and success of all groups. Success of filipino students has been dropping since 2003-04. The rate of change was from 76% to 58%. The reason for this change is unknown.

Program Review
Course Outline & Prerequisite Checklist

Discipline: Earth Science (Geology and Oceanography) Semester: Spring 2009

ALL COURSE OUTLINES MUST BE REVIEWED AND UPDATED DURING PROGRAM REVIEW!

If there are no changes made to the course outline, use the Program Review date to update the course outline***. Please note that all course outlines must now include the title of a representational text with its publication or revision date*** **and follow the current Title V format**. Refer to *Guidelines for Preparing a Course Outlines* for further assistance.

If it is determined that a course outline needs ***substantial modification***, you must complete and submit ***Form D – Course Modification*** to the Curriculum Committee for approval well **in advance** of your Program Review due date. Please check with your Curriculum Committee representative or go to the Curriculum Committee web site for a list of meeting dates, submission deadlines, instructions and curriculum forms to update (or modify) a course outline. (http://www.smccd.net/accounts/skycurr/).

List all the courses in your ***discipline*** on the attached form. Complete the columns on the form for each course in your discipline using the instructions below:

Column 1: What is the course prefix and number?

Column 2: What is the course title?

Column 3: What date was the course outline last reviewed or updated?

Column 4: If this course transfers to either CSU **or** CSU *and* UC, place a check mark in the appropriate column.

Column 5: If this course satisfies a GE (General Education) requirement, place a check mark in the column.

Column 6: Please list all course prerequisites, corequisites, and/or recommendations.

Column 7: Please indicate that the course prerequisites, corequisites, and/or recommendations have been reviewed and validated by faculty by placing a check mark in the column.

Column 8: Does the course have SLOs on the official course outline of record?

Column 9: Does the course have assessment plans?

Column 10: Has the course implemented their assessment plans?

Column 11: When did the department review results from implementation of the assessment plan?

Upon submission of your Program Review materials, all course outlines should have the current date in the upper right corner. Please submit a hard copy of **each** outline from your **discipline** listed on the form with your *Program Review* materials. Additionally, all course outline ***files*** should be e-mailed to the Instruction Office in care of Maria Norris (norris@smccd.net).

Please have the faculty and division dean sign and date the certification on the last page.

COURSE OUTLINE, PREREQUISITE, & STUDENT LEARNING OUTCOMES CHECKLIST

1	2	3	4		5	6	7	8	9	10	11
Prefix & Number	Title	Review Date	Transfer		G.E.	Prerequisites, Corequisites, Recommendations	Validated	SLOs	Assessment Plans	Implementation	Reviewed
			CSU	UC & CSU							
GEOL 100	Survey of Geology	4/09	X	X	X	Eligibility for English 836 or equivalent	x	x			
GEOL 105	Environmental Earth Science	4/09	X	X	X	Eligibility for English 836 or equivalent	x	x			
GEOL 180	Geology of California	4/09	X	X	X	Eligibility for English 836 or equivalent	x	x			
GEOL 210	General Geology	4/09	X	X	X	Eligibility for English 836 or equivalent	x	x			
GEOL 611	Field Geology	4/09	X	X		Completion of or concurrent enrollment in GEOL 100 or GEOL 210 or equivalent	x	x			
OCEN 100	Survey of Oceanography	4/09	X	X	X	Eligibility for English 836 or equivalent	x	x			
OCEN 101	Oceanography Laboratory	4/09	X	X	X	Completion of or concurrent enrollment in OCEN 100	x	x			

COURSE OUTLINE, PREREQUISITE, & STUDENT LEARNING OUTCOMES CHECKLIST

1	2	3	4		5	6	7	8	9	10	11
Prefix & Number	Title	Review Date	Transfer		G.E.	Prerequisites, Corequisites, Recommendations	Validated	SLOs	Assessment Plans	Implemen-tation	Reviewed
			CSU	UC & CSU							

Skyline College Program Review
Certification of Course Outline & Prerequisite Review

Faculty Signatures

_____	_____	_____
Mel Zucker	*Highlight this text & type in name*	*Highlight this text & type in name*
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Date Submitted: *April 17, 2009* ***Division Dean:*** _____

(Additional faculty signature lines may be added to this form as needed.)

MAPPING INSTRUCTIONAL COURSE LEVEL SLOS WITH INSTITUTIONAL SLOS (*FRAMEWORK*, 33-34)

An institutional student learning outcome is a knowledge, skill, ability, and/or attitude that students should attain by the end of their college experience. Here at Skyline, students who complete the GE requirements or receive an AA or AS degree should have mastered the following institutional SLOs: critical thinking, effective communication, citizenship, information and computer technology literacy, and lifelong wellness.

Mapping course-level SLOs with institutional SLOs enables you to identify which courses within your program may be contributing to student achievement of these outcomes, even though your program's approach may differ from others'. Conversely, mapping gives us the means to determine whether our institutional SLOs reflect our priorities as instructors.

Now that Skyline has defined its institutional outcomes, input the names of the key courses in your program (i.e., courses in a prerequisite sequence, heavily enrolled courses, GE courses, etc.) and determine whether achieving those institutional outcomes are: (c) central to a course or (s) supported by the course. An SLO is "central" if it is essential to the course's intent and therefore an instructional priority, and it is "supported" if addressed but not quite at the level of importance as a "central" SLO. Leave the space blank if the institutional SLO does not apply.

This same process can be employed for programs, such as Student Services Programs, that don't have courses. But instead, map your program outcomes to the institutional outcomes.

Skyline College Institutional Outcomes **Key: (C) central to a course, (S) supported by a course, (blank) does not apply**		Geology 210 Program Outcome 1	Oceanography 100 Program Outcome 2	Course C or Program Outcome 3	Course D or Program Outcome 4	Course E or Program Outcome 5	Course F or Program Outcome 6	Course G or Program Outcome 7	Course H or Program Outcome 8
Critical Thinking:	Raise vital questions, formulate responses (or solutions) to problems, evaluate the reasonableness of a solution and provide a justification.	C	C						
	Analyze and compose arguments; assess the validity or strength or an argument using appropriate deductive and inductive techniques.	S	S						
	Think creatively and open mindedly within alternative systems of thought; communicate, either artistically, graphically, symbolically, or verbally, a complete and clear solution to a given problem.	C	C						
	Make effective use of evidence in an argument; evaluate the truth or value of the premises using reliable sources of information.	C	C						
	Demonstrate understanding of diverse disciplinary perspectives and use appropriate inquiry, including the scientific method.	C	C						
	Analyze multiple representations of quantitative information, including graphical, formulaic, numerical, and verbal.	S	S						

Effective Communication:	Comprehend, analyze, and respond appropriately to oral, written, and visual information.	S	S						
	Effectively express ideas through speaking and writing.	S	S						
Citizenship:	Demonstrate scientific literacy concerning a range of global issues;	C	C						
	Articulate similarities and contrasts among cultures, demonstrating knowledge of and sensitivity to various cultural values and issues.	S	S						
	Develop attitudes central to lifelong learning: openness, flexibility, intellectual curiosity, and a broad perspective that values diversity of thought.	S	S						
	Demonstrate appropriate social skills in group settings, listening and being receptive to others' ideas and feelings, effectively contributing ideas, and demonstrating leadership by motivating others.	S	S						
	Demonstrate commitment to active citizenship.	S	S						
Information and Computer Technology Literacy:	Effectively locate and access information in numerous formats using a variety of appropriate search tools.	S	S						
	Use computer technology to organize, manage, integrate, synthesize, create, and communicate information and ideas in order to solve problems and function effectively in an information society.	S	S						
Information and Computer	Evaluate the relevance, quality, and credibility of a wide variety of information sources using critical thinking and	C	C						

Technology Literacy:	problem solving skills.								
Lifelong Wellness:	Demonstrate an understanding of physical fitness and its role in lifelong wellness.								
	Take personal responsibility for identifying academic and psycho-social needs, determining resources, and accessing appropriate services.								

Program Review - Resource Needs Summary Table

Program ___Earth Science_____

	Needs	Notes
Personnel	1. Earth Science is central to the science division and will always require a full-time instructor. 2. 3. 4.	
Equipment	1. 2. 3. 4.	
Facilities	1. 2. 3. 4.	

Program Review - Resource Needs Summary Table

Program ___Earth Science_____