ACADEMIC PROGRAM REVIEW
WALTER MAXWELL GIBSON
COLLEGE OF SCIENCE AND
ENGINEERING

May 2013

(NOTE: To move through the document use View/Navigation Pane in MS Word or in PDF use Thumbnails & Bookmarks to move through the document.

TABLE OF CONTENTS

CONTENTS

Academic Program Review Walter Maxwell Gibson College of Science and Engineering

(NOTE: To move through the document use View/Navigation Pane in MS Word or in PDF use Thumbnails & Bookmarks to move through the document.

May 2013

I. Executive Summary

The Walter Maxwell Gibson College of Science and Engineering (designated as either WMGCOSE or COSE in this report) underwent a comprehensive program review in 2012-13 as stipulated by SUU Policies & Procedures 6.41 *Cyclical Academic Program Reviews and Reports* and by Regents policy R411 *Cyclical Institutional Program Reviews*. The nine-member Academic Program Review Committee (APRC) committee convened several times during the year and reviewed the documentation provided by the College and the SUU Office of Institutional Research. Committee members divided the responsibility for assessing each department and developed reports and recommendations. The process was aided by the services of three external academic reviewers who visited campus in January of 2013. During their visit they met with faculty, staff, and students and the resulting report of their findings has been incorporated in this document. The final report document was assembled and edited by the Associate Provost with the support of committee members and staff.

The Walter Maxwell Gibson College of Science and Engineering is one of the most diverse and is the largest academic unit at Southern Utah University. This report will offer significant evidence the College's faculty, staff, and students are engaged in delivering high-quality programs of study, research, and service in learning environments extending beyond the traditional classrooms and laboratories and into the community, region and beyond. And while the College is operating at a high level of effectiveness, this report also identifies areas for improvement. In fact, improvement plans are already underway in several units and a culture of organizational development designed to further increase the quality of its operations and programs is readily apparent. The College's commitment to continuous assessment and improvement offers a model to all academic units at Southern Utah University.

II. Overview of Review Process

The Walter Maxwell Gibson College of Science & Engineering (WMGCOSE) submitted its program review documents February 25, 2013 as per the requirements currently stipulated in SUU Policy and Procedure 6.41, "Cyclical Academic Program Reviews and Reports." COSE also utilized three external reviewers in relevant fields who provided a comprehensive assessment report on the college as per SUU policy 6.41 and Regents Policy R411. Associate Dean Eric Freden worked closely with the COSE Dean, Dr. Robert Eves, and the department chairs in submitting a thorough and complete document. The APRC thanks the COSE staff and faculty for their diligence and hard work in preparing this review.

The external review team visited campus January 10 and 11, 2013 and submitted their report February 18, 2013. The College and the Departments prepared responses to the external reviewer's comments by early March. The APRC assigned members to review the external reviewers report and each committee member submitted their input and suggestions. The APRC summaries are incorporated in this report.

Strengths/Commendations

The APRC found the COSE mission, vision, and philosophy statements clearly articulated its purpose, aspirations, values and beliefs. The summary of the College's assessment processes, its specialized accredited programs, and its goals and objectives demonstrated good alignment with SUU's mission and vision and the College's mission and vision.

Dean Robert Eves, Associate Dean Eric Freden, and Administrative Assistant Barbara Rodriguez form an effective leadership and management team. The faculty, department chairs, administrative assistants, and academic advisors comprise a hardworking group of people dedicated to student success and achievement.

COSE has a solid record of garnering financial support including connecting to grant support, donors, and the community through K-12 initiatives. The partnership with the Iron County schools and the greater southern Utah community has been consistently productive and beneficial. A number of the academic units within the College also have advisory boards comprised of local and regional businesses and professions. Lastly, COSE contributes to the economic vitality of the area through a number of partnerships with local businesses and through various special projects with local and governmental agencies.

In a relatively short period of time (since 2011), the newly formed COSE has distinguished itself as a comprehensive academic unit of 8 departments offering 13 degree programs to over 2000 majors (Fall 2012). The merger of the College of Science and the College of Computing, Integrated Engineering and Technology (CIET) was proposed as part of the Academic Roadmap plan developed by SUU in 2009 and implemented in July 2011. The completion of the new science building addition in 2010-11 provided much needed space to meet enrollment demands and increased the capacity of the College to deliver an outstanding education to SUU students in its state-of-the-art facilities.

Donor support has been able to further bolster the College's effectiveness in supporting scholarships for students. Donor support included the largest ever endowed scholarship gift to SUU and resulted in the naming of the College May 3, 2012 as the Walter Maxwell Gibson College of Science and Engineering. In addition, the College obtained another major source of scholarship funding in August 2012 in the form of an S-Stem grant from the National Science Foundation. This $580,000 award is dedicated to scholarships for Math, Engineering, Biology, and Geology over the next four years.

In addition to the programmatic and curricular accomplishments of the College, the data collected in the program review process demonstrated growth on a variety of fronts including enrollment, faculty productivity, and the awarding of degrees. In addition to robust enrollment growth, other accomplishments include student placements in professional programs, high acceptance rates for students pursuing advanced degrees, and consistent recognition of student and faculty research and scholarship. A strong commitment to science education is also a distinguishing factor in COSE and results in placing effective science teachers throughout the state of Utah.

Some of the highlights in the data collected over the last 5 years included costs per student Full Time Equivalent (FTE) that averaged $3915 (2011-12) in the College. Math was the least costly per FTE at $2194 and Integrated Engineering was the most costly at $12,898. In 2011-12, there were 19.8 FTE Students per Faculty for the College, which was slightly above the SUU average of 19.4 per faculty. The range of the Student FTEs per Faculty FTE in 2011-12 included a high of 27.8 in Mathematics, to a low of 8.7 in Nursing. The data points related to the departments indicate most are managing robust numbers of majors. Math and Integrated Engineering seem to track consistently lower numbers of majors. There also appears to be a huge gap between the number of students tracked as Nursing majors verses number of graduates. For example, in 2011-12 there were 432 majors but only 66 Bachelor's degrees awarded. The full set of data tables may be found in the College's self-study report.

Weaknesses

The APRC did not find any significant overall weaknesses in the COSE. The merger of the two colleges appears to have created its own set of challenges that are still being worked through by the faculty and administration of the College. The APRC has attempted to factor into its review process the problems facing the two Colleges as they merged. In reviewing the feedback on the 8 departments there seemed to be areas for improvement. Some of the areas included:

- Curriculum alignment and relevance
- Thoroughness of the assessment of student learning
- Effectiveness of the leadership in some departments
- Scope and expectations of faculty performance related to the LRT criteria developed in departments
- Managing and keeping website content up to date

Many of these areas for improvement were identified in either the self-study documents submitted by the College or by the external reviewers. Regardless of the source for the suggested improvements, COSE has already taken the opportunity to thoughtfully prepare responses and action plans to address the concerns raised.

APRC Recommendations

As the APRC assessed the program review documents and the outside evaluator's observations, several key areas for consideration emerged. The College and its departments have already begun to address some of the challenges and the APRC is confident the COSE is on track to strengthen its programs and enhance its effectiveness and impact as a premiere educational unit at SUU and in the Utah system of higher education.

The APRC offers the following additional comments related to this review for consideration by the COSE:

1. Develop a master plan that articulates its enrollment goals in light of faculty resources and SUU's long-range growth plans.

The COSE is to be commended for the scope of its 2011-16 Strategic Plan found on its website. Item 1.C. Resources, provides the opportunity to clearly establish a framework for how many students may be effectively accommodated in each major and is an important step toward meeting the College's quality goals. An enrollment plan that aligns with the University's growth targets should be developed, if it has not already been done. Future allocation of new faculty lines or opportunities to reallocate resources because of faculty resignations or retirements should be part of a larger human resources plan for the College. Capping the number of majors accepted into programs, while always a challenge, can also be an important tool for strategically managing quality. More is not always a better metric for success and sometimes less can lead to more quality if planned and well managed. Likewise, conditions that are producing under-subscribed majors or that strain the College in supporting service courses should be rigorously addressed each year.

2. Implement a new curricular oversight working group/task force or expand the scope of the existing College's Curriculum Committee.

The APRC applauds the work started on the assessment of whether student learning outcome goals are being achieved throughout the College. Likewise, the APRC supports the College's efforts to review curricular alignment and content relevance in the majors. Given the overall size and scope of the College's course offerings, as well as other unique opportunities related to the College as a resource for our community and region, the APRC suggests the College consider establishing a working group or task force to better coordinate curriculum management and program

coordination. It is possible that the existing College Curriculum Committee might take on this role, but often-routine committee functions tend to usurp tackling larger strategic issues related to managing the impact and outcomes of the entire curriculum.

III. EXTERNAL REVIEWERS COMMENTS

The three external reviewers (Dr. Larry Davis, Dr. David Matty, and Dr. Scott Danielson) developed a comprehensive 59-page report on the College and its Departments. The overall report was positive, but it did have several suggestions and recommendations.

It became apparent early in the review process that the external evaluation team had a different set of expectations about supporting materials required for the review. Upon their arrival on campus, additional evidence was provided where feasible. There also was a persistent gap in the reviewer's expectations about the assessment of student learning and COSE's ability to provide supporting evidence. The review team voiced concern that COSE has not produced enough evidence. However, since the implementation of the new assessment process supported by TracDat just began with the 2012-13 academic year, it was not reasonable to expect detailed reports at the time of the external reviewers visit. There was a similar information gap with the external reviewers understanding the faculty review and leave, rank, and tenure process. Again, what was requested by the reviewers was not part of the SUU program review process.

Despite the shortcoming of the SUU program review process (which will be addressed in future reviews), the College and Department responses to the suggestions and recommendations systematically and clearly addressed the feedback from the external reviewers. As noted, a few points of criticism raised by the external reviewers were a result of the shortcomings of SUU's program review. Other feedback from the external reviewers made sense to the members of the SUU APRC. The College has formulated action plans to be taken to address concerns citied, responsibility has been delegated for following through on the proposed improvements, and time lines, as appropriate, have been assigned to the recommendations.

SUMMARY OF EXTERNAL REVIEWERS SUGGESTIONS & RECOMMENDATIONS

1. Strategic Plan and other missing material

Observation/Recommendation: *"…information organized by the (COSE) strategic plan would have been very helpful to the program team review….in future program review self-studies, such a model (should) be utilized."*

2. Program Learning Objectives and Assessment

a. Recommendation: *All departments in the COSE revisit their assessment plans through additional training develop clearer, more measureable expected learning outcomes, along with a more robust mechanism to assess the achievement of those learning outcomes . . . while program/course improvements are being made, they are in response to advisory boards or other ad hoc stimuli.*

b. Recommendation: *All COSE programs strive toward developing summary data/indicators of student program learning objectives and their attainment, providing a straightforward tool for monitoring assessment indicators.*

3. Relevancy of Programs within COSE

a. Recommendation: *Programs determine which content is critical in each program and focus effort on making sure that critical content is attained by students.*

b. Recommendation: *Program faculty and administrators ensure that program curricula allow differentiation from regional competitors so they can be effectively marketed.*

c. Recommendation: *COSE should investigate the possibility of developing more interdisciplinary programs or programmatic tracks to allow students to gain expertise beyond their major, insuring marketability and future student success.*

4. Identifying Peer Institutions

a. Recommendation: "*…the College of Science and Engineering (COSE) identify two to three peer or aspirational peer programs (departments), from among the list of SUU's peer institution if possible, to establish specific benchmarks for assessing program strengths and weaknesses."*

b. Recommendation: "*Based on the program reviews provided by COSE, only the Department of Nursing investigates comparative data based on the National Council Licensure Examination for Registered Nurses (NCLEX-RN®)."*

5. Gerald R. Sherratt Library

a. Recommendation: "…*COSE establish a library committee, with representatives from the various departments, to periodically meet with the library staff to address immediate and future issues…"*

b. Recommendation: "…*does the allocation of library funds for ACS certification constitute an undue burden?"*

6. Defining Scholarship and Relevant Scholarly Activities

a. Recommendation: *The COSE leadership needs to create a college level promotion and tenure document that provides college level definitions with specific examples, to be used to refine department/program scholarly requirements and ensure expectation transparency.*

b. Recommendation: *The department may want to consider formalizing the process of providing data as part of their annual departmental reviews, as well as for future program reviews.* [This recommendation was in reference to exit surveys.]

7. Professional Development and its Funding

Recommendation: *The College or Institution considers funding individuals or teams to participate in education related professional development opportunities.*

8. Experiential Learning Opportunity

Recommendation: *COSE faculty treat the EDGE as an exciting challenge by proposing partnerships and by developing/investigating ways to engage students in EDGE activities related to specific college programs and programs in other colleges.*

SUMMARY OF RESPONSES BY THE COLLEGE OF SCIENCE & ENGINEERING TO EXTERNAL REVIEW

1. Strategic Plan and other missing material

Response: The format of all constituent self-study reports comprising the initial program review document closely followed the instructions of Utah State Board of Regents Policy R411 and SUU Policy 6.41. Perhaps 6.41 should be revised to be more inclusive.

Action: Some of these materials were provided during the reviewers' site visit and are included in the several due responses (e.g. the COSE strategic plan). Other items (comparison with peer institutions) take more time and have been delegated to Department due responses.

2. Program Learning Objectives and Assessment

a. Response: Systematic and cyclical assessment of Student Learning Outcomes began Spring 2012 for the departments of Ag/Nutrition, Biology, ETCM, Math, Nursing, and PSCI. It should be noted that the ABET accredited departments of CSIS and IE were described by the reviewers as "*more comprehensive in their process and mature in their implementation of the process.*" These two departments have made numerous curriculum improvements based on assessment data over the last six years, and serve as a model for the other departments.

Action: Assessment training, data collection, curriculum adjustments, and follow-up assessment will be ongoing for the foreseeable future. Individual departments will analyze assessment data, make curriculum adjustments and follow-up at the end of every semester.

b. Response: COSE will facilitate those discussions and assist individual programs in fine-tuning assessment plans and in closing the assessment loop through continuous improvement.

Action: Through regular and consistent effort and attention, COSE will assist departments who have identified critical content in fine-tuning their assessment effort.

c. Response: A summary report was written yearly when SUU used a 5-column (then 6-column) report. As the College and University changed to the new assessment system and format in the past year, no data was requested and therefore no formal reports were developed.

Action: Create a summary of the results of the exit survey completed by program graduates and include this information in all future program review documentation.

3. Relevancy of Programs within COSE

a. Response: With the recent establishment of Dixie State University, there will be greater need to provide distinctive programs that not only rely on the strength of the College's curriculum but that are academically distinctive, robust, and responsive to employer demand. The College is committed to utilizing available resources, faculty expertise, external advisory boards, and focus groups to modify curricula and ensure distinctiveness.

Action: Those programs within the College who do not already use an external advisory board will investigate the feasibility of regular input from such a body. Program faculty will critically assess current curricula and incorporate feedback from external advisory groups.

b. Response: There have been numerous significant attempts at interdisciplinary offerings within the COSE that bear consideration. There are successful interdisciplinary offerings operating in the COSE; for example, the Bachelors of Interdisciplinary Studies (BIS) in Geographic Information Systems and the BIS in Agriculture.

Action: COSE administration will encourage departments to consider new interdisciplinary programs they are comfortable owning and promoting.

4. Identifying Peer Institutions

a. Response: This is an excellent suggestion and has been overlooked by COSE up to this point.

Action: Departments will each select a similar program and solicit comparative data from one of the SUU designated peer institutions. Specific plans are outlined in the several due responses.

b. Response: During their campus visit, the reviewers were shown standardized exam scores for Biology, Chemistry, Computer Science, Integrated Engineering, and Mathematics. Those departments have included such data in their respective due responses.

Action: N/A

5. Gerald R. Sherratt Library

a. Response: SUU already has a University Library Committee established for this purpose. The COSE representative on this committee is Assistant Professor of Chemistry, Radhika Nair.

Action: N/A

b. Response: PSCI Chair Redd responds that ACS certification is indeed a substantial advantage to Chemistry graduates, furthermore the library expense associated with such certification (specific journal subscriptions) is borne by the Sherratt Library and not COSE.

Action: It has been determined the access already exists and no further action is needed.

6. Defining Scholarship and Relevant Scholarly Activities

a. Response: SUU policy on faculty evaluation places primacy in determining faculty scholarly expectation at the department/program level. In addition, there may be two reasons for the perceived lack of clarity in scholarly expectation within the programs of the College. One is that there are numerous new faculty members who are not acquainted with department standards of performance, not because they do not exist but because they have not been communicated. The other issue has to do with some ambiguity in SUU Policy 6.1, "Faculty Evaluation, Promotion and Tenure" regarding the responsibilities of Non-Tenure Track faculty.

Action: The COSE leadership (Dean's office and chairs) will discuss the possibility of creating a college-wide set of standards to assist departments in establishing greater transparency in scholarly expectation.

7. Professional Development and its Funding

a. Response: There are actually several available sources to fund faculty professional development and SUU provides base budget travel funding for faculty members. The SUU Faculty Center provides funding for professional development activities through the Faculty Development Support Fund (FDSF). The Institution is the annual recipient of Perkins funds to support Career and Technical Education (CTE) initiatives.

Action: A discussion will take place between the Dean and the director of Perkins funds and the recipients of Engineering and Computer Science Initiative funds to encourage greater consideration for education related faculty development activities. The Department Chairs' Council will discuss the possibility of broadening the criteria for applying to the FSSF to include education-related professional development opportunities. The COSE will provide support for at least one education-related faculty development opportunity out of its appropriated budget each semester.

(See next page for COSE plans to address recommendations)

IV. COSE Program Review Department Action Timelines

These table contains a summary of proposed actions listed in the Departmental due responses to Program Review. (See individual Department Response documents for more complete details.)

Yellow cells indicate no specific timeline date was given ("ongoing" seems to be the common response)

Green cells indicate the actual completion of the proposed action.

Greyed-out cells indicate that the issue is not relevant to the given department.

	Identify peer depts for comparison	Physical space issues	Curriculum issues I	Curriculum issues II
AGNS	May 2103	Storage space for Ag materials; timeline not specified	Determine demand for an Ag Ed program; May 2013)	Investigate new Biochem course for NFS majors; timeline not specified
BIOL	June 2013		Find ways to reduce bottleneck issues in GE courses; March 2013	Reduce the several emphases to Biology and Biology Education; March 2013
CSIS	timeline not specified		Find ways to reduce FTE loads in CSIS 1000; timeline not specified	Evaluate CSIS curriculum; timeline not specified (however, two new courses added in 2012-3)
ETCM	Fall 2013 (after Majors Meeting)	Utilize TH 106 for CM courses and projects; May 2013	CM program; March 2013	
IE	April 2013	Re-organize lab space in TH 011/012; May 2013)	Investigate reconfiguration of APE; Fall 2013 (after Majors Meeting)	Possible revision of math component for IE; timeline not specified
MATH	Fall 2013 (after Majors Meeting)		Advise students (especially Actuarial majors) about appropriate minors; no timeline specified	Ensure uniform rigor in prerequisite courses, compare with other USHE institutions; Fall 2013 (after Majors Meeting)
NURS	Prior to next self-study		Install faculty advisor(s) to follow up on EDGE requirements for majors; Jan 2013	
PSCI	Fall 2013 (after Majors Meeting)	Look for more space to devote to undergraduate research and EDGE projects; timeline not specified	Investigate new Biochem course for NFS majors; timeline not specified	

	Assessment issues I	Assessment issues II	LRT, Scholarship, EP, etc.	Program enrollment issues	Website issues	Evaluate current partnerships with other COSE departments
AGNS	Look for standardized, normed test; timeline not specified	Create summary of and utilize exit survey data; May 2013	Revise Department LRT document and submit to Dean for approval; May 2013			Examine cooperation with Biology, Outdoor Rec, Business, etc; May 2013
BIOL	Analyze and use data from ETS Major Field Exam (including remediation for poor results); Fall 2013	Create summary of and utilize exit survey data; May 2013	Revise Department LRT document and submit to Dean for approval; timeline not specified		Include scholarship, grant and undergrad research activities on the Dept website; June 2013	
CSIS	Keep TracDat data current and use it to produce summary reports; ongoing		Revise Department LRT document and submit to Dean for approval; timeline not specified	Tout Dept strengths vs similar USHE programs; timeline not specified	Modify website for recruitment and fix ABET logo; mostly done	
ETCM	Keep TracDat data current and use it to produce summary reports; ongoing		Educate faculty about EDGE and other research opportunites; March 2013	Track and analyze lack of retention, identify reasons; timeline not specified	Include Borisova's photo (done), update project and CM pages; timeline not specified	
IE	Keep TracDat data current and use it to produce summary reports; ongoing		2011-2012 academic year	Review recruitment and especially retention issues; May 2013	Modify website for recruitment and fix ABET logo; May 2013	
MATH	Keep TracDat data current and use it to produce summary reports; ongoing	Address use of ETS Major Field Exam for assessment; May 2013	Revise Department LRT document and submit to Dean for approval; timeline not specified	Track progress of majors towards graduation; timeline not specified		
NURS	Keep TracDat data current and use it to produce summary reports; ongoing	Collect and present comparative data from EBI, employers, Advisory Board; prior to next self-study	Revise Department LRT document and submit to Dean for approval; May 2013			
PSCI	Keep TracDat data current and use it to produce summary reports; ongoing		Revise Department LRT document and submit to Dean for approval; timeline not specified			

V. Academic Program Review Committee (APRC) Members 2012-13

Thank you to the members of the APRC for their input and participation in the review process.

COMMITTEE MEMBER NAME	APRC MEMBER AFFILIATION	COSE Prg Review ASSIGNMENTS
Barney, Steve	Fac Senate	Nursing
Bradshaw, Keith	CPVA	Engineering, Technology & Construction Management
Brown, Vik	Library	Physical Science
Harvell, Lindsey	HSS	Agriculture & Nutrition Science
Haslem, Bruce	Business	Math
McCoy, James	Education	Integrated Engineering
Warner, Janet	COSE	Biology
Weingartner, Andreas	At-Large	Computer Science & Information Systems
Byrnes, Bill	Academic Affairs	
Reiner, Christian	Academic Affairs	
Rayburn, Bonny	Academic Affairs	

END OF EXECUTIVE SUMMARY

PROGRAM REVIEW OF THE COLLEGE

OVERVIEW OF THE COLLEGE

As of July 1, 2011, the former College of Science (COS) and College of Computing, Integrated Engineering and Technology (CIET) merged to form the College of Science and Engineering. A very generous endowment from the estate of alumnus Walter Maxwell Gibson was received during the 2011-12 academic year. This donation constitutes the largest gift in Southern Utah University's history. The endowment proceeds are wholly dedicated for use within the newly named Walter Maxwell Gibson College of Science and Engineering (COSE).

The College currently houses 8 departments supporting 13 baccalaureate programs (that include twice as many emphases) along with numerous minors, associate degrees and certificates. All of the STEM disciplines at SUU are contained within COSE. As of Fall 2012 more than 1900 students have declared majors within COSE. This constitutes about one fourth of all SUU students. COSE is also the largest college at SUU with respect to full-time faculty: there are 87.

The remainder of this section is devoted to College-wide goals, accomplishments, resources, activities, and raw data. Self-study reports for individual departments and their respective programs in the R411 format follow.

MISSION/VISION/PHILOSOPHY/GOALS

THE COLLEGE'S MISSION

The Walter Maxwell Gibson College of Science and Engineering is made up of academic programs in agriculture, biology, chemistry, computer science, engineering and technology, geography, geology, information systems, mathematics, nursing, nutrition, and interdisciplinary studies. These programs are housed in the departments of Agriculture and Nutrition Science, Biology, Integrated Engineering, Mathematics, Nursing, Physical Science and the School of Computing and Technology. The College operates or participates in the operation of several special learning environments for students that include a Keck Foundation sponsored undergraduate research lab, an astronomical observatory, a GIS lab, a certified water lab, a scanning electron microscopy lab, the Garth & Jerri Frehner Natural History Museum, the Cedar Mountain Science Center, the Valley Farm, a Computer Forensic Lab, a Networking and Security Lab, the James E. Bowns Herbarium and the Mountain Ranch. The College serves as the center of learning for the undergraduate STEM programs offered at SUU. It also serves as the resource center of scientific knowledge and expertise for southern Utah. The purpose of the Walter Maxwell Gibson College of Science and Engineering is to provide comprehensive classroom and experiential learning that emphasizes critical thinking, problem solving, decision-making, and communication in STEM. The faculty is committed to providing high-quality education, individual guidance and assistance to students, and helping them grow intellectually, professionally and personally while pursuing their academic goals.

THE COLLEGE'S VISION

The Walter Maxwell Gibson College of Science and Engineering will be nationally recognized as a premier institution of learning known for enabling its students to honor thought and accomplishment in all of its finest forms, achieve excellence in their chosen field, and create positive change in the world. Graduates will demonstrate high levels of academic achievement through admission to graduate and professional schools and/or gainful employment. Faculty will model engaged pedagogy and scholarly activities, thereby increasing the value of students' degrees.

The College's Philosophy

The values and beliefs that guide the Walter Maxwell Gibson College of Science and Engineering in all activities and serve as a basic foundation are:

I. Undergraduate education has highest priority.
II. Well-planned and executed, pedagogically sound classroom, laboratory, and outdoor educational activities are expected.
III. Faculty will model life-long learning by being professionally active and productive scholars in their fields.

Assessment and External Accreditation

Assessment of Student Learning

The programs of Integrated Engineering, Computer Science, and Information Systems have been accredited by ABET since 2005 and 2009, respectively. One requirement for this specialized accreditation is the establishment of Student Learning Outcomes (SLOs) at the program level, cyclical assessment of these SLOs, and curriculum adjustment in the event of unsatisfactory assessment results. Typically ABET requires this setup and three consecutive assessment cycles prior to their sending an accreditation team for a site visit (a reason for this is discussed in the next subsection).

Southern Utah University created institutional learning outcomes in Spring 2011 and mandated that departments/programs do the same. COSE formed a Program Review Committee in Fall 2011 to help departments draft their own SLOs (and eventually write the self-study reports that appear below). The ABET model of assessment and rubrics was eventually adopted by most of these departments. Program level SLOs were developed in Fall 2011 and the assessment cycle began on a COSE-wide basis starting Spring 2012. During the same time frame, a specialized software package, *TracDat* by Nuventive, was purchased by SUU for the expressed purpose of facilitating and recording the assessment processes at all levels (programs, departments, colleges, and administrative/support units). This package was not configured for COSE use until Fall 2012. As of this printing, all 2011-12 assessment data and evaluations of such are recorded in *TracDat*; indeed several of the department reports below use custom-generated output tables as snapshots of *TracDat* sources.

Closing the Assessment Loop

The title of this heading refers to fixing flaws discovered by the assessment process, performing follow-up assessments during a subsequent cycle to determine if the proposed fixes were effective, and the documentation of the entire procedure. The College as a whole has finished two semesters of assessment cycles of SLOs by the end of Fall 2012. Most SLO assessment occurs at the course level, where specific course objectives tied to the broader SLOs are assessed via exams, homework, and student projects. Many of these courses are offered annually rather than every semester. Consequently for these courses, two consecutive semesters of assessment data does not permit the reassessment of those objectives corresponding to curriculum adjustments following poor student performance (this is why ABET requires *three* semesters of assessment data prior to accreditation requests). Individual department/program self-study reports below list their respective curriculum changes due to assessment of SLOs (among various other reasons). However, there are only a few documentations of follow-up reports subsequent to curriculum change (in particular, the CSIS Department has some of these since they started the assessment process in 2008 because of their ABET accreditation).

Specialized Accreditation

As mentioned earlier, the three programs Integrated Engineering, Computer Science, and Information Systems are accredited by ABET. The Engineering Technology program requested ABET accreditation in January 2012, submitted

a self-study report to ABET in June, and received a site visit by an ABET team in October. The preliminary report of this team found a couple of discrepancies (that were easily fixed) and was positive overall. It is expected that the Engineering Technology program will be accredited following the ABET summer meeting of August 2013.
The Nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE). This Commission has its own established SLOs that the SUU Nursing program has adopted, however, CCNE has not (yet) mandated formal assessment of these SLOs. The SUU Nursing program instituted their assessment procedures starting Spring 2012 as described above.
Although not a formal accrediting body, the American Chemical Society (ACS) has a Committee on Professional Training which establishes guidelines and procedures for approval of bachelor's degrees in chemistry programs. The COSE Chemistry Professional Emphasis degree is formally endorsed by the ACS.
There are Teacher Education emphases for the COSE programs of Biology, Chemistry, Mathematics, and Physical Science. All of these degrees (upon successful completion of course work, student teaching, and respective Praxis II exams) result in secondary licensure by the Utah State Office of Education and are accredited by the Teacher Education Accreditation Council (TEAC).

THE COLLEGE'S GOALS AND OBJECTIVES WITH 2011-12 ASSESSMENTS

The College has a list of Program Goals that are not directly related to Student Learning Outcomes. The observable, measurable goals of COSE and the objectives by which they will be accomplished are:

1. GOAL: PREPARE STUDENTS FOR GRADUATE AND PROFESSIONAL SCHOOLS.

OBJECTIVE: offer coursework and active learning experiences appropriate to the prerequisites of specified post-baccalaureate programs.
ASSESSMENT: tabulate student reportage on application/acceptance to post-baccalaureate programs.
For this academic year, note the following:

- 95% acceptance to medical schools
- 89% acceptance to dental schools
- 80% acceptance to pharmacy schools
- 75% acceptance to physical therapy programs
- 90% acceptance to PA schools

2. GOAL: PREPARE STUDENTS FOR CAREERS USING THEIR BACCALAUREATE DEGREE.

OBJECTIVE: offer coursework appropriate for employment related to departmental majors or minors.
ASSESSMENT: require standardized, nationally-normed tests where appropriate and student reportage of employment at baccalaureate level.
For 2011-12, the following were reported:

- Educational Testing Service (ETS) Major Field Exams
  - Chemistry–86th percentile student average, 98th percentile institutional/program average
  - Biology–50th percentile student average
  - Mathematics–71st percentile student average
  - Math Ed–50th percentile student average
- American Chemical Society (ACS) end of course exams
  - Average for all Summer 2011 sections: 70th percentile
  - Average for all Fall 2011 sections: 63rd percentile
  - Average for all Spring 2012 sections: 69th percentile

- NCLEX national standardized nursing licensure exam
  - 100% pass rate for Fall 2011
  - 100% pass rate for Spring 2012

3. GOAL: DEVELOP SKILLS IN ANALYSIS, CRITICAL THINKING, PROBLEM SOLVING, DECISION-MAKING AND COMMUNICATION.

OBJECTIVE: offer well-planned and pedagogically sound learning exercises in courses and in research projects.
ASSESSMENT: annually examine and evaluate course syllabi, course materials, and student research experiences.
For 2011-12

- Each syllabus was examined at the department chair level.
- Student research experiences were evaluated during local presentation of the results, including the 4th Annual COSE Research Symposium.

4. GOAL: PROVIDE HANDS-ON EXPERIENCES WITH STATE-OF-THE-ART SCIENTIFIC INSTRUMENTS AND EQUIPMENT

OBJECTIVE: provide coursework and research opportunities that include opportunities to use equipment.
ASSESSMENT: inventory current, and continuously update need for future, equipment.
In 2011-12 COSE acquired:

- ICPMS (mass spectrometer)
- GCMS (mass spectrometer)
- a single crystal X-ray diffractometer
- circular dichroism instrument
- an HD medical camera
- a microwave reactor
- a solvent purifier
- a plasma cutter
- a microbiological incubator
- a glucose monitor,
- a biochemical analyzer
- a benchtop shaker
- a gradient cycler, a polarimeter
- three smartboards
- a plasma cutter
- a laser table (for precision milling)

5. GOAL: PROVIDE HIGHLY SKILLED TEACHERS AND PROFESSORS THAT ARE ALSO RESPECTED SCHOLARS.

OBJECTIVE: recruiting Ph.D. - prepared faculty, reward good teaching, encourage faculty to conduct funded research and publish results, and encourage participation in professional organizations.
ASSESSMENT: annually evaluate faculty performances, teaching, scholarship, service, and collegiality using criteria and performance standards developed by departments and the college.

- All faculty members were formally evaluated by at least their chairs, peers, and the dean during 2011-12.
- All new faculty hires are highly qualified and hold terminal degrees.

6. GOAL: provide special, unique learning opportunities.
OBJECTIVE: utilize the Valley Farm, Mountain Ranch, Cedar Mountain Science Center, SUU's Ashcroft Observatory, Water Lab, the Southern Utah Natural History Museum, the GIS lab, the molecular genetics and ecology labs, the casting/welding lab.
ASSESSMENT: annually evaluate the use of our specialized learning environments.

- The Valley Farm continues to support the SUU agriculture program.
- The Mountain Ranch and its uses are being reviewed and a utilization plan drafted in cooperation with SUU Outdoor Recreation and the Office of Regional Services.
- Cedar Mountain Science Camp served over 387 students from 62 cities/towns in nine separate camps and continues to have many more applicants than it can accommodate.
- The Ashcroft observatory is utilized as a teaching laboratory each semester and continues to hold community nights each Monday.
- The Water Lab continues to provide a community resource and employment and hands-on experience to SUU chemistry students.
- The Geographic Information Systems (GIS) lab is supporting coursework and completing contract work for local, state and federal agencies.
- The molecular genetics and ecology labs provide undergraduate research support
- The Casting/Welding Lab allows the physical realization of design projects for engineering and technology students.

7. GOAL: MAXIMIZE THE UTILIZATION OF UNIQUE COMMUNITY AND GEOGRAPHIC RESOURCES
OBJECTIVE: foster and strengthen community and agency relationships.
ASSESSMENT: annually evaluate community and agency interaction.

- Faculty members from the COSE continue to serve on the cooperating association boards of Zion and Bryce Canyon national parks.
- COSE continues to be a partner in the Intergovernmental Internship Cooperative (IIC) effort, which provides internship opportunities for SUU students with public land management agencies.

EXTERNAL GRANTS, ENDOWMENTS, SPECIALIZED STATE FUNDS

Since the year 2001, SUU departments related to Computer Science, Engineering, and Technology have received ongoing earmarked funds from the state of Utah (the so-called Engineering Initiative). During 2008-12 the total annual amounts have varied between $400,000 and $500,000. Between half and three-fourths of these funds are devoted to salaries/benefits in order to attract high quality faculty. Most of the remaining funds have been used for purchase of capital equipment and specialized faculty training (*e.g.* forensic computer science training).
The US Department of Education sponsors the Perkins Career and Technical Education (CTE) program. Southern Utah University participates in CTE with monies distributed annually to two-year programs in Agriculture, Computer Science, Construction, Engineering Technology, Geographic Information Systems, Family and Consumer Education, Criminal Justice. All but the latter two are administered by COSE. Annual amounts received over the last five years have ranged between $131,000 and $252,000. The funds are used for capital equipment, software licenses, travel to relevant conferences and student competitions, and stipend for the SUU CTE director.
In addition, during the period 2006-11, departments and faculty currently housed in COSE have solicited and received more than $700,000 in grants from numerous agencies and for numerous purposes:

- National Forest Service (research and agriculture projects)
- National Park Service (research projects)
- National Science Foundation (various research and education projects)

- Bureau of Land Management (native plant studies)
- Technology Intensive Concurrent Enrollment (education)
- Utah Science Technology and Research initiative (small business technology outreach)

The 2011-12 academic year illustrated the old adage that good things come in triples. The estate of alumnus Walter Maxwell Gibson provided an endowment to the newly named Walter Maxwell Gibson College of Science and Engineering in the amount of $4,000,000. In addition, the College received $1,500,000 from the ALSAM Foundation targeting scholarships and undergraduate research. Finally, COSE received a $580,000 National Science Foundation grant to fund scholarships for the STEM disciplines (in particular, Biology, Engineering, Geology, and Mathematics) over a five year period.

PUBLIC OUTREACH

INTERACTION AT THE K-12 LEVEL

The College maintains a commitment to K-12 as well as higher education. The following list shows recurring educational programs sponsored by COSE, *et al*:

- Cedar Mountain Science Camp (annual summer outdoor education experience)
- Chemistry Olympics (annual education contest aimed at high school teams)
- Engineering Week at SUU(occurs every February with competitions and banquet)
- High School Interactive Experience (hands-on interactive events for high schoolers)
- Science Fair (annual competition with junior and senior high categories)
- State Math Contest (the southern region of this statewide event is held at SUU)
- Technology Fair (annual event with competitions, exhibits, and the cardboard boat race)
- Voyager (a mobile science lab devoted to K-6 schools throughout southern Utah)
- Science Olympiad (a state/national science competition)

IRON COUNTY SCHOOLS

The College maintains a strong partnership with the Iron County School District (ICSD). The Southern Utah Center for Computing, Engineering, and Science Students (SUCCESS) Academy is an ICSD charter school located on the SUU campus. This year marks the eighth year of the partnership between SUCCESS Academy and COSE. Of the 79 SUCCESS graduates from May 2012, 70 students earned SUU Associate of Science degrees while completing their high school diplomas. The SUCCESS Academy 10th and 12th grade math teams were recognized as the Statewide Team Math Champions. School wide SUCCESS Academy at SUU earned 2311 concurrent enrollment credits from Southern Utah University and paid over $100,000 dollars in tuition costs for Senior participation in on-campus courses. Over 85% of the graduating class will attend SUU to complete their Bachelor of Science degree.
Another ICSD partnership with SUU is found at North Elementary School in Cedar City. Cedar North Elementary is Iron County's first STEAM (Science, Technology, Engineering, Arts, and Mathematics) designated school. SUU places pre-service teachers (college students who are studying to become certified teachers) in North Elementary classrooms to assist teachers and students. North's teachers and students will also gain access to COSE professors who are experts in areas such as biology, astronomy, physics, math and chemistry.

THE GENERAL PUBLIC

The College offers monthly seminars of interest to the general public during Spring and Fall semesters under the auspices of COSE's CARAT (Center for Applied Research and Advanced Technology). Speakers and topics range from NASA rocket science to dental implant technology.

The Garth and Jerri Frehner Museum of Natural History was made possible with the support of Garth and Jerri Frehner. The Museum is located in the new Science Addition building and provides students, staff, and faculty as well as the public at large with the opportunity to learn about the natural world. Admission to the museum is free.
The Ashcroft Observatory is located west of campus and maintained by the Department of Physical Science. Besides being open to the public on Monday evenings with staffed volunteers, the Observatory hosts periodic public star parties.
The Environmental Water Laboratory is also maintained by the Department of Physical Science. The Water Lab analyzes water samples (for a fee), testing for chemical impurities and biological contamination.
The SUU Farm in conjunction with staff from Agriculture and Biology offers gardening advice along with free community garden plots during the growing season.
Nursing and Nutrition students and staff provide numerous public health clinics throughout the region, including flu shots, BMI analysis, vision and hearing tests.

Area Economic Development

In conjunction with grants from the Utah Science Technology and Research initiative (USTAR) listed above, students and faculty from COSE partnered with local business to create technological innovations:

- TouchMD (cross-platform patient education software system)
- IDT (radio frequency identification tags for Union Pacific Railroad cars)
- Assistive Drive System (recovery/storage of kinetic energy from braking vehicles)
- Walk-N-Roll (new idea for safer and more useful walker for the elderly)

Capstone projects for students have included website design/creation for several local area businesses, integration of database and web front-end for an intranet belonging to Coldwell-Banker, and statistical analysis of electrode failure for WECCO/AMPCO.

DATA FOR COLLEGE OF SCIENCE & ENGINEERING 7-YEAR PROGRAM REVIEW

The data in the tables below were compiled by the SUU Office Institutional Research and Assessment for the period 2006-10. Since COSE only came into existence in July 2011, the data have been combined from the constituent Colleges of CIET and Science, respectively.

ABBREVIATIONS:

Abbreviation	Meaning
ASNS	Agriculture & Nutrition Science
BIOL	Biology
CSIS	Computer Science & Information Systems
ETCM	Engineering Technology & Construction Management
IE	Integrated Engineering
MSFS	Masters of Forensic Science
MATH	Mathematics
NURS	Nursing
PSCI	Physical Science
COSE	College of Science & Engineering

TABLE 1: ANNUALIZED FTE GENERATED BY COSE PROGRAMS

Table 1: Annualized FTE Generated by COSE Programs (Summer EOT, Fall & Spring 3rd week; budget-related only)

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
ASNS	155.47	160.37	162.02	170.44	170.20
BIOL	336.00	367.42	366.00	419.67	462.71
CSIS	175.30	184.07	210.02	231.80	241.13
ETCM	77.33	69.03	75.23	84.40	88.34
IE	41.77	45.00	46.43	48.30	46.73
MSFS	9.50	20.10	12.00	1.15	0.35
MATH	464.53	521.90	519.20	576.63	590.74
NURS	145.67	142.93	131.53	111.13	106.67
PSCI	351.15	365.83	373.80	419.22	452.39
COLLEGE TOTAL	1756.72	1876.65	1896.24	2062.74	2159.25

Table 2: Annualized FTE Generated by College of Science & Engineering as % of SUU Total

Table 2: Annualized FTE Generated by College of Science & Engineering as % of SUU Total (Summer EOT, Fall & Spring 3rd week; budget-related only)

	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
COSE % of SUU Total FTE	31.7%	31.7%	31.0%	31.7%	32.6%

Table 3: Annualized Faculty FTE by COSE Programs

Table 3: Annualized Faculty FTE by COSE Programs (Data from Cost Study)

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
ASNS	7.17	6.86	7.26	7.13	7.44
BIOL	13.93	15.26	15.00	13.62	15.72
CSIS	9.52	10.38	10.00	11.24	10.37
ETCM	6.55	5.58	6.97	7.80	8.36
IE	3.53	4.88	3.10	3.99	5.35
MSFS	0.14	2.36	1.66	0.00	0.00
MATH	15.98	16.09	16.67	15.40	16.67
NURS	12.61	12.62	10.27	10.39	10.08
PSCI	17.66	17.99	20.47	18.20	19.54
COLLEGE TOTAL	87.10	92.01	91.39	87.76	93.53

Table 4: Annualized Faculty FTE for College of Science & Engineering as % of SUU Total

Table 4: Annualized Faculty FTE for College of Science & Engineering as % of SUU Total (Based on Cost Study)

	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
COSE % of SUU Total Faculty FTE	29.1%	28.3%	27.4%	26.4%	26.9%

TABLE 5: STUDENT/FACULTY RATIO

Table 5: Student/Faculty Ratio (Generated Annualized FTE divided by Annualized Faculty FTE)

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
ASNS	21.7	23.4	22.3	23.9	22.9
BIOL	24.1	24.1	24.4	30.8	29.4
CSIS	18.4	17.7	21.0	20.6	23.2
ETCM	11.8	12.4	10.8	10.8	10.6
IE	11.8	9.2	15.0	12.1	8.7
MSFS	69.0	8.5	7.2	0.00	0.00
MATH	29.1	32.4	31.1	37.4	35.4
NURS	11.5	11.3	12.8	10.7	10.6
PSCI	19.9	20.3	18.3	23.0	23.1
COLLEGE TOTAL	20.2	20.4	20.7	23.5	23.1
SUU TOTAL	18.5	18.2	18.4	19.6	19.0

TABLE 6: AVERAGE ANNUAL UNDERGRADUATE CLASS SIZE FOR LECTURES

Table 6: Average Annual Undergraduate Class Size for Lectures (Summer EOT, Fall and Spring 3rd week; budget-related only; excluding online classes; undergraduate classes only)

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
ASNS	25.1	26.8	28.2	29.8	33.5
BIOL	38.7	38.9	39.1	49.7	50.0
CSIS	21.5	21.7	22.9	24.4	24.8
ETCM	16.1	14.3	16.3	18.7	18.4
IE	17.8	18.9	19.8	18.5	15.5
MATH	29.2	29.0	28.9	32.9	33.5
NURS	29.0	28.0	26.1	22.2	21.4
PSCI	25.8	24.8	23.6	28.6	30.1
COLLEGE TOTAL	26.8	27.0	27.2	30.4	30.9
SUU TOTAL	26.3	26.7	27.1	28.9	29.2

TABLE 7: AVERAGE ANNUAL UNDERGRADUATE CLASS SIZE FOR LABS

Table 7: Average Annual Undergraduate Class Size for Labs (Summer EOT, Fall & Spring 3rd week; budget-related only; excluding online labs; undergraduate labs only)

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
ASNS	14.6	14.5	17.1	17.4	15.0
BIOL	20.6	18.5	18.5	21.4	22.4
CSIS	1.5		1.0	1.0	
ETCM		13.6	10.9	11.9	10.6
IE	9.4	13.4	13.7	9.3	7.0
NURS		5.0	11.8	10.5	10.5
PSCI	16.0	16.2	17.2	18.5	18.9
COLLEGE TOTAL	17.0	16.8	16.8	18.0	18.4
SUU TOTAL	14.4	15.7	17.4	17.9	18.0

TABLE 8: MASTER'S DEGREES AWARDED IN COLLEGE OF SCIENCE & ENGINEERING

Table 8: Master's Degrees Awarded in College of Science & Engineering

Department	Year (July 1 – June 30)				
	2006-7	2007-8	2008-9	2009-10	2010-11
COSE TOTAL	0	14	16	4	2
COSE % of SUU Total	0.0%	12.5%	5.6%	1.1%	0.5%

TABLE 9: BACHELOR'S DEGREES AWARDED

Table 9: Bachelor's Degrees Awarded (based on students' first major)

Department	Year (July 1 – June 30)					
	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12
ASNS	15	17	25	25	33	36
BIOL	82	57	85	64	73	66
CSIS	11	4	10	5	13	15
ETCM	33	25	28	28	25	33
IE	4	10	10	14	12	3
MATH	10	8	9	12	18	11
NURS	76	78	73	77	69	66
PSCI	17	16	20	9	7	15
COSE TOTAL	248	215	260	234	250	245

TABLE 10: BACHELOR'S DEGREES AWARDED IN COLLEGE OF SCIENCE & ENGINEERING AS % OF SUU TOTAL

Table 10: Bachelor's Degrees Awarded in College of Science & Engineering as % of SUU Total

(based on students' first major)

Department	Year (July 1 – June 30)				
	2006-7	2007-8	2008-9	2009-10	2010-11
COSE % of SUU Total	28.7%	24.7%	28.8%	25.3%	26.7%

TABLE 11: ASSOCIATE DEGREES AWARDED IN COLLEGE OF SCIENCE & ENGINEERING

Table 11: Associate Degrees Awarded in College of Science & Engineering (based on students' first major)

Department	Year (July 1 – June 30)					
	2006-7	2007-8	2008-9	2009-10	2010-11	2011-2012
COSE TOTAL	10	5	9	14	15	23
COSE % of SUU Total	6.0%	2.4%	2.8%	4.4%	4.2%	6.5%

TABLE 12: CERTIFICATES AWARDED IN COLLEGE OF SCIENCE & ENGINEERING

Table 12: Certificates Awarded in College of Science & Engineering

Department	Year (July 1 – June 30)				
	2006-7	2007-8	2008-9	2009-10	2010-11
COSE TOTAL	10	3	8	3	15
COSE % of SUU Total	100.0%	60.0%	61.5%	23.1%	75.0%

TABLE13: MAJORS BY DEPARTMENT – DUPLICATED HEADCOUNT

Table13: Majors by Department – Duplicated Headcount (Double majors count twice)

Department	Fall Semester 3rd Week					
	2007	2008	2009	2010	2011	2012
ASNS	116	133	146	156	180	217
BIOL	752	731	750	782	706	715
CSIS	95	99	110	128	136	151
ETCM	189	184	189	188	171	179
IE	124	111	125	120	122	103
MSFS	40	24	1	2	0	N/A
MATH	72	73	90	94	79	99
NURS	476	437	440	432	432	419
PSCI	131	158	160	182	229	209
COSE Total	1995	1950	2011	2084	2055	2092

TABLE 14: DISTRIBUTION OF COLLEGE OF SCIENCE & ENGINEERING MAJORS AS % OF SUU TOTAL

Table 14: Distribution of College of Science & Engineering Majors as % of SUU Total

(undergraduate and graduate students)

	Fall Semester 3rd Week				
	2006	2007	2008	2009	2010
COSE % of SUU Total	28.8%	26.6%	26.0%	26.4%	26.7%

TABLE 15: STUDENT DEMOGRAPHICS-GENDER– DUPLICATED HEADCOUNT

Table 15: Student Demographics-Gender– Duplicated Headcount (Double majors count twice)

Department	Fall Semester 3rd Week									
	2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M
ASNS	81	35	100	33	101	45	107	49	120	60
BIOL	313	439	329	402	348	402	368	414	304	402
CSIS	16	79	13	86	16	94	19	109	13	123
ETCM	18	171	16	168	25	164	20	168	24	147
IE	17	107	15	96	16	109	19	101	10	112
MSFS	23	17	11	13	0	1	0	2	0	0
MATH	44	28	39	34	52	38	51	43	46	33
NURS	392	84	373	64	374	66	377	55	369	63
PSCI	44	87	59	99	61	99	68	114	82	147
College Total	948	1047	955	995	993	1018	1029	1055	968	1087

TABLE 16: GENDER DISTRIBUTION AS COLLEGE OF SCIENCE & ENGINEERING % OF SUU TOTAL

Table 16: Gender Distribution as College of Science & Engineering % of SUU Total

	Fall Semester 3rd Week									
	2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M
COSE % of SUU Total	23.3%	33.1%	21.4%	30.1%	20.6%	29.0%	21.7 %	29.7%	21.7%	30.2%

Table 17: Student Demographics-Race/Ethnicity– Duplicated Headcount

Table 17: Student Demographics-Race/Ethnicity– Duplicated Headcount (Double majors count twice)

Department	Race/Ethnicity	Fall Semester 3rd Week				
		2007	2008	2009	2010	2011
ASNS	Caucasian	105	122	134	143	160
	Non-Caucasian	10	10	11	13	20
BIOL	Caucasian	665	640	648	657	587
	Non-Caucasian	78	84	97	122	117
CSIS	Caucasian	84	85	91	105	106
	Non-Caucasian	9	14	18	22	29
ETCM	Caucasian	169	165	168	159	133
	Non-Caucasian	16	16	20	27	36
IE	Caucasian	102	100	111	109	110
	Non-Caucasian	18	10	12	8	9
MSFS	Caucasian	38	21	1	2	0
	Non-Caucasian	2	3	0	0	0
MATH	Caucasian	58	62	78	83	68
	Non-Caucasian	12	10	12	10	10
NURS	Caucasian	430	388	380	381	389
	Non-Caucasian	38	38	51	47	43
PSCI	Caucasian	121	137	137	155	193
	Non-Caucasian	7	17	19	21	34
College Total	Caucasian	1772	1720	1748	1794	1746
	Non-Caucasian	190	202	240	270	298

Table 18: Race/Ethnicity Distribution as College of Science & Engineering % of SUU Total

Table 18: Race/Ethnicity Distribution as College of Science & Engineering % of SUU Total

	Race/Ethnicity	Fall Semester 3rd Week				
		2007	2008	2009	2010	2011
COSE % of SUU Total	Caucasian	27.9%	25.4%	23.9%	25.0%	25.2%
	Non-Caucasian	27.1%	24.9%	26.3%	27.0%	28.4%

REPORTS BY DEPARTMENTS

The balance of the material consists of self-study reports arranged by department rather than by program. (The reasons for this are practical: there are only eight departments but 28 total programs at the bachelor degree level. Furthermore, the information in the several required R411 Data Forms is almost exclusively gathered at the department level). Each self-study report conforms to the format below.

- A main body following the Utah State Board of Regents R411 directions, containing
    - Description of Program(s)
    - Data Form
    - Program assessment by reviewers (due February 2013)
    - Institutional response to review findings (due April 2013)
- Further information following SUU Policy 6.41 Appendix A directions, containing
    - Appendix I: mission statement, SLOs, program overview
    - Appendix II: program resources, description of how SLOs are achieved
    - Appendix III: description of the assessment process and its implementation
    - Appendix IV: description of program improvements based on assessment and other factors

There is a discrepancy in dates in these reports. Ostensibly, the program review period is for five years starting in 2006-7. However, the assessment process described previously was started College-wide during the 2011-12 academic year. The College and its departments have elected to furnish some data from the 2011-12 year, especially assessment methodology and outcomes.

AGRICULTURE AND NUTRITION

PROGRAM DESCRIPTION: AGRICULTURE (CIP 01.0000)

Southern Utah University was founded in 1897 as a branch normal school by the Utah state legislature. In 1913 the school was changed to a branch of the Utah State Agriculture College (now Utah State University). The founding of the farms at SUU began with this association. In 1936, SUU was authorized to offer a three-year course in agriculture. Realignment of SUU programs in 1988 allowed students to combine courses in the basic sciences, applied agriculture, and business to earn a Bachelors of Interdisciplinary Science. The program has seen an increase in majors in the past five years and the number of graduates increased fifty percent of the time covered by this report.

Each agriculture student has the opportunity to engage in challenging courses and laboratory experiences. Students are expected to become fully integrated into the university experience and develop an appreciation of education as a lifelong pursuit. Whether the student plans a production or home farm/ranch career, agribusiness, science and technology, or continued education, SUU Agriculture graduates are prepared to demonstrate that they are ready for the challenge of meeting the most basic human needs for food, fiber, and by-products.

Within the interdisciplinary degree, students select an emphasis from the following options:

- Agribusiness
- Animal science
- Plant science
- General agriculture

The program also offers Associate of Applied Science degrees in Equine Studies and Agriculture: Livestock and Farm Management and a minor in agriculture.

DEGREE REQUIREMENTS FOR B.I.S. IN AGRICULTURE

General Education Core

Core course requirements (must take MATH 1050)		16-17 credits
Knowledge areas requirements (must take NFS 1020, CHEM 1210/1215)		16 credits

University Requirements

Experiential education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3920	EER Proposal	1 credit
UNIV 4920	Synthesis and Reflection	1 credit

(continued)

Agriculture Core Requirements (29 credits)

AGSC 1010	Agriculture & Society	3 credits
AGSC 1110	Crop Production	3 credits
AGSC 1115	Crop Production Lab	1 credit
AGSC 1990	Agriculture Leadership	1 credit
AGSC 3020	Agribusiness Management	3 credits
AGSC 3400	Feeding & Nutrition of Livestock…	3 credits
AGSC 3405	Feeding & Nutrition of Livestock…Lab	1 credit
AGSC 3560	Soil Science	3 credits
AGSC 3565	Soil Science Lab	1 credit
AGSC 4990	Agriculture Seminar	1 credit
ACCT 2010	Accounting Principles	3 credits
and		
ENGL 2040	Professional Business Writing	3 credits
or		
COMM 4240	Technical Writing	3 credits

Agribusiness Emphasis (18 credits)

ACCT 2020	Managerial Accounting	3 credits
ACCT 3350	Business Law	3 credits
MKTG 3010	Marketing Principles	3 credits
MGMT 3180	Management & Organizations	3 credits
AGSC 3000-level course (Plant/Animal Mgt)		3 credits
AGSC 3000-level course (Plant/Animal Mgt)		3 credits

Animal Science & Industries Emphasis (17 credits)

AGSC 3150	Animal Breeding	3 credits
AGSC 3500	Animal Reproduction	3 credits
AGSC 3505	Animal Reproduction Lab	1 credit
AGSC 3060	Genetics	3 credits
AGSC 3065	Genetics Lab	1 credit
AGSC 3000-level course (Animal Management)		3 credits

AGSC 3000-level course (Animal Management)		3 credits

Plant Science & Industries Emphasis (18 credits)

AGSC 3030	Forage Crops	3 credits
AGSC 3035	Forage Crops Lab	1 credit
AGSC 3230	Pests & Pest Management	3 credits
AGSC 3235	Pests & Pest Management Lab	1 credit
AGSC3700		
AGSC 3705		
AGSC 3000-level course (Plant Science)		3 credits
AGSC 3000-level course (Plant Science)		3 credits

Natural Resources/Range Management Emphasis (18 credits)

AGSC 3100	Beef Cattle Management	3 credits
AGSC 3250	Sheep Management	3 credits
RANG 3600	Range Management	3 credits
RANG 3605	Range Management Lab	1 credit
RANG 3800	Wildland Plant Identification	3 credits
RANG 3805	Wildland Plant Identification Lab	1 credit
RANG 4200	WIldland Ecology	3 credits
RANG 4400	Wildland Restoration	3 credits
RANG 4405	Wildland Restoration	1 credit

Total Credits for B.I.S. Degree in Agriculture 120 credits

PROGRAM DESCRIPTION: NUTRITION (CIP 19.0504)

Nutrition has been taught at Southern Utah University since its inception in 1897. Over the years, it has been housed in multiple departments and colleges/schools on campus. It currently resides within the College of Science and Engineering in the Agriculture and Nutrition Department. A Bachelor of Science degree in Human Nutrition was first offered at SUU in Fall, 2006. Last spring (2012), the major was bifurcated to include two options: pre-dietetics and pre-allied health to allow students to take classes that best prepare them for their future career goals.

The curriculum during the first two years allows students to explore the general field of human nutrition while completing courses in chemistry, biology, and the social sciences that provide the foundation for the human nutrition major.

The Bachelor of Science Degree in Human Nutrition degree emphasizes the biological and physical sciences and provides students with the background necessary to understand the function and metabolism of nutrients. The program provides an excellent foundation for students considering careers in dietetics, medicine, dentistry, and other health related science professions. Academic requirements for entering medical school, dental school, or allied health professional may be met though this degree. The program is vibrant, strong and enrollment is increasing rapidly. Over the course of the five years included in this report, the number of majors in the Agriculture and Nutrition Department went from 61 to 156; it is now well over 200 and most of that increase has been in the Nutrition program (see R411 Data Table).

A Bachelor of Science in Dietetics accredited by Accreditation Council for Education in Nutrition and Dietetics is on SUU's list of programs to add in the next three to five years. Documentation of the need and potential coursework has been established with the assistance of the accrediting body and directors of other accredited dietetics programs. This program would greatly benefit those students desiring to become Registered Dietitians.

The program is enriched by

- Service learning experiences
- Undergraduate research opportunities
- International service learning opportunities
- Travel abroad opportunities
- A capstone course
- Diversity in teaching/learning methods

DEGREE REQUIREMENTS FOR B.S. IN HUMAN NUTRITION

General Education Core

Core course requirements (must take MATH 1050)	16-17 credits
Knowledge areas requirements (must take NFS 1020, CHEM 1210/1215)	16-17 credits

University Requirements

Experiential education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3920	EER Proposal	1 credit
UNIV 4920	Synthesis and Reflection	1 credit

(continued)

Human Nutrition Core (24 hours)

NFS 1240	Culinary Arts	2 credits
NFS 1241	Culinary Arts Lab	1 credit
NFS 2020	Nutrition in the Life Cycle	3 credits
NFS 3020	Nutrition as Related to Sports & Fitness	3 credits
NFS 3030	Nutrition and Diet Therapy	3 credits
NFS 4020	Advanced Human Nutrition	3 credits
NFS 4200	Food Science	3 credits
NFS 4210	Food Science Lab	2 credits
NFS 4480	Community Nutrition	3 credits
NFS 4950	Senior Seminar	1 credit

Elective Courses (select a minimum of 18 hours)

BIOL 1610	General Biology I	3 credits
BIOL 1615	General Biology I Lab	1 credit
BIOL 1620	General Biology II	3 credits
BIOL 1625	General Biology II Lab	1 credit
BIOL 2060	General Microbiology	3 credits
BIOL2065	General Microbiology Lab	1 credit
BIOL 2320	Human Anatomy	3 credits
BIOL 2325	Human Anatomy Lab	1 credit
BIOL 2420	Human Physiology	3 credits
BIOL 2425	Human Physiology Lab	1 credit
BIOL 3050	Biomedical Ethics	2 credits
BIOL 3060	Genetics	3 credits
BIOL 3065	Genetics Lab	1 credit
CHEM 1210	Principles of Chemistry I	4 credits
CHEM 1215	Principles of Chemistry I Lab	1 credit
CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
CHEM 2310	Organic Chemistry I	4 credits
CHEM 2320	Organic Chemistry II	4 credits
CHEM 2325	Organic Chemistry II Lab	1 credit
CHEM 4110	Biochemistry I	4 credits
CHEM 4120	Biochemistry II	4 credits
MATH 1040	Statistics	4 credits
NFS 4850	Undergraduate Research	2 credits
PE 3070	Exercise Physiology	3 credits
SOC 4100	Sociology of Health & Medicine	3 credits

Total Credits for B.S. Degree in Human Nutrition 120 credits

R411 DATA FORM: AGRICULTURE AND NUTRITION

This section of the review covers the 2006 to 2010 but data from the 2011-2012 school year is included in the assessment results in the appendices.

Department or Unit--Agriculture & Nutrition Science					
	2006-07	2007-08	2008-09	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including terminal degrees, as specified by the institution)	2	2	2	2	2
Full-time Tenured	1	1	1	1	1
Full-time Non-Tenured	1	1	1	1	1
Part-time					
With Master's Degrees	4	4	5	4	5
Full-time Tenured	2	2	3	3	4
Full-time Non-Tenured	2	2	1	1	
Part-time			1		1
With Bachelor's Degrees	0	0	1	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time			1		
Other	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time					
Total Headcount Faculty	6	6	8	6	7
Full-time Tenured	3	3	4	4	5
Full-time Non-Tenured	3	3	2	2	1
Part-time	0	0	2	0	1
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	6.00	6.00	6.00	6.00	6.00
Teaching Assistants					
Part-time (May include TA's)	1.17	0.86	1.26	1.13	1.44
Total Faculty FTE	7.17	6.86	7.26	7.13	7.44
Number of Graduates					
Certificates	0	1	0	0	0
Associate Degrees	1	2	4	1	1
Bachelor's Degrees	15	17	25	25	33
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week)					
Total # of Declared Majors	61	116	133	146	156
Total Department FTE*(annualized)	155.47	160.37	162.02	170.44	170.20

Department or Unit--Agriculture & Nutrition Science					
	2006-07	2007-08	2008-09	2009-10	2010-11
Total Department SCH* (Total annual)	4664.00	4811.00	4860.50	5113.00	5106.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	21.7	23.4	22.3	23.9	22.9
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	642439.33	689272.28	736364.43	738274.20	679361.07
Cost Per Student FTE	4132.31	4298.08	4544.98	4331.71	3991.56
Funding					
Appropriated Fund	628223.84	679039.39	729422.91	731274.76	669584.05
Other:					
Special Legislative Appropriation					
Grants of Contracts	3269.00	0.00	0.00	0.00	0.00
Special Fees/Differential Tuition	165263.47	195186.66	193540.57	221333.99	178830.55
Total	796756.31	874226.05	922963.48	952608.75	848414.60

Overall Program Assessment

Includes strengths, weaknesses, and recommendations from the reviewers.

Institution's Response

Includes responses to reviewer's findings and recommendations.

DEPARTMENT OF BIOLOGY

PROGRAM DESCRIPTION: BIOLOGY (CIP 26.0101)

The Department of Biological Sciences offers a diverse academic program to prepare students who wish to continue their education in graduate or professional degrees or teach on the K-12 level, as well as students who are interested in pursuing careers in wildlife, fisheries, or management. Biology degrees are offered in one of four emphases, which are described below. The Biology program has a high success rate in placing students into post-graduate programs, including medical schools and graduate programs, and many students are placed into government agency jobs and in local or regional K-12 schools.

The Department of Biology continues to grow in numbers of students, faculty, facilities, and national prestige. Today, Biology ranks either number one or number two on the SUU campus in terms of the number of declared majors. The number of graduates also ranks among the highest of all departments on campus. For the most recent academic year (2011-2012), we note the following:

- 95% acceptance to medical schools
- 89% acceptance to dental schools
- 80% acceptance to pharmacy schools
- 75% acceptance to physical therapy programs
- 90% acceptance to PA schools

Faculty members of the Department of Biology are active scholars, and they frequently involve their students in research. During the 2011-2012 academic year, numerous presentations were made at professional venues on the local, regional, and national level by both faculty and students. Scholarly publications and external grants were also obtained. Six grants obtained by three faculty members totaled $557,416 in this year alone. Also, numerous service activities were completed and memberships in professional organizations maintained by the department faculty. One of the three distinguished educators honored at the 113th SUU Annual Commencement May 4, 2012, was Biology's own Dr. Betsy Bancroft.

The Department of Biology offers Bachelor of Arts and Bachelor of Sciences degrees in Biology in the following emphases:

Botany Emphasis
Education Emphasis (discussed below, CIP 13.1322)
Forensics Emphasis
Zoology Emphasis

Other options offered by the Department of Biology include a Bachelor of Interdisciplinary Studies degree and a Biology Minor. The Bachelor of Interdisciplinary Studies degree is a customized degree combining either two or three areas of student interest. Recent examples of customized combinations of coursework include Natural Resources/Range Management, Environmental Studies, GIS, Criminology, Spanish, Business, and History. The minor in Biology is also offered by the Department of Biology for those students wishing to diversify their skills in preparation for the job market.

BIOLOGY - ZOOLOGY EMPHASIS, B.S.

The Biology - Zoology Emphasis degree is the most popular route toward medical and other professional schools as well as careers in professional biology. The degree is offered as either a BA or BS degree. The requirements are identical, except for the specific requirements for the BA or BS. Following are the degree requirements for the BS in Biology – Zoology emphasis, the most frequently declared Biology emphasis and the popular route to medical and

similar professional schools.

General Education Core
- Core Course Requirements ..... 16-17 credits
- Knowledge Areas Requirements ..... 16 credits

University Requirements
Experiential Education .....3 Credits
- UNIV 1010 - EDGE Program Introduction ..... 1 credits
- UNIV 3925 - EDGE Project Proposal: [Engagement Center] ..... 1 credits
- UNIV 4925 - EDGE Program Completion: [Engagement Center] ..... 1 credits

Zoology Curriculum Summary
Core Requirements .....20 Credits
All students majoring in biology must complete the following core courses. We recommend this sequence.
- BIOL 1610/1615 - General Biology I and Lab .....3/1 credits
- BIOL 1620/1625 - General Biology II and Lab .....3/1 credits
- BIOL 3030/3035 - Ecology and Lab .....3/1 credits
- BIOL 3060/3065 - Genetics and Lab .....3/1 credits
- BIOL 3110 - Evolution ..... 3 credits
- BIOL 4990 - Seminar ..... 1 credit

Required support courses .....18-28 Credits
- MATH 1040 - Statistics ..... 4 credits
- MATH 1050 - College Algebra ..... 4 credits

And either:
- CHEM 1110/1115 - Elementary Chemistry and Lab .....3/1 credits
- CHEM 1120/1125 - Elementary Organic Bio-Chemistry and Lab .....5/1 credits

or

Recommended for advanced degrees (professional, graduate, etc) in biological sciences
- CHEM 1210/1215 - Principles of Chemistry I and Lab .....4/1 credits
- CHEM 1220/1225 - Principles of Chemistry II and Lab .....4/1 credits
- CHEM 2310/2315 - Organic Chemistry I and Lab .....4/1 credits
- CHEM 2320/2325 - Organic Chemistry II and Lab .....4/1 credits

Zoology Core Requirements .....15-16 Credits

All students will complete, in addition to the core requirements listed above:
Any three of the following (12 Credits):

- BIOL 3250/3255 - Histology and Lab ..... 3/1 credits
- BIOL 3270/3275 - Vertebrate Physiology and Lab ..... 3/1 credits
- BIOL 3290/3295 - Embryology and Lab ..... 3/1 credits
- BIOL 3310/3315 - Cell & Molecular Biology and Lab ..... 3/1 credits
- BIOL 3390/3395 - Mammalogy and Lab ..... 3/1 credits
- BIOL 3410/3415 - Invertebrate Zoology and Lab ..... 3/1 credits
- BIOL 3430/3435 - Entomology and Lab ..... 3/1 credits

BIOL 3450/3455 - Comparative Vertebrate Studies and Lab ..... 3/1 credits
BIOL 3370/3375 - Ichthyology and Lab ..... 3/1 credits
BIOL 3470/3475 - Herpetology and Lab ..... 3/1 credits
BIOL 3490/3495 - Ornithology and Lab ..... 3/1 credits
AGSC 3400/3405 - Feeding and Nutrition of Horses & Livestock and Lab ..... 3/1 credits
AGSC 3500/3505 - Animal Reproduction and Lab .....3/1 credits

Any one of the following .....3-4 Credits
One of the following:
BIOL 4070 - Capstone: History & Literature of Biology ..... 3 credits
BIOL 4310/4315 - Biotechnology and Lab .....3/1 credits
BIOL 4410 - Animal Behavior ..... 3 credits
BIOL 4620 - Bioinformatics ..... 4 credits
BIOL 4650 - Capstone: Conservation Biology ..... 3 credits

Free Upper Electives (includes completing BA/BS degree requirements) ..... 20-32 credits

In addition, all courses to be counted in the Biology Department major and minor must be passed with a "C-" or better. Biology majors must take a national biology exit examination in their senior year.

NOTE: Students who intend to apply to health care professional school, veterinary school, or seek advanced degrees in animal science, natural resources, or wildlife are advised to select electives from specific lists of courses given in the University Catalog.

Total Credits, B.S. degree: .....120 Credits

BIOLOGY TEACHER EDUCATION (CIP 13.1322)

The Biology - Education Emphasis degree is also available as either a BA or a BS degree. It is sought by students wishing to teach biology in the public schools. Following are the degree requirements for the BS in Biology – Education emphasis

General Education Core
- Core Course Requirements ..... 16-17 credits
- Knowledge Areas Requirements ..... 16 credits

University Requirements
Experiential Education .....3 Credits
- UNIV 1010 - EDGE Program Introduction ..... 1 credits
- UNIV 3925 - EDGE Project Proposal: [Engagement Center] ..... 1 credits
- UNIV 4925 - EDGE Program Completion: [Engagement Center] ..... 1 credits

Biology Education Curriculum Summary
Core Requirements ..... 20 credits
All students majoring in biology must complete the following core courses. We recommend this sequence.
- BIOL 1610/1615 - General Biology I and Lab .....3/1 credits
- BIOL 1620/1625 - General Biology II and Lab .....3/1 credits
- BIOL 3030/3035 - Ecology and Lab .....3/1 credits
- BIOL 3060/3065 - Genetics and Lab .....3/1 credits
- BIOL 3110 - Evolution .....3/1 credits
- BIOL 4990 - Seminar ..... 1 credit

Required support courses .....18-28 Credits
- MATH 1040 - Statistics ..... 4 credits
- MATH 1050 - College Algebra ..... 4 credits

And either:
- CHEM 1110/1115 - Elementary Chemistry and Lab .....3/1 credits
- CHEM 1120/1125 - Elementary Organic Bio-Chemistry and Lab .....5/1 credits

or

Recommended for advanced degrees (professional, graduate, etc) in biological sciences
- CHEM 1210/1215 - Principles of Chemistry I and Lab .....4/1 credits
- CHEM 1220/1225 - Principles of Chemistry II and Lab .....4/1 credits
- CHEM 2310/2315 - Organic Chemistry I and Lab .....4/1 credits
- CHEM 2320/2325 - Organic Chemistry II and Lab .....4/1 credits

Biology Teaching Core ..... 19 Credits*
In order to meet state standards for a license to teach biology in secondary schools in Utah, students will complete the following (in addition to the core requirements listed above):
- BIOL 2420/2425 - Human Physiology and Lab .....4/1 credits
- BIOL 2060/2065 - Introductory Microbiology and Lab .....4/1 credits
- BIOL 4650 - Capstone: Conservation Biology ..... 3 credits
- BIOL 4070 - Capstone: History & Literature of Biology ..... 3 credits

BIOL 4900 - Biology Teaching Methods ..... 3 credits
BIOL 4980 - Student Teaching ..... 2 credits

And any one of the following .....3-4 Credits
BIOL 2500 - Environmental Biology ..... 3 credits
BIOL 3390/3395 - Mammalogy and Lab ..... 3/1 credits
BIOL 3410/3415 - Invertebrate Zoology and Lab ..... 3/1 credits
BIOL 3430/3435 - Entomology and Lab ..... 3/1 credits
BIOL 3450/3455 - Comparative Vertebrate Studies and Lab ..... 3/1 credits
BIOL 3370/3375 - Ichthyology and Lab ..... 3/1 credits
BIOL 3470/3475 - Herpetology and Lab ..... 3/1 credits
BIOL 3490/3495 - Ornithology and Lab ..... 3/1 credits
BIOL 4410 - Animal Behavior ..... 3 credits

And any one of the following .....3-4 Credits
BIOL 3510/3515 - Plant Anatomy& Diversity and Lab ..... 3/1 credits
BIOL 3530/3530 - Plant Physiology and Lab ..... 3/1 credits
BIOL 3550 - Plant Taxonomy ..... 3 credits

Additional Coursework
Additional coursework in computer science, geology and physics selected in consultation with the departmental advisor.

1. Secondary Teaching Certification requires specific professional education courses. Consult the department of teacher education for additional advisement.
2. This degree does not include the requisite number of upper division hours. Students completing this degree will fill the upper division requirements while completing course work for the Secondary Teaching Certificate.

Free Upper Electives (includes completing B.S. requirements) .....11-22 credits

Total Credits, B.S. Degree: .....120 Credits

In addition, all courses to be counted in the Biology Department major and minor must be passed with a “C-” or better. Biology majors must take a national biology exit examination in their senior year.

Secondary Education Licensure
Please see the degree requirements for Secondary Education Licensure. Some classes required for the licensure cannot be taken until the teacher candidate has been admitted to the Teacher Education Department. Please consult your advisor or the Teacher Education Department for further instruction.

R411 DATA – BIOLOGY

Department or Unit--Biology					
	2006-07	2007-08	2008-09	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	12	13	11	12	13
Full-time Tenured	2	2	2	2	2
Full-time Non-Tenured	5	7	5	5	7
Part-time	5	4	4	5	4
With Master's Degrees	3	3	3	3	3
Full-time Tenured					
Full-time Non-Tenured	3	3	3	3	2
Part-time					1
With Bachelor's Degrees	0	1	0	0	1
Full-time Tenured					
Full-time Non-Tenured					
Part-time		1			1
Other	0	2	0	2	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time		2		2	
Total Headcount Faculty	15	19	14	17	17
Full-time Tenured	2	2	2	2	2
Full-time Non-Tenured	8	10	8	8	9
Part-time	5	7	4	7	6
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	13.00	11.88	12.25	9.74	11.75
Teaching Assistants					
Part-time (May include TA's)	0.93	3.38	2.75	3.88	3.97
Total Faculty FTE	13.93	15.26	15.00	13.62	15.72
Number of Graduates					
Certificates	0	0	0	0	0
Associate Degrees	0	0	0	0	0
Bachelor's Degrees	82	57	85	64	73
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week) Semester of Data: _____, 20__					
Total # of Declared Majors	514	752	731	750	782

Department or Unit--Biology					
	2006-07	2007-08	2008-09	2009-10	2010-11
Total Department FTE*(annualized)	336.00	367.42	366.00	419.67	462.71
Total Department SCH* (Total annual)	10058.00	10992.00	10977.50	12589.00	13881.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	24.1	24.1	24.4	30.8	29.4
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	1044743.05	1114253.44	1173993.47	1063528.35	1172379.29
Cost Per Student FTE	3109.36	3032.68	3207.61	2534.22	2533.75
Funding					
Appropriated Fund	1012802.81	1078263.90	1149088.46	1024919.79	1120915.04
Other:					
Special Legislative Appropriation					
Grants of Contracts	67601.69	23730.50	21107.28	7310.73	82309.86
Special Fees/Differential Tuition	58178.80	73356.60	123668.49	23620.34	7333.24
Total	1138583.30	1175351.00	1293864.23	1055850.86	1210558.14

Overall Program Assessment

Includes strengths, weaknesses, and recommendations from the reviewers.

Institution's Response

Includes responses to reviewer's findings and recommendations.

COMPUTER SCIENCE & INFORMATION SYSTEMS (CSIS)

PROGRAM DESCRIPTION: COMPUTER SCIENCE (CIP 11.0701)

Prior to the 2003-2004 academic year, Southern Utah University offered a Bachelor of Science program in as a Computer Science Composite (with no emphasis) degree, and a minor in Computer Science, all housed in the College of Science, Department of Mathematics and Computer Science. Two new emphases within the Computer Science Composite were developed: Geographic Information Systems in 2000 and Forensic Science in 2004. As a result, since the 2004-2005 academic year, within the Computer Science Composite there have been three different tracks/emphases: no emphasis, GIS emphasis, and Forensic Science emphasis. (GIS has been discontinued effective in the 2007-2008 academic year)

Effective July 1, 2011, the College of Computing, Integrated Engineering and Technology (CCIET) was combined with the College of Science to create the new Walter Maxwell Gibson College of Science and Engineering (COSE). In this new College the School of Computing and Technology was created and houses the Computer Science Composite and Information Systems Composite degrees in the Department of Computer Science and Information Systems (CSIS). At this time no changes were made to curriculum that would affect accreditation. This was entirely an administrative change in the University.

During the 2004-2005 academic year, the Bachelor of Science Computer Science Composite degree was revised to ensure compliance with ABET standards. The Computer Science Composite with emphasis in Forensic Science was revised during 2007-2008 academic year to ensure compliance with the curriculum requirements of ABET/CAC.

Due to a lack of demand from students, in May 2007, the Computer Science Composite with an emphasis in GIS with four students in the emphasis was proposed to be discontinued. The registrar's office has received the instruction not to accept new students with this emphasis. The proposed changes were effective in the 2007-2008 academic year and is shown in the 2008-2009 catalog on our website at: http://www.suu.edu/academics/catalog/2008/dept-csis.pdf

In May 2007, the curriculum for the Computer Science Composite emphasis in Forensic Science was proposed to be modified to meet the ABET/CAC requirements. These curriculum changes were approved at all levels. The proposed changes were effective in the 2007-2008 academic year and are shown in the 2008-2009 catalog.

We are maintaining and developing the Forensic Science emphasis to give students a foundation of forensic computer science and to provide them with more career options. Due to the similarity between the curriculum for both emphases (no emphasis and Forensic Science emphasis) in the Computer Science Composite program, the program outcomes for both emphases are the same. Because of this, all statements in this report are applicable to both emphases unless otherwise stated.

In 2009, the Computer Science Degree was accredited by the Accrediting Board for Engineering and Technology (ABET), with an extension in 2011. Re-accreditation is scheduled for the 2013-2014 academic year.

Our Computer Science graduates have been very fortunate to find employment at the time of graduation. Based on an 84% response rate of graduates (36 total graduates responded between 2007 and 2011, 83% were employed, the other 17% went on to graduate school, or to serve a mission for their church. The surveys were conducted at the time of graduation for each graduating class.

Program Description: Information Systems (CIP 11.0101)

Southern Utah University at one time offered a two-year program in Information Systems as well as a Bachelors degree in Management Information Systems, both housed in the School of Business. During the 2000–2001 academic year, in addition to the existing AAS (Associate Degree of Applied Science) with emphases in Networking & Telecommunications and User Support Service, BA/BS degrees in Information Systems with minors in GIS (Geographic Information Systems) and Graphic Arts were established. The Utah State Board of Regents authorized the Bachelor of Science in Information Systems composite degree in 2004. During the 2004-2005 academic year, the BS in Information Systems was established as a composite degree, in which no minor was required.

Starting July 1, 2004, when the new Department of Computer Science and Information Systems was established within the new College of Computing, Integrated Engineering and Technology, the Bachelors degree in Information Systems Composite and an Associate of Applied Science in Information Technology with three emphases remained as the only degrees offered.

During the 2004-2005 academic school year, the Information Systems BS degree was updated to ensure compliance with ABET standards. In 2009, the Information Systems Degree was accredited by the Accrediting Board for Engineering and Technology (ABET), with an extension in 2011. A re-accreditation visit will occur in the 2013-2014 academic year.

In July 2011 the College of Computing, Integrated Engineering and Technology was merged with the College of Science to create the College of Science and Engineering. Within this College, the School of Computing and Technology was created to house the Department of Computer Science and Information Systems. This change was strictly administrative and did not affect curriculum in the degree programs within the Department.

Our Information Systems graduates have been very fortunate to find employment at the time of graduation. In some cases, they are working with companies prior to graduation. We certainly have more demand for our graduates than we have graduates. The industry has been on the rise and our graduates have been the beneficiaries of this boon to the industry.

R411 DATA FORM: CSIS

Department or Unit--Computer Science & Information Systems					
	2006-7	2007-8	2008-9	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	4	7	8	7	7
Full-time Tenured	1	1	2	2	2
Full-time Non-Tenured	3	6	6	5	5
Part-time					
With Master's Degrees	3	3	1	1	2
Full-time Tenured	1	1	1	1	1
Full-time Non-Tenured	2	2			1
Part-time					
With Bachelor's Degrees	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time					
Other	2	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured	1				
Part-time	1				
Total Headcount Faculty	9	10	9	8	9
Full-time Tenured	2	2	3	3	3
Full-time Non-Tenured	6	8	6	5	6
Part-time	1	0	0	0	0
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	8.24	9.50	10.00	8.09	8.99
Teaching Assistants					
Part-time (May include TA's)	1.28	0.88	0.00	3.15	1.38
Total Faculty FTE	9.52	10.38	10.00	11.24	10.37
Number of Graduates					
Certificates	0	0	0	0	0
Associate Degrees	1	1	0	0	0
Bachelor's Degrees	10	4	7	5	12
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week) Semester of Data: _____, 20__					
Total # of Declared Majors	122	95	99	110	128
Total Department FTE*(annualized)	175.30	184.07	210.02	231.80	241.13

Department or Unit--Computer Science & Information Systems					
	2006-7	2007-8	2008-9	2009-10	2010-11
Total Department SCH* (Total annual)	5259.00	5510.00	6299.00	6954.00	7234.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	18.4	17.7	21.0	20.6	23.2
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	686825.07	891381.28	882790.24	836903.83	927621.01
Cost Per Student FTE	3918.00	4842.70	4203.42	3610.46	3846.92
Funding					
Appropriated Fund	671657.92	876729.64	860664.14	807688.77	893253.30
Other:					
Special Legislative Appropriation					
Grants of Contracts				17445.20	81419.18
Special Fees/Differential Tuition	73093.00	71560.50	54115.00	1372.50	995.00
Total	744750.92	948290.14	914779.14	826506.47	975667.48

Overall Program Assessment

Includes strengths, weaknesses, and recommendations from the reviewers.

Institution's Response

Includes responses to reviewer's findings and recommendations.

ENGINEERING TECHNOLOGY & CONSTRUCTION MANAGEMENT

Engineering Technology Degree: Electronics Emphasis
Engineering Technology Degree: CAD/CAM Emphasis
Construction Management Degree

ENGINEERING TECHNOLOGY: CAD/CAM EMPHASIS (CIP 15.0000)

Prior to 1990, Southern Utah University offered a two-year degree in Design Technology. Mechanical Drawing instruction began in 1908 with the hiring of John Woodbury. In 1990, the Utah State Board of Regents approved a four-year Bachelor's degree in Engineering Technology with an emphasis in CAD/CAM.

Course #	Course title	CR	Off'd	Pre-reqs
CCET 4960	Capstone Project for CAD/CAM	3	S	Instr Permission Required
CSIS 1040	Intro to Programming w/ MatLab	3	S	MATH 1010 or ACT of 23
ENGR 1030	Computer Assisted Design	3	F/S	
CCET 1010	Engineering Technology Graphics	3	F/S	
CCET 1030	Intro to CAD 3-D	3	F/S	
CCET 1040	Computer Aided Design	3	F/S	
CCET 2620	3D Design	3	F	CCET 1040
CCET 2650	Mechanical Blueprint Reading	2	F	CCET 1010
CCET 3610	Architectural Design	3	F	CCET 1010, 1040
CCET 3630	Fundamentals of CATIA	3	F	CCET 1040
CCET 3670	Civil Design	3	S	CCET 1010, 1040
CCET 3680	CNC Design	3	F	MATH 1060 preferred
CCET 4600	Engineering Design	3	S	CCET 1040; 2620 ,3630
CCET 4610	Advanced Solid Modeling	3	S	CCET 1040; 2620, 3630
CCET 4690	CNC Software & Applications	3	S	CCET 3680
EET 3760	Electronic Design & Fabrication	3	F	
ENGR 2010	Statics	3	F	PHYS 2010, MATH 1210
ENGR 2140/45	Strength of Materials & lab	3	S	ENGR 2010/ENGL 2010
CCET Electives (9 hrs. from the courses listed below)				
CM 3650	Residential Drafting	3	S	CCET 3610
ENGR 2240/45	Surveying & Global Positioning/lab	2/1	F	MATH 1060
GEOG 3500/3505	Intro to Cartography/lab	3/1	F-odd	Co: GEOG 3505

Upper Division — free electives to total 40 hrs. of upper division

UNIV 1010	Introduction to Experiential Education	1	F/S/M	
UNIV 3925	EER Proposal	1	F/S/M	
UNIV 4925	Synthesis and Reflection	1	F/S/M	
GENERAL EDUCATION				
ENGL 1010	Intro to Academic Writing	3		
ENGL 2010	Intermediate Writing	3		
*MATH 1210	Calculus I	4	F/S/M	MATH 1050 & 1060
LM 1010	Information Literacy	1		

American Institution	3			
CSIS 1000 Intro to Computer Apps & Internet		3		
FINE ARTS:		3		
*HUMANITIES: COMM 1010 Introduction to Communication		3	F/S/M	
SOCIAL SCIENCE		3		
LIFE SCIENCE			3/4	
*PHYS. SCI.: PHYS 2010/15 College Physics & lab		4/1	F	MATH 1060

Degree Total: 120 credits

ENGINEERING TECHNOLOGY: ELECTRONICS EMPHASIS (CIP 15.0000)

Prior to 1990, Southern Utah University offered a two year degree in Electronics Technology. Electronics instruction began in 1964 with the hiring of Dr. Don Blanchard. In 1990, the Utah State Board of Regents approved a four-year Bachelor's degree in Engineering Technology with an emphasis in Electronics.

Course #	Course title	Cr	Offered	Pre-requisites
COMM 1010	Introduction to Communication	GE	F/S	
CSIS 1410	Object Oriented Programming	3	F/S	CSIS 1400
EET 4960	Capstone Project for EET	3	S	Permission Required
PHYS 2010/2015	College Physics I	GE	F	MATH 1060
MGMT 3180	Management & Organizations	3	F/S	Advisor must sign in
EET 2700	Circuit Analysis II	3	S	EET 1700 & MATH 1210
CSIS 2810	Computer Organization & Architecture	3	S	EET 2780
CSIS 2420	Intro to Algorithms & Data Structures	3	F	CSIS 1410
CSIS 2600	Data Communications & Networking	3	S	
CSIS 3150	C & C++ Programming	3	F	CSIS 2420
CSIS 3600	Operating Systems	3	S	CSIS 2420
EET 1700	Circuit Analysis I	3	F	pre/co-req: MATH 1050
EET 1730	Electronic Devices I	3	F-even	EET 2700
EET 2710	Electronic Devices II	3	S-even	EET 1730
EET 2750	PC Hardware	3	F/S	
EET 2760	Industrial Control Systems	3	S-even	
EET 2780	Digital Electronics I	3	F	Math 1050
EET 3080	Digital Electronics II	3	S-odd	EET 2710 & 2780
EET 3710	Op-Amps & Linear Integrated Circuits	3	S-odd	MATH 1210, EET 2710
EET 3760	Electronic Design & Fabrications	3	F	
EET 3780	Applications of Microprocessors	3	S even	EET 2780
MATH 1040	Statistics	4	F/S/M	MATH 1010 or ACT of 23
Technology electives	(6 hrs. from list below)			
CSIS 2620	Network Administration I	3	F	CISI 1000, CSIS 2600
EET 3720	Communication Circuits	3	S-odd	EET 2710 & 3710
EET 3790	Computer Interfacing	3	S-odd	EET 2780
Upper Division —	free electives	to total 40 hrs. of upper division		

UNIV 1010	Introduction to Experiential Education		1		
UNIV 3925	EER Proposal		1		
UNIV 4925	Synthesis and Reflection		1		
GENERAL EDUCATION					
ENGL 1010	Intro to Academic Writing		3		
ENGL 2010	Intermediate Writing		3		
MATH 1210	Calculus I		4	F/S/M	MATH 1050 & 1060
LM 1010	Information Literacy		1		
American Institution			3		
CSIS 1000	Intro to Computer Applications		3		
FINE ARTS:			3		
*HUMANITIES: COMM 1010		Intro to Comm	3	F/S/M	
SOCIAL SCIENCE			3		
LIFE SCIENCE			3		
*PHYS. SCI.: PHYS 2010/15		College Physics /Lab	5	F	MATH 1060

Degree Total: 123 credits

Degree requirements for Construction Management (*CIP 46.0412*)

Prior to 1994 Southern Utah University offered a two year degree in Construction Technology. Construction oriented instruction began in the fall of 1930 with the hiring of Charles Bennett Cooley. Cooley implemented a teaching method that included the building of a Project home. Starting in 1994 the Utah State Board of Regents approved a four-year Bachelor degree in Construction Management.

Course #	Course title	Cr	Of'rd	Pre-Requisites
CORE				
ACCT 2010	Accounting Principles	3	F/S	
ACCT 3350	Business Law I	3	F/S	
CCET 1040	Computer Aided Design	3	F/S	
CCET 3610	Architectural Design	3	F	CCET 1040
MATH 1050	College Algebra	4	F/S/M	MATH 1010
MATH 1060	Trigonometry	3	F/S/M	MATH 1010
MATH 2040	Business Statistics	4	F/S	MATH 1010 or ACT 23
MGMT 3100	Operations Management	3	F/S	Signature of Advisor
MGMT 3180	Management & Organizations	3	F/S	Signature of Advisor
MGMT 3210	Entrepreneurship	3	F	Signature of Advisor
MGMT 3240	Human Resource Management	3	F/S/M	MGMT 3180
MGMT 4100	Organizational Behavior & Leadership	3	F/S	Signature of Advisor
CM 1290	Electrical Systems	3	S	
CM 2000	Statics for Construction Management	2	F	MATH 1210
CM 2010	Framing Systems	3	F	
CM 2015	Framing Systems lab	2	F	
CM 2050	Concrete & Masonry	3	F	

CM	2055	Concrete & Masonry lab	2	F	
CM	2100	Finishing Systems	3	S	
CM	2105	Finishing Systems lab	2	S	
CM	3240	Estimating & Bidding	3	S	CSIS 1000 or permission
CM	3270	Building Codes	3	F	
CM	4400	HVAC & Plumbing Princ. & Design	3	S	
CM	4405	HVAC/Plumbing Princ. & Design Lab	1	S	
ENGR	2240	Surveying & GPS	2	F	MATH 1060
ENGR	2245	Surveying & GPS lab	1	F	
CM	3880	Scheduling & Cost Control	3	S	
Upper division Free elective			3		
Upper division Free elective			3		
Upper Division —	free electives	to total 40 hrs. of upper division			
UNIV 1010		Introduction to Experiential Education	1		
UNIV 3924		EER Proposal 1			
UNIV 4925		Synthesis and Reflection	1		
GENERAL EDUCATION					
ENGL 1010		Intro to Academic Writing	3		
ENGL 2010		Intermediate Writing	3		
MATH 1210		Calculus I	4	F/S/M	MATH 1050 & 1060
LM 1010		Information Literacy	1		
American Institution			3		
CSIS 1000		Intro to Comp Apps & Internet	3		
FINE ARTS:			3		
HUMANITIES			3		
SOC SCI: Econ 2010 or 2020		Micro or Macro Econ	3	F/S	
LIFE SCIENCE			3		
PHYSICAL SCIENCE			4		

Degree Total: 120-121

In the 2004-2005 academic year the Engineering Technology and Construction Management degrees became part of the Department of Integrated Engineering and Technology. This new department was moved into the newly created College of Computing, Integrated Engineering and Technology. In the 2008-2009 academic year the Department of Integrated Engineering and Technology was split into two separate departments consisting of the Department of Integrated Engineering and the Department of Engineering Technology & Construction Management. The Engineering Technology and Construction Management programs currently reside in the latter. In the 2011-2012 academic year the College of Computing, Integrated Engineering and Technology was merged with the College of Science to create the Walter Maxwell Gibson College of Science and Engineering

R411 DATA FORM: ETCM

Engineering Technology and Construction Management Department

R411 Data Table					
Department or Unit--Engineering Technology & Construction Management					
	2006-07	2007-08	2008-09	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	1	1	1	1	1
Full-time Tenured	0	1	1	1	1
Full-time Non-Tenured	0	0	0	0	0
Part-time					
With Master's Degrees	5	5	5	5	5
Full-time Tenured	3	3	3	3	2
Full-time Non-Tenured	2	2	2	2	3
Part-time					
With Bachelor's Degrees	0	0	1	1	1
Full-time Tenured					
Full-time Non-Tenured					
Part-time			1	1	1
Other	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time					
Total Headcount Faculty	6	6	7	7	7
Full-time Tenured	3	4	4	4	3
Full-time Non-Tenured	3	2	2	2	3
Part-time	0	0	1	1	1
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	6.18	5.18	6.48	5.75	5.50
Teaching Assistants					
Part-time (May include TA's)	0.38	0.40	0.49	2.04	2.86
Total Faculty FTE	6.55	5.58	6.97	7.80	8.36
Number of Graduates					
Certificates	5	1	0	2	8
Associate Degrees	7	3	4	10	13
Bachelor's Degrees	33	25	28	28	25
Master's Degrees	0	0	0	0	0

R411 Data Table					
Department or Unit--Engineering Technology & Construction Management					
	2006-07	2007-08	2008-09	2009-10	2010-11
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week) Semester of Data: _____, 20__					
	2006-07	2007-08	2008-09	2009-10	2010-11
Total # of Declared Majors	183	189	184	189	188
Total Department FTE*(annualized)	77.33	69.03	75.23	84.40	88.34
Total Department SCH* (Total annual)	2320.00	2071.00	2257.00	2532.00	2650.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	11.8	12.4	10.8	10.8	10.6
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	872040.13	870059.99	1001998.31	966382.18	893428.63
Cost Per Student FTE	11276.43	12603.26	13318.69	11450.03	10114.10
Funding					
Appropriated Fund	870377.98	868974.37	1001612.18	966647.85	892343.48
Other:					
Special Legislative Appropriation					
Grants of Contracts	748.63	13325.96	11782.87	4071.59	37325.86
Special Fees/Differential Tuition	74009.74	69246.17	178951.68	9145.65	58057.79
Total	945136.35	951546.50	1192346.72	979865.10	987727.13

Overall Program Assessment

Includes strengths, weaknesses, and recommendations from the reviewers.

Institution's Response

Includes responses to reviewer's findings and recommendations.

INTEGRATED ENGINEERING (IE)

PROGRAM DESCRIPTION: INTEGRATED ENGINEERING (CIP 14.1301)

The Integrated Engineering program was initially offered in the 2002-2003 school year in the Division of Engineering and Physics of the College of Science. In the 2004-2005 school year, the program became part of the Integrated Engineering and Technology Department in the new College of Computing Integrated Engineering and Technology. In 2009, the Department of Integrated Engineering was established, and the Integrated Engineering degree program presently resides there. In 2011, the College of Computing, Integrated Engineering and Technology was merged with

the College of Science, and the Integrated Engineering Department became part of the newly created College of Science and Engineering.

Two degrees are offered. One is a 4-year Bachelor of Science in Integrated Engineering that was accredited by ABET in 2005 and again in 2011. The second is a 2-year Associate of Pre-Engineering degree, primarily for students who do not wish a full 4-year Bachelor of Science program or who plan to complete an engineering degree in one of the classical engineering disciplines at another institution.

The Integrated Engineering degree was created to fill the need of smaller companies who only hire one or two engineers. These engineers must have knowledge in multiple engineering areas in order to satisfactorily perform their duties. Hence, the Integrated Engineering curriculum includes elements from Civil, Electrical, Mechanical, and Manufacturing Engineering disciplines. This curriculum is also excellent preparation for students who will become project managers and technical leads in larger companies where they must effectively communicate with and direct activities of other engineers in the specific disciplines.

There are no variants or options presently available as part of the Integrated Engineering degree program. The range of engineering subjects covered, and the interrelationships between the various engineering subjects taught precludes variances in the scope of classes offered for the degree.

All students participate in a capstone design course in which they work in teams to conceive, plan, design, and in most cases build a project that demonstrates interdisciplinary skills. Projects are typically designs that can be marketed to consumers, governmental agencies, or companies. One such project was the design of a water catch basin structure that would hold rapid spring run-off from Coal Creek here in Cedar City and facilitate movement of that water into the aquifer rather than evaporating from the surface and being lost. Another project, funded by USTAR (Utah Science, Technology, And Research initiative) resulted in the engineering design and prototype fabrication for a new and innovative walker design that should eliminate many serious falls connected with the use of walkers. Yet another designed a specialized sprinkler for crops in which satellite imaging data can be used to vary the application of fertilizers and pesticides on fields according to need.

Students are strongly encouraged to serve internships with area businesses in which they can experience the engineering environment and where prospective employers can evaluate them. Among the local companies where Integrated Engineering students have worked as interns are MetalCraft (aviation parts manufacturer), Smead (office products manufacturer), Lamoreaux and Associates (zip lines and entertainment structures), Western Electro-chemical Company (specialized chemical producer), and the U.S. Forrest Service.

Another significant opportunity is DesignBuildBLUFF, a service learning program in which students attend the University of Colorado Denver campus with Colorado graduate architecture students for a summer semester to design an innovative, energy-efficient home for a client family residing on the Navajo Reservation. Then in the fall semester, the team lives at the Bluff, UT campus of the DesignBuildBLUFF non-profit corporation and builds the home they have designed using donated materials. This home was designed during summer semester and built during the fall 2012 semester at a site approximately 25 miles southeast of Bluff. SUU Integrated Engineering students bring analytical tools and skills to the program that add substantially to the quality of the work.

Degree Requirements for the Bachelor of Science in Integrated Engineering

Required General Education (34 credit hours)

English Requirement: students must take

ENGL 1010 Academic Writing*	3 credits
ENGL 2010 Intermediate Writing	3 credits

Quantitative Literacy Requirement: students must take	
MATH 1210 Calculus I	4 credits
Information Literacy Requirement: students must take	
LM 1010 Information Literacy	1 credit
Computer Literacy Requirement: students must take	
CSIS 1040 Intro to Programming with MatLab	3 credits
American Institutions Requirement: student's choice	3 credits
Knowledge Area Requirements: student choice, except one must take ENGR 1010 Engineering in the 21st Century	12 credits
Physical Science Requirement: students must take	
CHEM 1210 Principles of Chemistry	4 credits
CHEM 1215 Principles of Chemistry Lab	1 credit

University Requirements

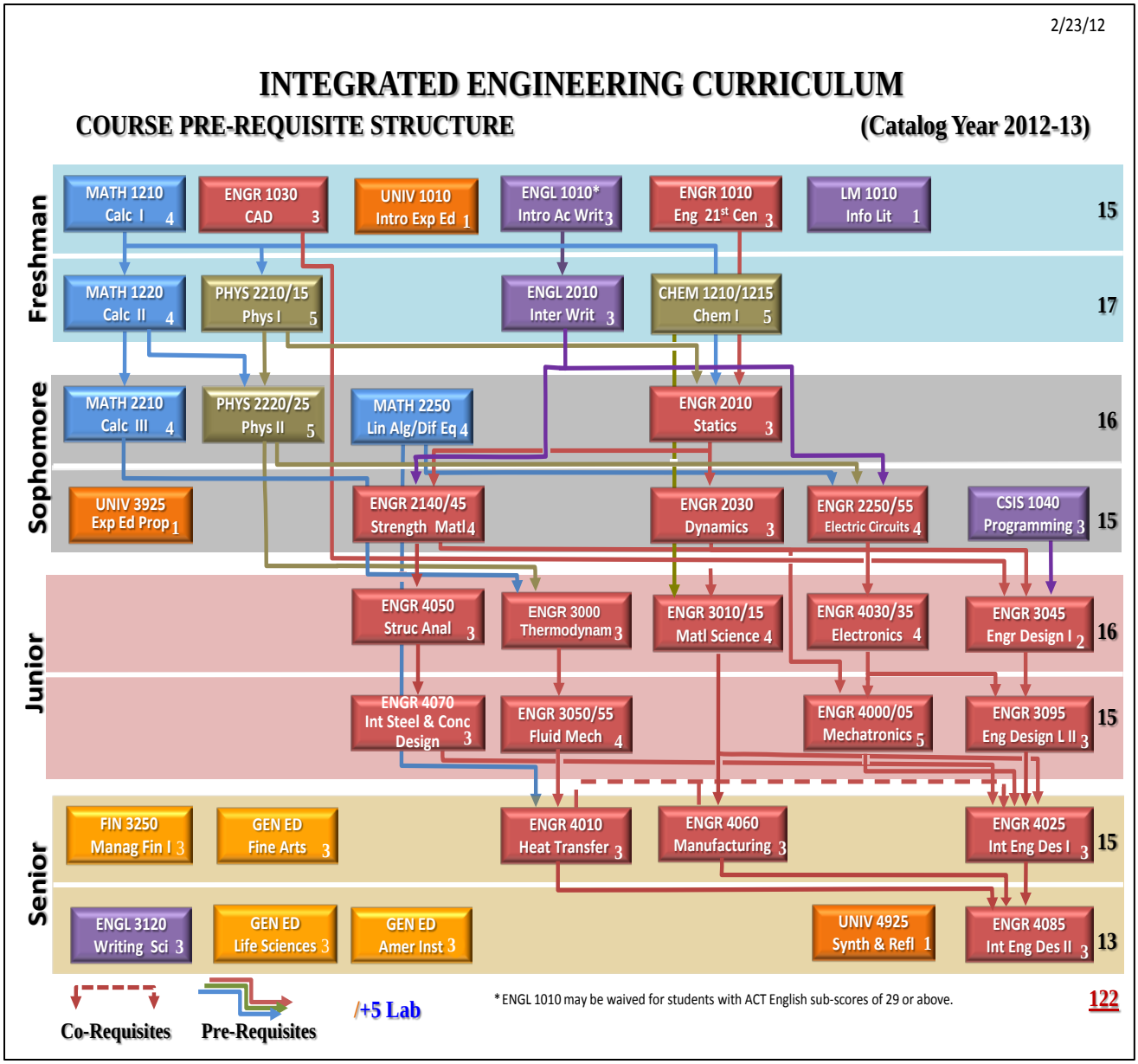
BS Degree – Math or Science minimum requirement (12 hours) is included in Core Requirements	
Experiential Education Requirement: students must take	
UNIV 1010 Introduction to Experiential Education	1 credit
UNIV 3925 EER Proposal	1 credit
UNIV 4925 Synthesis and Reflection**	1 credit

Degree Core Requirements (88 hours)

ENGL 3120 Writing in the Sciences	3 credits
ENGR 1030 Computer Aided Design	3 credits
ENGR 2010 Statics	3 credits
ENGR 2030 Dynamics	3 credits
ENGR 2140 Strength of Materials	3 credits
ENGR 2145 Strength of Materials Lab	1 credits
ENGR 2270 Electric Circuits	3 credits
ENGR 2275 Electric Circuits Lab	1 credits
ENGR 3000 Thermodynamics	3 credits
ENGR 3010 Materials Science Engineering	3 credits
ENGR 3015 Materials Science Engineering Lab	1 credit
ENGR 3045 Engineering Design I	2 credits
ENGR 3050 Fluid Mechanics	3 credits
ENGR 3055 Fluid Mechanics Lab	1 credits
ENGR 3095 Engineering Design II	3 credits
ENGR 4000 Mechatronics	3 credits
ENGR 4005 Mechatronics Lab	2 credits
ENGR 4010 Heat Transfer	3 credits
ENGR 4025 Integrated Engineering Design I	3 credits
ENGR 4030 Electronics	3 credits
ENGR 4035 Electronics Lab	1 credit
ENGR 4050 Structural Analysis	3 credits
ENGR 4060 Manufacturing Engineering	3 credits
ENGR 4070 Intro to Steel and Concrete Design	3 credits

ENGR 4085 Integrated Engineering Design Lab II	3 credits
MATH 1220 Calculus II	4 credits
MATH 2210 Calculus III	4 credits
MATH 2250 Linear Algebra and Differential Equations	4 credits
PHYS 2210 Physics for Scientists & Engineers I	4 credits
PHYS 2215 Physics for Scientists & Engineers I Lab	1 credit
PHYS 2220 Physics for Scientists & Engineers II	4 credits
PHYS 2225 Physics for Scientists & Engineers II Lab	1 credit
Total Credits for Bachelor of Science in Integrated Engineering	122

The interrelationship and prerequisite structure for the Integrated Engineering program is shown on the chart in the figure below.



Mapping of course sequence and prerequisite structure for the Bachelor of Science in Integrated Engineering.

R411 DATA FORM: IE

Department of Integrated Engineering					
	2006-7	2007-8	2008-9	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	3	5	3	4	4
Full-time Tenured		2	1	1	1
Full-time Non-Tenured	3	3	2	3	3
Part -time					
With Masters Degrees	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part -time					
With Bachelor's Degrees	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part -time					
Other	1	1	0	0	0
Full-time Tenured					
Full-time Non-Tenured	1				
Part -time		1			
Total Headcount Faculty	4	6	3	4	4
Full-time Tenured	0	2	1	1	1
Full-time Non-Tenured	4	3	2	3	3
Part-time		1	0	0	2

FTE (A-1/S-11/Cost Study Definition)					
Full-time Salaried	3.53	4.31	2.78	3.84	3.66
Teaching Assistants					
Part-time (May include TA's)	0.00	0.57	0.32	0.16	1.69
Total Faculty FTE	3.53	4.88	3.10	3.99	5.35
Number of Graduates					
Certificates	0	0	0	0	0
Associate Degrees	1	0	0	3	1
Bachelor's Degrees	4	10	10	14	12
Master's Degrees	N/A	N/A	N/A	N/A	N/A
Doctoral Degrees	N/A	N/A	N/A	N/A	N/A
Number of Students—(Data Based on Fall Third Week)					
Total # of Declared Majors	125	124	111	125	120
Total Department FTE*(annualized)	41.77	45.00	46.43	48.30	46.73
Total Department SCH*(Total annual)	1253.00	1350.00	1393.00	1449.00	1402.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	11.8	9.2	15.0	12.1	8.7
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	469797.33	760827.93	445451.89	494868.36	571759.98
Cost per Student FTE	11248.19	16906.91	9593.23	10245.72	12234.48
Funding					
Appropriated Fund	468901.88	759878.60	445280.22	495004.41	571065.53
Other:					
Special Legislative Appropriation					
Grants of Contracts	403.31	11652.94	5238.23	2085.00	23887.11
Specials Fees/Differential Tuition	39871.54	60552.63	79555.38	4683.34	37157.76
Total	509176.73	832084.17	530073.84	501772.74	632107.40

MATHEMATICS

PROGRAM DESCRIPTION: MATHEMATICS (CIP 27.0101)

The Department of Mathematics is committed to offering a well-rounded academic program that will enhance the lives of both our own students and those that we serve through our courses. The demand for knowledge we offer is enormous in both industry and education.

During the last six years, the University as a whole has seen a 13% increase in enrollment whereas enrollment of Math and Math Ed majors has jumped by 40%. At present we have over 100 majors in Mathematics or Mathematics Education. Occupational outlook reports show that jobs in mathematics and statistics, including the job of actuary, are among the best in stability, income and demand in the foreseeable future. We believe the increase in majors compared to enrollments originates both from occupational outlook awareness as well as recruiting efforts including

- An active Math Club overseen by Drs. Han then Rimmasch with 50 active student members.
- Taking students to Mathematical Association of America conferences.
- Hosting 300-350 high school students at SUU for the yearly Utah State Math Contest.

The Department of Mathematics offers two emphases with a BS degree in Mathematics: Pure Math and Actuarial Science. For eight years predating the present year, we also offered an emphasis in Bioinformatics. This was recently eliminated for the following reasons:

- Our faculty member in mathematical biology left and we were unable to find a suitable replacement candidate.
- Student interest in the program dropped significantly and resources had to be stretched to offer all the courses needed for this emphasis.
- The program included a 7-credit hour internship requirement working at a laboratory in the field of Bioinformatics that generally took an entire semester or summer. Though some did very well in these internships, they have not been easy or even possible to find for students with sub-par performance in this emphasis.
- In seeking information from many universities offering informatics programs, SUU's Math BS with Bioinformatics Emphasis was the only one housed in a math department. It required math courses significantly beyond those needed to work in the field of Bioinformatics since it was a Math degree.

Besides the course requirements listed below, students are required to pass the ETS Major Field Exam in Mathematics and score at the 25th percentile before graduation. This includes all Math and Math Education students. Recently we have had two students in the 99th percentile (perfect scores), many in the 90th percentile or above and have an overall pass rate of above 90% for first-time takers of the test. They can retake it until passing at the 25th percentile.

Over the 2011-2012 academic year, Dr. Jana Lunt, a Math faculty member, oversaw as PI the writing of a $580,000 National Science Foundation S-STEM Grant. This grant was funded in May 2012. Its resources are shared among other SUU investigators from the fields of Chemistry, Biology, Geology and Engineering. This grant provides scholarship money designed to keep talented STEM students from having to support their studies by working outside of their field. There are currently 15 students receiving this funding for the 2012-13 academic year, four of which are Math majors. It provides for students currently on scholarship to continue with money in the program who maintain required performance standards and allows five new students added yearly to those receiving these scholarships over the next five years.

Students who graduate in one of our programs must do so with a minimal grade of C in each of the core classes as well as a 2.0 overall GPA. The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. As new majors come to SUU, we encourage them to carry out undergraduate research with a Math faculty member to fulfill the EDGE requirements. For Actuarial Science Emphasis majors, our target is for them to pass two of the six actuarial exams by graduation. Some have passed three and four of the six before graduating.

We are fortunate to have as a faculty member Dr. Andreas Weingartner who is an Actuarial Fellow (has passed the Society of Actuaries exams) and has done consulting for Esurance Insurance Services, Inc. based in San Francisco as well. He directs our Actuarial Science Emphasis.

Several faculty members have worked with students to give presentations and co-author peer-reviewed publications. These faculty members include Drs. Jianlong Han, Eric Freden, Andreas Weingartner, Derek Hein, Said Bahi, Jim Brandt, Gretchen Rimmasch and Sarah Duffin.

In addition to the above efforts, as mentioned, each year we take students to the regional Mathematical Association of America meetings at regional universities; it was hosted at SUU in 2009 under the direction of Dr. Derek Hein. Our students generally either prepare to speak on their research or participate in "integration bees." Several of our students have fared well and reached final rounds, though to date none of them have won the competition outright.

Degree Requirements for a Bachelor of Science in Mathematics, Pure Math Emphasis

Course Number and Description	Credits
General Education Core	
• Core Course Requirements: (must take MATH 1210)	16-17
• Knowledge Areas Requirements: (must take PHYS 2210/PHYS 2215)	16
University Requirements: Experiential Education	
• UNIV 1010 - EDGE Program Introduction	1
• UNIV 3925 - EDGE Project Proposal	1
• UNIV 4925 - EDGE Program Completion	1
Program Prerequisites	
• MATH 1050 - College Algebra	4
• MATH 1060 - Trigonometry	3
Core Requirements	
• MATH 1220 - Calculus II	4
• MATH 2210 - Calculus III	4
• MATH 2270 - Linear Algebra	3
• MATH 2280 - Differential Equations	3
• MATH 3120 - Transition to Advanced Mathematics	3
• MATH 3700 - Probability & Statistics	4
• MATH 4220 - Abstract Algebra	3
• MATH 4400 - Advanced Calculus I	3

- MATH 4410 - Advanced Calculus II 3
- MATH 4580 - Complex Analysis 3
- MATH 4990 - Capstone Seminar 3

One of the following 3

- CSIS 1400 - Fundamentals of Programming
- CSIS 1410 - Object Oriented Programming

Program Electives (any of the following) 12

- CSIS 4550 - Programming Languages
- Any upper division math courses except MATH 3140 or MATH 4900

Other Electives 26-27

- Free Electives (minor not required_

Total Credits, B.S. degree: 120

Degree Requirements for a Bachelor of Science in Mathematics, Actuarial Science Emphasis

Course Number and Description	Credits
General Education Core	
• Core Course Requirements: (must take MATH 1210)	16-17
• Knowledge Area Requirements: (must take ECON 2010)	17
University Requirements: Experiential Education	
• UNIV 1010 - EDGE Program Introduction	1
• UNIV 3925 - EDGE Project Proposal:	1
• UNIV 4925 - EDGE Program Completion:	1
Support Core Requirements	
• ECON 2020 - Principles of Macroeconomics	3
Program Prerequisites	
• MATH 1050 - College Algebra	4
• MATH 1060 - Trigonometry	3
Core Requirement	
• MATH 1220 - Calculus II	4
• MATH 2210 - Calculus III	4
• MATH 2270 - Linear Algebra	3
• MATH 2280 - Differential Equations	3
• MATH 3120 - Transition to Advanced Mathematics	3
• MATH 3500 - Actuarial Mathematics	3
• MATH 3700 - Probability & Statistics	4
• MATH 3770 - Mathematical Modeling	3

- MATH 4220 - Abstract Algebra 3
- MATH 4400 - Advanced Calculus I 3
- MATH 4990 - Capstone Seminar 3
- ACCT 2010 - Accounting Principles 3
- FIN 3250 - Managerial Finance I 3
- FIN 3260 - Managerial Finance II 3
- ECON 4260 - Principles of Econometrics 3
- FIN 3110 - Risk & Insurance 3
- Any upper division math course except MATH 3140 or MATH 4900 3

One of the following: 3

- CSIS 1400 - Fundamentals of Programming
- CSIS 1410 - Object Oriented Programming

Other Electives

- Free Electives (minor from Business is recommended but not required) 15-16

Total Credits, B.S. degree: 120

PROGRAM DESCRIPTION: MATHEMATICS EDUCATION (CIP 13.1311)

In secondary schools the two greatest shortages of qualified teachers across the nation are in mathematics and technology. This provides us with a great opportunity to serve both our students and the public. Southern Utah University's Department of Mathematics is a primary supplier of public school math teachers for grades 8-12 in the Southern Utah region. Under the direction of Dr. Marty Larkin and her many contacts throughout the region, we have 100% placement of Mathematics Education graduates in either teaching jobs or graduate school.

Graduation requirements include those mentioned in the description of the Mathematics Program: ETS Field Test in Mathematics at the 25th percentile, the same grade/GPA requirements. In addition, our Mathematics Education graduates must pass the Praxis II Exam in Mathematics. They have all done so over the past seven years with the exception of one student who was a dual major in History Education and decided to teach in that field. Along with their coursework, these students fulfill requirements given by the Utah State Office of Education for Secondary Mathematics Licensure; they graduate with a Level IV Endorsement.

We do not differentiate between Mathematics and Mathematics Education majors in all opportunities to carry out research and present at SUU Scholarship venues and Mathematical Association of America conferences. Mathematics Education majors were not required to take the Capstone course, but as it has been eliminated in the future from all department programs, they will likewise be invited to participate in undergraduate research if they are inclined to do so to fulfill EDGE requirements.
Through the extra electives they may take, talented students in the program are, at graduation, also prepared to enter graduate programs in either Mathematics or Mathematics Education since the Math course requirements differ little between Pure Math Emphasis students and Mathematics Education majors.

Degree Requirements for a Bachelor of Science in Mathematics Education

Course Number and Description Credits

General Education Core

- Core Course Requirements: (must take MATH 1210) 16-17
- Knowledge Areas Requirements: 16

University Requirements: Experiential Education (UNIV 1010, 3925, 4925) 3

Program Prerequisites

- MATH 1050 - College Algebra 4
- MATH 1060 - Trigonometry 3

Core Requirements

- MATH 1220 - Calculus II 4
- MATH 2210 - Calculus III 4
- MATH 2270 - Linear Algebra 3
- MATH 2280 - Differential Equations 3
- MATH 3120 - Transition to Advanced Mathematics 3
- MATH 3130 - Modern Geometries 3
- MATH 3700 - Probability & Statistics 4
- MATH 4220 - Abstract Algebra 3
- MATH 4400 - Advanced Calculus I 3
- MATH 4900 - Methods of Teaching Secondary School 3
- MATH 4980 - Student Teaching 2

Electives (any upper division math course) 9

Required Secondary Education Licensure:

- EDUC 3000 - Principles of Teaching & Learning 3
- SCED 3400 - Educating Diverse Populations 3

Initial Teacher Education Program Courses

- EDUC 3180 - Educational Decision Making 3
- SCED 3200 - Secondary Educational Psychology 3
- SCED 3570 - Sec Classroom Management 3
- SCED 3590 - Planning, Delivery, & Assessment 3
- SCED 3720 - Content Area Literacy and Common Core 2
- SPED 3030 - Educating Exceptional Students 3
- Academic 4900 Methods Course 2-5

Advanced Teacher Education Program Courses

- SCED 4520 - Practicum/Induction Seminar 2
- SCED 4980 - Secondary Student Teaching 8
- Academic 4980 - Clinical Practice 2

Total Credits, B.S. degree with licensure: 123-127

R411 DATA FORM: DEPARTMENT OF MATHEMATICS

This section of the review covers the 2006 to 2011 but data on the 2011-2012 academic year is included in the assessment results in the appendices.

Department or Unit--Mathematics					
	2006-7	2007-8	2008-9	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	10	11	11	10	11
Full-time Tenured	3	5	5	4	4
Full-time Non-Tenured	7	6	6	6	7
Part-time					
With Master's Degrees	3	3	3	1	2
Full-time Tenured					
Full-time Non-Tenured	2	2	2	1	2
Part-time	1	1	1		
With Bachelor's Degrees	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time					
Other	2	1	1	1	1
Full-time Tenured					
Full-time Non-Tenured	1				
Part-time	1	1	1	1	1
Total Headcount Faculty	15	15	15	12	14

Department or Unit--Mathematics					
	2006-07	2007-08	2008-09	2009-10	2010-11
Faculty (continued)					
Full-time Tenured	3	5	5	4	4
Full-time Non-Tenured	10	8	8	7	9
Part-time	2	2	2	1	1
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	13.00	12.08	12.00	11.17	13.00
Teaching Assistants					
Part-time (May include TA's)	2.98	4.01	4.67	4.23	3.67
Total Faculty FTE	15.98	16.09	16.67	15.40	16.67

Number of Graduates					
Certificates	0	0	0	0	0
Associate Degrees	0	0	0	0	0
Bachelor's Degrees	10	8	9	12	18
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week) Semester of Data: _____, 20__					
Total # of Declared Majors	78	72	73	90	94
Total Department FTE*(annualized)	464.53	521.90	519.20	576.63	590.74
Total Department SCH* (Total annual)	13936.00	15657.00	15576.00	17299.00	17722.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	29.1	32.4	31.1	37.4	35.4
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	1094655.90	1067545.35	1077277.30	1079462.25	1168114.20
Cost Per Student FTE	2356.46	2045.50	2074.88	1872.01	1977.39
Funding					
Appropriated Fund	1035771.66	1021439.20	1026889.30	1019751.15	1090108.62
Other:					
Special Legislative Appropriation					
Grants of Contracts	75.61				
Special Fees/Differential Tuition	127857.59	128031.11	54103.75	2762.50	13680.62
Total	1163704.86	1149470.31	1080993.05	1022513.65	1103789.24

NURSING

PROGRAM DESCRIPTION: (CIP 51.3801)

Southern Utah University was founded in 1897 as a branch normal school by the Utah state legislature. In 1913 the school was changed to a branch of the Utah State Agriculture College (now Utah State University). The Department of Nursing resides in the Walter Maxwell Gibson College of Science and Engineering at Southern Utah University. The Southern Utah University Nursing Program was conditionally approved by the Utah State Board of Regents in December, 2003 as a pre-licensure baccalaureate of science in nursing program (BSN). Final approval was granted from the Utah State Board of Regents to begin the program in April, 2004. The inaugural class of 20 pre-licensure students was admitted and started course work in August 2004. Subsequent pre-licensure students (including some Practical Nurse (PN) to BSN option students) were admitted Spring and Fall 2005 consisting of 23 and 36 students respectively. (Because of the nursing shortage, the department received additional private funding to increase the number of graduates. To meet that request, the number admitted went from 23 to 30.) The first group of 36 RN to BSN students was

admitted Summer term of 2005. The nursing program continued to admit 30 pre-licensure students fall and spring semesters until fall of 2008 when the additional funding was stopped and the number admitted returned to 20 students per semester. The number of RN to BSN students has been consistent at approximately 30 students admitted each summer. Realization that the PN to BSN track was problematic for both students and faculty, resulted in termination of the PN option. PN students did not feel that they were really a part of either the RN to BSN class or the pre-licensure class. Faculty had difficulty with consistently communicating with this group of students to get them the information needed. Since that time, PN students desiring their BSN apply and complete the program with the pre-licensure students.

The Southern Utah University Nursing Program is the first "generic" baccalaureate nursing program in the southern Utah region. SUU had a 30+ year history of providing associate degree nursing and then RN to BSN education as a cooperative program with Weber State University. The nursing faculty developed the SUU nursing program using experiences, knowledge, and insight gained from the Weber State cooperative experience in combination with skills and perspective from new faculty as they joined the Department of Nursing. The

The transition from AD and RN to BSN education (as was offered in the Weber based program) to a "generic" BSN program, combined with new faculty, growth, and integration in Southern Utah University, was not as smooth and seamless as faculty had hoped. Our challenges were most obvious in our poor NCLEX-RN pass rate. While some of the faculty had concerns about our learning/teaching approach prior to the first group testing, once NCLEX-RN results were obtained, the faculty began instituting changes to strengthen individual learning. While the details of these changes will be spelled out in this self-study, a four word description of the changes is "increased accountability for learning".

While program NCLEX-RN pass rates were not at an acceptable level, feedback from employers of graduates' performance on the job has consistently been positive. SUU graduates have functioned well in practice and are successful in graduate school. Having BSN graduates who were both clinically and academically strong was one of the goals of the SUU faculty when the transition to an independent SUU Nursing Program was initiated. Therefore, faculty was encouraged with this outcome.

The BSN curriculum has two phases. The first phase consists of completion of general education core and required support courses designed to be accomplished in four semesters. The second phase consists of nursing course work comprising classroom, laboratory, and clinical practice experiences. Each phase is designed to be completed in four semesters. Upon completion, graduates are eligible to sit for the NCLEX-RN and apply for licensure as registered nurses. At the request of students and community members, an equivalency program is in place for pre-licensure students who desire to sit for the NCLEX-PN after completing level two of the program. The BSN degree provides flexibility in career choices as well as a foundation for continued formal study in graduate programs. Alumni are practicing in hospitals, long term care, private duty, home health, correctional facilities, and more. Some graduates have continued on to seek advanced degrees as nurse educators, advanced practice clinicians, and administrators.

The nursing Department Chair is the Chief Executive Officer of the Department of Nursing and is responsible directly to the Dean of the College. The Department is administered by the Department Chair who also carries a reduced teaching load. In addition, there are eight full-time faculty members serving 78 pre-licensure and 20 RN to BSN students (as of 01/01/2013).
The Department of Nursing offers the following programs:

BACHELOR OF NURSING (PRE-LICENSURE BSN) & (RN TO BSN)

Consists of the following classes:

Pre-Licensure:

1st Semester/Level 1		2nd Semester/Level II	
Course	Credits	Course	Credits
NURS 3120 Intro to Health Assessment	4	NURS 3220 Pharm & Therapeutic Intervention	3
NURS 3130 Fundamentals of Nursing	4	NURS 3230 Care of Adults	4
NURS 3135 Fund. of Nursing – Lab	4	NURS 3235 Care of Adults – Lab	4
NURS 3140 Found. of Professional Nsg.	3	NURS 3240 Concepts in Mental Health Nsg	2
NURS 4360 Nursing Theory & Research	3		
Total Credit Hours (semester 1)	15	Total Credit Hours *(semester 2)*	16

3rd Semester/Level III		4th Semester/Level IV	
Course	Credits	Course	Credits
NURS 3260 Health Promo & Education	3	NURS 4430 High Acuity Nursing	3
NURS 4330 Care of the Family	3	NURS 4435 High Acuity Nursing – Lab	2
NURS 4335 Care of the Family Nsg Lab	3	NURS 4440 Contemporary Issues in Nsg	3
NURS 4340 Concepts in Geriatric Nsg	2	NURS 4550 Leadership & Management in Nsg	3
NURS 4350 Community Health Nsg	2	NURS 4555 Leadership – Lab	4
NURS 4355 Comm. Health Nsg. Lab	2		
Total Credit Hours (semester 3)	15	*Total Credit Hours (semester 4)*	15

Total Credit Hours *(Program total)* 60

RN to BSN:

1st Semester (Summer)		2nd Semester (Fall)	
Course	Credits	Course	Credit
NURS 3121 Health Assessment for Registered Nurses	3	NURS 4340 Concepts in Geriatric Nursing	2
NURS 3141 Professional Nursing Foundations	3	NURS 4351 Community Health Nursing	3
NURS 4361 Nursing Theory and Research	4	NURS 4356 Community Health Clinical	1
		NURS 3260Health Promotions & Education	3
Total Credit Hours (semester 1)	10	*Total Credit Hours (semester 2)*	9

3rd Semester (Spring)	
Course	Credits
NURS 4431 High Acuity Nursing	3
NURS 4436 High Acuity Clinical	1
NURS 4440 Contemporary Issues in Nsg.	3
NURS 4551 Leadership & Management in Nsg.	4
NURS 4556 Leadership & Management. Clinical	1
Total Credit Hours (semester 3)	12

Total Major Hours: 31

R411 DATA FORM: NURSING

Department or Unit--Nursing					
	2006-7	2007-8	2008-9	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	2	1	1	1	2
Full-time Tenured					
Full-time Non-Tenured	2	1	1	1	2
Part-time					
With Master's Degrees	9	8	9	7	6
Full-time Tenured					
Full-time Non-Tenured	7	6	7	6	5
Part-time	2	2	2	1	1
With Bachelor's Degrees	0	0	0	1	1
Full-time Tenured					
Full-time Non-Tenured				1	1
Part-time					
Other	1	0	0	1	1
Full-time Tenured					
Full-time Non-Tenured	1			1	1
Part-time					
Total Headcount Faculty	12	9	10	10	10
Full-time Tenured	0	0	0	0	0
Full-time Non-Tenured	10	7	8	9	9
Part-time	2	2	2	1	1
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	9.33	8.50	8.79	9.00	8.37
Teaching Assistants					
Part-time (May include TA's)	3.28	4.12	1.48	1.39	1.71
Total Faculty FTE	12.61	12.62	10.27	10.39	10.08
Number of Graduates					
Certificates	0	0	0	0	0
Associate Degrees	0	0	0	0	0
Bachelor's Degrees	76	78	73	77	69
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students—(Data Based on Fall Third Week) Semester of Data: _____, 20__					
Total # of Declared Majors	442	476	437	440	432
Total Department	145.67	142.93	131.53	111.13	106.67

Department or Unit--Nursing					
	2006-7	2007-8	2008-9	2009-10	2010-11
FTE*(annualized)					
Total Department SCH* (Total annual)	4370.00	4288.00	3946.00	3334.00	3200.00
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	11.5	11.3	12.8	10.7	10.6
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	950241.34	965597.13	964992.20	977378.99	966861.47
Cost Per Student FTE	6523.43	6755.57	7336.47	8794.60	9064.21
Funding					
Appropriated Fund	934717.31	950945.49	951419.05	962771.46	952818.11
Other:					
Special Legislative Appropriation					
Grants of Contracts	300.00				
Special Fees/Differential Tuition	281595.99	84428.37	78910.60	22763.17	34918.75
Total	1216613.30	1035373.86	1030329.65	985534.63	987736.86

PHYSICAL SCIENCE: CHEMISTRY, GEOLOGY, AND PHYSICAL SCIENCE TEACHER EDUCATION

PROGRAM DESCRIPTION: CHEMISTRY (CIP 40.0501)

Chemistry, a central science, has been at Southern Utah University since its inception in 1897. The chemistry program has grown from a course in 1897 to a robust major taught by dedicated and highly qualified faculty with terminal degrees in each major area of the chemistry curriculum (analytical, bioanalytical, biochemistry, inorganic, organic, and physical). Faculty with expertise in numerous chemical disciplines, offer students expertise in the classroom and a wide variety of undergraduate research opportunities. A low student to faculty ratio guarantees a close working relationship between students and their professors, especially in upper division classes. Students are expected to become fully integrated into the university experience and develop an appreciation of education as a lifelong pursuit. Students who graduate in a chemistry program must do so with a minimal grade of "C" in each course required for the major or minor. The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students.

Each chemistry student has the opportunity to engage in challenging courses, laboratory, and research experiences. Undergraduate research is stressed within the Chemistry program, offering our students a key element for admission to top graduate schools and professional programs. Our labs are well equipped, offering students exposure to modern instrumentation such as X-ray crystallography, Mass spectrometry, Nuclear Magnetic Resonance spectroscopy, FTIR spectroscopy, and X-ray Spectroscopy among others.

The program is also enriched by

- External assessment and direction
- Undergraduate research opportunities
- A literature searching / presentation course
- Service learning opportunities
- Travel abroad opportunities
- Diversity in teaching/learning methods

Within the Bachelor of Science chemistry degree, students select an emphasis from the following options:

- Professional
- Healthcare
- Forensic
- Teacher Education (Secondary Education Licensure by State Board of Education)

The program also offers minors in Chemistry and Chemistry Teacher Education.

In 2010, the Chemistry Professional Emphasis program obtained formal approval from the American Chemical Society (ACS), the established national chemical oversight organization. Approval of our Chemistry-Professional Emphasis program assures that SUU graduates meet national standards in curriculum and preparation for graduate studies. The American Chemical Society is a valued external advisor and evaluator of our chemistry program. Our program utilizes externally created ACS exits exams in each content area of chemistry where available. ACS exam results are available upon request. A Major Field Exam administered by the Educational Testing Services (ETS), is required in each sub-discipline of chemistry, for graduation. Department faculty have no access to externally created exams such as those from the ACS and ETS. Results from 2001-2012 ETS exit exams are shown in the table below:

	Total		1-Physical Chemistry		2-Organic Chemistry		3-Inorganic Chemistry		4-Analytical Chemistry	
Year Avg	Score	Percentile	Sub Score	Percentile	Sub Score	Percentile	Sub Score	Percentile	Sub Score	Percentile
2012	169.5	98	69.28	97	71.5	99	64.25	96	65.75	96
2011	170	95	70	95	95	95	66	95	64	95
2010	158	85	51	60	59	85	59	85	55	75
2009	156	80	56	80	59	80	52	65	54	75
2008	167	95	63	90	67	95	65	95	62	90
2007	165	95	57	80	68	95	63	90	56	75
2006	170	84	61	72	70	83	66	81	69	84
2005	166	95	57	85	67	95	65	95	64	95
2004	168	95	61	95	68	95	63	95	62	95
2003	160	96	57	89	58	98	65	99	50	55
2002	157.6	92	55	81	62	99	53	76	55	83
2001	156	89	51	65	56	96	56	86	54	79

DEGREE REQUIREMENTS FOR B.S. IN CHEMISTRY, PROFESSIONAL EMPHASIS

General Education Core

Core course requirements (must take MATH 1210)		17 credits
Knowledge areas requirements		16 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Chemistry Requirements – Professional Emphasis (75 credits)

CHEM 1210	Principles of Chemistry I	4 credits
CHEM 1215	Principles of Chemistry I Lab	1 credit
CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
CHEM 2310	Organic Chemistry I	4 credits
CHEM 2315	Organic Chemistry I Lab	1 credit
CHEM 2320	Organic Chemistry II	4 credits

CHEM 2325	Organic Chemistry II Lab	1 credit
CHEM 3000	Quantitative Analysis	3 credits
CHEM 3005	Quantitative Analysis Lab	1 credit
CHEM 3160	Intermediate Inorganic Chemistry	3 credits
CHEM 3610	Physical Chemistry I	3 credits
CHEM 3615	Physical Chemistry I Lab	1 credit
CHEM 3620	Physical Chemistry II	3 credits
CHEM 3625	Physical Chemistry II Lab	1 credit
CHEM 4110	Biochemistry I	4 credits
CHEM 4160	Advanced Inorganic Chemistry	3 credits
CHEM 4165	Advanced Inorganic Chemistry Lab	1 credit
CHEM 4230	Instrumental Analysis	3 credits
CHEM 4240	Analysis Lab	2 credits
CHEM 4250	Synthesis Lab	2 credits
CHEM 4990	Chemical Literature/Seminar	1 credit
MATH 1220	Calculus II	4 credits
MATH 2210	Calculus III	4 credits
MATH 2270	Linear Algebra	3 credits
MATH 2280	Differential Equations	3 credits
PHYS 2210	Physics for Scientists & Engineers I	4 credits
PHYS 2215	Physics for Scientists & Engineers I Lab	1 credit
PHYS 2220	Physics for Scientists & Engineers II	4 credits
PHYS 2225	Physics for Scientists & Engineers II Lab	1 credit
Free Electives (7 hours must be upper division)		9 credits
Total Credits for B.S. Degree in Chemistry, Professional Emphasis		120 credits

DEGREE REQUIREMENTS FOR B.S. IN CHEMISTRY, HEALTH CARE EMPHASIS

General Education Core

Core course requirements (must take MATH 1210)	17 credits
Knowledge areas requirements (must take BIOL 1610/1615 and CHEM 1210/1215)	17 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Chemistry Requirements – Health Care Emphasis (54 credits)

CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
CHEM 2310	Organic Chemistry I	4 credits
CHEM 2315	Organic Chemistry I Lab	1 credit
CHEM 2320	Organic Chemistry II	4 credits
CHEM 2325	Organic Chemistry II Lab	1 credit
CHEM 3000	Quantitative Analysis	3 credits
CHEM 3005	Quantitative Analysis Lab	1 credit
CHEM 3160	Intermediate Inorganic Chemistry	3 credits

CHEM 3610	Physical Chemistry I	3 credits
CHEM 3615	Physical Chemistry I Lab	1 credit
CHEM 4110	Biochemistry I	4 credits
CHEM 4120	Biochemistry II	4 credits
CHEM 4230	Instrumental Analysis	3 credits
CHEM 4240	Analysis Lab	2 credits
CHEM 4990	Chemical Literature/Seminar	1 credit
MATH 1220	Calculus II	4 credits
PHYS 2010	College Physics I	4 credits
PHYS 2015	College Physics I Lab	1 credit
PHYS 2020	College Physics II	4 credits
PHYS 2025	College Physics II Lab	1 credit

Students must choose either option 1 or option 2 below.

Option 1 (8 credits)

CHEM 3620	Physical Chemistry II	3 credits
CHEM 3625	Physical Chemistry II Lab	1 credit
CHEM 4160	Advanced Inorganic Chemistry	3 credits
CHEM 4165	Advanced Inorganic Chemistry Lab	1 credit
Free Electives (5 hours must be upper division)		22 credits

Option 2 (5-7 credits)

BIOL 3310	Cell & Molecular Biology	3 credits
BIOL 3315	Cell & Molecular Biology Lab	1 credit
CHEM 4540	Selected Topics in Chemistry	1 to 3 credits (Health Care)
Free Electives (4 hours must be upper division)		15-17 credits
Total Credits for B.S. Degree in Chemistry, Health Care Emphasis		120 credits

DEGREE REQUIREMENTS FOR B.S. IN CHEMISTRY, FORENSIC EMPHASIS

General Education Core

Core course requirements (must take MATH 1210)	17 credits
Knowledge areas requirements (must take BIOL 1610/1615 and CHEM 1210/1215 and CJ 1010)	16 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Required Courses – Forensic Emphasis (76-78 credits)

CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
CHEM 2310	Organic Chemistry I	4 credits
CHEM 2315	Organic Chemistry I Lab	1 credit
CHEM 2320	Organic Chemistry II	4 credits
CHEM 2325	Organic Chemistry II Lab	1 credit

CHEM 3000	Quantitative Analysis	3 credits
CHEM 3005	Quantitative Analysis Lab	1 credit
CHEM 4110	Biochemistry I	4 credits
CHEM 4120	Biochemistry II	4 credits
CHEM 4230	Instrumental Analysis	3 credits
CHEM 4240	Analysis Lab	2 credits
CHEM 4540	Selected Topics in Chemistry	1 to 3 credits (Qual. Analysis)
CHEM 4990	Chemical Literature/Seminar	1 credit
MATH 1040	Statistics	4 credits
MATH 1220	Calculus II	4 credits
PHYS 2210	Physics for Scientists & Engineers I	4 credits
PHYS 2215	Physics for Scientists & Engineers I Lab	1 credit
PHYS 2220	Physics for Scientists & Engineers II	4 credits
PHYS 2225	Physics for Scientists & Engineers II Lab	1 credit
CJ 1340	Criminal Investigation	3 credits
CJ 1350	Introduction to Forensic Science	3 credits
CJ 2350	Laws of Evidence	3 credits
CJ 3100	Advanced Criminalistics	3 credits
BIOL 1620	General Biology II	3 credits
BIOL 1625	General Biology II Lab	1 credit
BIOL 3060	Genetics	3 credits
BIOL 3065	Genetics Lab	1 credit
BIOL 3310	Cell & Molecular Biology	3 credits
BIOL 3315	Cell & Molecular Biology Lab	1 credit
Free Electives (4 hours must be upper division)		6-8 credits
Total Credits for B.S. Degree in Chemistry, Forensic Emphasis		120 credits

DEGREE REQUIREMENTS FOR B.S. IN CHEMISTRY, TEACHER EDUCATION EMPHASIS (CIP 13.1323)

General Education Core

Core course requirements (must take MATH 1210)		17 credits
Knowledge areas requirements		16 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Chemistry Requirements – Education Emphasis (43 credits)

CHEM 1210	Principles of Chemistry I	4 credits
CHEM 1215	Principles of Chemistry I Lab	1 credit
CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
CHEM 2010	Chemical Lab Safety	1 credit
CHEM 2310	Organic Chemistry I	4 credits

CHEM 2315	Organic Chemistry I Lab	1 credit
CHEM 2320	Organic Chemistry II	4 credits
CHEM 2325	Organic Chemistry II Lab	1 credit
CHEM 3000	Quantitative Analysis	3 credits
CHEM 3005	Quantitative Analysis Lab	1 credit
CHEM 3160	Intermediate Inorganic Chemistry	3 credits
CHEM 3610	Physical Chemistry I	3 credits
CHEM 3615	Physical Chemistry I Lab	1 credit
CHEM 3620	Physical Chemistry II	3 credits
CHEM 3625	Physical Chemistry II Lab	1 credit
CHEM 4240	Analysis Lab	2 credits
CHEM 4990	Chemical Literature/Seminar	1 credit
PSCI 4900	Teaching Science in Secondary Schools	2 credits
PSCI 4980	Student Teaching in Physical Science	2 credits

Required Minor (21 Credits)

Required Secondary Education Licensure (37-40 Credits)
Please see the degree requirements for Secondary Education Licensure. Some classes required for the licensure cannot be taken until the teacher candidate has been admitted to the Teacher Education Department.

Total Credits, B.S. Degree in Chemistry, Teacher Education Emphasis 137-140 credits

PROGRAM DESCRIPTION: GEOLOGY (CIP 40.0601)

The SUU Geology program trains students for professional, academic, governmental, or teaching careers in the Earth Sciences. Our major is research-oriented with strong laboratory and field components. Students have direct access to rock-preparation, mineralogy, geochemistry, paleontology, and GIS lab facilities for hands-on learning during individual research, class work, and group projects. Geology majors are likely to spend time analyzing the elemental make-up of rocks and minerals on the scanning electron microscope, determining conditions of mineral formation from microscopic analysis, mapping complex geologic structures or measuring stratigraphic sections in the field, or participating in paleontological exploration and digs locally and globally. The geology program places great emphasis on experiential learning outside the classroom. With its location on the boundary between the Colorado Plateau and the Basin and Range, near numerous national parks, The Geology program offers undergraduate research and outdoor learning opportunities that are unmatched by other universities. Students typically spend time discovering geological phenomena while camping and hiking in the beautiful landscape of southern Utah, combing the deserts of Nevada, exploring lagoons and reefs in the Bahamas, the rift basins of southern Africa and other exotic localities. Within the area surrounding SUU, our students can study ancient, continental rocks nearly 2 billion years old, rocks deposited in ancient oceans, a diverse assemblage of dinosaur fossils, some of the largest volcanoes preserved in North America, and some of the youngest volcanic deposits on the continent.

Geology faculty strive to provide students at Southern Utah University with excellence in earth science education. Our integrated efforts are directed toward those methods we feel produce the best possible educational experience. The primary goal of the geology faculty is to ensure academic excellence while demanding integrity and building self-esteem in our students. Students who graduate in the geology program must do so with a minimal grade of "C" in each course required for the major or minor.

The program is enriched by

- Undergraduate research opportunities
- A capstone course
- Service learning opportunities
- Travel abroad opportunities
- Diversity in teaching/learning methods
- World-class geology within the surrounding area

DEGREE REQUIREMENTS FOR B.S. IN GEOLOGY, PROFESSIONAL EMPHASIS

General Education Core

Core course requirements (must take MATH 1210)		17 credits
Knowledge areas requirements		16 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Geology Requirements – Professional Emphasis (79 credits)

GEO 1110	Physical Geology	3 credits
GEO 1115	Physical Geology Lab	1 credits
GEO 1220	Historical Geology	3 credits
GEO 1225	Historical Geology Lab	1 credits
GEO 3010	Environmental Geology	3 credits
GEO 3015	Environmental Geology Lab	1 credits
GEO 3110	Paleontology	3 credits
GEO 3115	Paleontology Lab	1 credits
GEO 3120	Tectonics	3 credits
GEO 3210	Mineralogy	3 credits
GEO 3215	Mineralogy Lab	1 credits
GEO 3330	Igneous-Metamorphic Petrology	3 credits
GEO 3335	Igneous-Metamorphic Petrology Lab	1 credits
GEO 3410	Sedimentology & Stratigraphy	3 credits
GEO 3415	Sedimentology & Stratigraphy Lab	1 credits
GEO 3510	Structural Geology	3 credits
GEO 3515	Structural Geology Lab	1 credits
GEO 4000	Selected Field Trips	.5 to 3 credits

(students must obtain 2 credits from this course to meet degree requirements)

GEO 4800	Senior Project	3 credits
GEO 4960	Field Geology	6 credits
GEO 4990	Seminar in Geology	1 to 4 credits
CHEM 1210	Principles of Chemistry I	4 credits
CHEM 1215	Principles of Chemistry I Lab	1 credits
CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credit
GEOG 3550	Principles of Geographic Information Systems	3 credits
GEOG 3555	Principles of GIS Lab	2 credits
GEOG 4150	Advanced GIS Analysis Methods Lab	3 credits or
GEO 4070	Applied Geochemistry	3 credits
MATH 1220	Calculus II	4 credits
PHYS 2210	Physics for Scientists & Engineers I	4 credits
PHYS 2215	Physics for Scientists & Engineers I Lab	1 credit
PHYS 2220	Physics for Scientists & Engineers II	4 credits
PHYS 2225	Physics for Scientists & Engineers II Lab	1 credit
Free Electives up to 3.5 credits		

Total Credits for B.S. Degree in Geology, Professional Emphasis 120-122 credits

Program Description: Physical Science Teacher Education (*CIP 13.1316*)

The Physical Science Teacher Education degree contains academic breadth in the disciplines of chemistry, geography, geology, physics and education. The program was created to address the need for a physical science generalist in small isolated rural schools where one educator was required to teach science in several physical science content areas. Graduates from this program can aquire the content competencies required to provide fundamental knowledge common to physics and chemistry, and competencies necessary for a beginning teacher of one of the physical sciences in a secondary school. The graduate of this degree also has additional competencies in Geology and Mathematics. Students who graduate with this degree must do so with a minimal grade of "C" in each required course.

All teacher candidates are required to complete an appropriate PRAXIS II Subject Assessment and the PRAXIS II PLT (Principles of Learning and Teaching) Assessment adopted by the Utah State Office of Education (USOE). The Physical Science PRAXIS Subject Assessment content knowledge test measures fundamental knowledge common to physics and chemistry, and competencies necessary for a beginning teacher of one of the physical sciences in a secondary school. The test Praxis II PLT is required primarily as an assessment tool to identify strengths and weaknesses of beginning teachers produced by the program.

The program is enriched by

- External assessment and direction
- Undergraduate research opportunities
- Service learning opportunities
- Travel abroad opportunities
- Diversity in teaching/learning methods
- World-class geology within the surrounding area

DEGREE REQUIREMENTS FOR B.S. OR B.A. IN PHYSICAL SCIENCE TEACHER EDUCATION

General Education Core

Core course requirements (must take MATH 1210)		17 credits
Knowledge areas requirements (must take CHEM 1210/1215)		16 credits

University Requirements

Experiential Education

UNIV 1010	Introduction to Experiential Education	1 credit
UNIV 3925	EER Proposal	1 credit
UNIV 4925	Synthesis and Reflection	1 credit

Physical Science Teacher Education Requirements

CHEM 1220	Principles of Chemistry II	4 credits
CHEM 1225	Principles of Chemistry II Lab	1 credits
CHEM 2010	Chemical Lab Safety	1 credits
CHEM 2310	Organic Chemistry I	4 credits
CHEM 2315	Organic Chemistry I Lab	1 credits
CHEM 2320	Organic Chemistry II	4 credits
CHEM 2325	Organic Chemistry II Lab	1 credits
CHEM 3000	Quantitative Analysis	3 credits
CHEM 3005	Quantitative Analysis Lab	1 credits
CHEM 3700	Environmental Chemistry	3 credits
GEOG 3220	Weather & Climate	3 credits
GEOG 3225	Weather & Climate Lab	1 credits
GEO 1110	Physical Geology	3 credits
GEO 1115	Physical Geology Lab	1 credits
GEO 1220	Historical Geology	3 credits
GEO 1225	Historical Geology Lab	1 credits
GEO 3210	Mineralogy	3 credits
GEO 3215	Mineralogy Lab	1 credits
MATH 1220	Calculus II	4 credits
PHYS 1040	Elementary Astronomy	3 credits
PHYS 1045	Elementary Astronomy Lab	1 credits
PHYS 2210	Physics for Scientists & Engineers I	4 credits
PHYS 2215	Physics for Scientists & Engineers I Lab	1 credits
PHYS 2220	Physics for Scientists & Engineers II	4 credits
PHYS 2225	Physics for Scientists & Engineers II Lab	1 credits
PHYS 3310	Quantum Physics I	3 credits
PSCI 4900	Teaching Science in Secondary Schools	2 credits
PSCI 4980	Student Teaching in Physical Science	2 credits

Plus four (4) credit hours from the following list:

GEO 3010	Environmental Geology	3 credits
GEO 3015	Environmental Geology Lab	1 credits
GEO 3110	Paleontology	3 credits
GEO 3115	Paleontology Lab	1 credits
GEO 3170	Oceanography	3 credits
GEO 3175	Oceanography Lab	1 credits
GEO 3410	Sedimentology & Stratigraphy	3 credits
GEO 3415	Sedimentology & Stratigraphy Lab	1 credits

GEO 3510	Structural Geology	3 credits
GEO 3515	Structural Geology Lab	1 credits
GEO 4000	Selected Field Trips.	.5 to 3 credits (2 cr max)
GEO 4070	Applied Geochemistry	3 credits

Required Secondary Education Licensure (37-40 Credits)
Please see the degree requirements for Secondary Education Licensure. Some classes required for the licensure cannot be taken until the teacher candidate has been admitted to the Teacher Education Department.

Total Credits, B.S. Degree in Physical Science Teacher Education: 141-144

BA Degree Foreign Language Requirement (16 credits or proficiency test)

Physical Science Composite Teacher Education Emphasis Curriculum Summary

Total Credits, B.A. degree in Physical Science Teacher Education: 156-157

Support (Minor Degree) Program Description:

The multidisciplinary Department of Physical Science at Southern Utah University offers Minors in areas that serve the broader campus community. These Minors are in the areas of Chemistry, Chemistry Teaching, Geography, Geology Teacher Education, Physics, Physics Teacher Education, and a Geographic Information Systems certificate. Our dedicated and highly qualified faculty represent numerous disciplines, offering students expertise in the classroom and a wide variety of undergraduate research opportunities.

R411 DATA FORM: PHYSICAL SCIENCE

Department or Unit--Physical Science					
	2006-07	2007-08	2008-09	2009-10	2010-11
Faculty					
Headcount					
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	12	13	14	15	16
Full-time Tenured	2	4	4	5	5
Full-time Non-Tenured	6	5	6	5	6
Part-time	4	4	4	5	5
With Master's Degrees	2	3	2	3	3
Full-time Tenured	1	1	1	1	1
Full-time Non-Tenured	1	2	1	2	1
Part-time					1
With Bachelor's Degrees	0	0	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time					
Other	0	1	0	0	0
Full-time Tenured					
Full-time Non-Tenured					
Part-time		1			
Total Headcount Faculty	14	17	16	18	19
Full-time Tenured	3	5	5	6	6
Full-time Non-Tenured	7	7	7	7	7
Part-time	4	5	4	5	6
FTE (A-1/S-11/Cost Study Definition)					
Full-time (Salaried)	15.00	14.87	16.00	14.00	15.00
Teaching Assistants					
Part-time (May include TA's)	2.66	3.12	4.47	4.20	4.54
Total Faculty FTE	17.66	17.99	20.47	18.20	19.54
Number of Graduates					
Certificates	5	1	8	1	7
Associate Degrees	0	0	0	0	0
Bachelor's Degrees	17	16	20	9	7
Master's Degrees	0	0	0	0	0
Doctoral Degrees	NA	NA	NA	NA	NA

Department or Unit--Physical Science					
	2006-07	2007-08	2008-09	2009-10	2010-11
Number of Students—(Data Based on Fall Third Week)					
Total # of Declared Majors	141	131	158	160	182
Total Department FTE*(annualized)	351.15	365.83	373.80	419.22	452.39
Total Department SCH* (Total annual)	10533.00	10968.00	11214.00	12576.50	13571.50
*Per Department Designator Prefix					
Student FTE per Total Faculty FTE	19.9	20.3	18.3	23.0	23.1
Cost (Cost Study Definitions)					
Direct Instructional Expenditures	1482957.86	1534605.86	1538967.54	1506556.43	1585001.07
Cost Per Student FTE	4223.15	4194.82	4117.09	3593.71	3503.66
Funding					
Appropriated Fund	1415687.08	1469283.97	1466391.46	1417633.08	1486993.85
Other:					
Special Legislative Appropriation					
Grants of Contracts	25019.29	11523.71	11421.44	2587.65	22061.47
Special Fees/Differential Tuition	192867.02	170138.44	180592.80	140027.94	155258.99
Total	1633573.39	1650946.12	1658405.70	1560248.67	1664314.31

EXTERNAL REVIEW – COLLEGE OF SCIENCE & ENGINEERING

Larry E. Davis, PhD - College of St. Benedict / St. John's University

David J. Matty, Ph.D. - Weber State University (designated USHE reviewer)

Scott G. Danielson, Ph.D., P.E.- Arizona State University

OVERVIEW

This report is configured with comments that span multiple departments within the college and departmental specific comments following. The Walter M Gibson College of Science and Engineering (COSE), as result of several administrative changes in recent years, contains a diverse mix of programs and units. There are six departments and a school, containing two departments, in the College with academic programs ranging from nursing to engineering. The numbers of students, credit hours generated, etc., are significant to the University (approximately a third of the University's enrollment and student credit hour generation). The Dean and Associate Dean are seasoned administrators and academics, with a great deal of knowledge of the institution. They, and the University Provost and President, appear to be held in good regard by the faculty and staff of the college. Specific mention was made by various faculty across the College that administration efforts to increase faculty salaries are appreciated and that faculty feel more valued than in the past as an important resource to the University.

The COSE provided its 2011 strategic plan while the review team was on site. It provides objectives and assessment strategies within three major areas of academic endeavor. However, although the plan outlines both frequency of the assessment strategy and whom is expected to accomplish the assessment, no information or data organized by the plan's objectives were presented to the review team. This was unfortunate, as information organized by the strategic plan would have been very helpful to the program review team. For instance, information related to subsection A, Academic Excellence and Distinctiveness, under Area I, Undergraduate Education Is Our Highest Priority, in one location and organized by unit or program within the self-study would have been much appreciated. It is recommended that in future program review self-studies, such a model be utilized.

The diversity of the programs within the College is of importance. This diversity creates tremendous opportunity if programs and their faculty are willing to reach across traditional academic boundaries to work together, especially to join in working on University initiatives. In particular, amazing things can happen when diverse groups of students are brought together to work on a problem. The COSE should embrace and enable such interactions, especially since it has programs that feature high levels of experiential learning as the rest of the University strives to move towards experiential learning.

This diversity also presents challenges to the college leadership team—the Dean, Associate Dean and department chairs. The variety of programs means that faculty cultures are different, with varying expectations regarding scholarly activity and recognition, and thus faculty may not feel that they have much in common with their colleagues. In addition, the relatively high work load of the faculty presents challenges when those faculty are asked to engage in different ways and do more than their routine activities. These are challenges the leadership team must overcome if the COSE is to obtain its full potential as a unit with a rich diversity of programs, faculty and students. The COSE could be adventuresome and investigate alternative structures as compared to the classic department/program structure.

Realistically, growth and progress of the COSE will be much more difficult without additional resources. The review team recommends that the COSE leadership continually look for ways to leverage the diversity and

strength of the programs towards gaining more faculty lines. Many funding agencies looks for cross departmental initiatives when reviewing proposals, as do foundations. It might be possible for funds to be generated that would allow for the hire of contract faculty to carry higher teaching loads to free up the tenure track faculty to do program development work. Also, proposals towards moving the University's experiential learning initiative forward in novel ways might be used to gain additional faculty lines in key areas. Additional discussion on these topics is found in the department specific reviews that follow this College Overview section.

PROGRAM LEARNING OBJECTIVES AND ASSESSMENT

The Provost asked the review team to provide comment on the college programs' learning objectives and the assessment of those objectives. The development of program learning objectives and assessment of them is University-wide requirement and it linked to the institutional regional accreditation.

In general, the review team found that all units have developed program learning outcomes. However, as might be expected, each unit has implemented their assessment in unique ways. Some of the units are more comprehensive in their process and mature in their implementation of the process. Some were clearly lacking in their understanding of what attributes, e.g., measurable learning outcomes, are needed to develop a robust assessment plan. Moreover, it was not readily apparent that program improvements/changes were being driven consistently across COSE by data resulting from existing assessment systems. Such improvements are one of the fundamental reasons for implementation of assessment systems and programs should drive towards developing meaningful assessment datasets that can drive program improvements. Instead, while program/course improvements are being made, they are in response to advisory boards or other ad hoc stimuli.

Three of the departments, Departments of Integrated Engineering, Engineering Technology and Construction Management, and Computer Science and Information Systems, have sought or attained ABET accreditation for programs within the unit and the existence of program outcomes and their assessment is required for that accreditation. Thus, it was expected that program learning outcomes and their assessment would be well established. The program learning outcomes were found to have been established and assessment of course learning outcomes was evident. However, the self-study did not provide comprehensive information about summary program learning outcome assessments and such data were not presented during the site visit. Unit representatives from Integrated Engineering and Engineering Technology and Construction Management indicated that such summary data had not been developed and that course level assessment data were not always rolled up to present an overall summary of graduate attainment of the program learning outcomes. Computing and Information Science representatives said they did do have/have done an aggregation of data towards providing evidence of overall student attainment of the program level outcomes.

Also, external, normalized exam data did not appear to be used by many programs, in spite of such mechanisms being a part of the COSE strategic plan. While not an easy task for some programs, the Integrated Engineering and Engineering Technology programs do have several options available to them via tests like the NCEES Fundamentals of Engineering exam, the PPI Exam Café test bank or those provided via the Society of Manufacturing Engineers.

It is recommended that all College programs revisit their assessment plans and obtain assistance and training as needed to develop clearer and actually measurable expected learning outcomes, as well as a more robust mechanism to assess whether learning outcomes are actually being achieved. We recommend that faculty or departmental level administrators with knowledge of assessment best practices be engaged to assist COSE programs in this endeavor rather than assessment or evaluation "experts" who may not understand the challenges and obstacles that faculty face in designing and implementing such a plan. A basic plan that is working well is better than a complex, sophisticated plan that does not work due to

administrative overhead burden rates.

Moreover, it is recommended that all College programs strive towards developing summary data/indicators of student program learning objectives attainment. Such a "dashboard" approach would provide a straightforward tool for both internal use and external use. For instance, if such summary data showed that one outcome was lowest on the attainment scale, efforts could be devoted to improving the student learning experience within that outcome. It appeared that many of the current improvement efforts are done in an ad hoc manner and are not driven by quality assessments via assessment data. The ABET-accredited programs should be leaders in this area and could serve as resources to other programs as necessary.

This recommendation, if adopted, has to be done in a manner that does not significantly impact faculty work load. A system that builds on existing data collection efforts and is simple to implement is an admirable goal. Here again, external test data by topic/subject can easily inform quality systems with little work load to the faculty. Most assessment systems fail because they require too much data to be gathered, thus becoming a high overhead activity on the faculty, or do not provide relevant information that can be used to improve the curricula.

RELEVANCY OF PROGRAMS WITH THE COLLEGE

The Provost asked the review team to provide comment on the college programs' relevancy within the academic endeavor of Southern Utah University. Specific detail fulfilling this charge is embedded in the departmental report sections. However, general comment can be made. The University fulfills an important role within the southern part of Utah and has been designated a liberal arts and sciences institution by the state. However, due the University's regional role, some programs, e.g., Integrated Engineering, are also of strategic importance even though they are not traditional liberal arts or science programs. Also, given the University's location and distance from the state's land grant university, it is reasonable that the College's agriculture-focused programs exist as they are relevant to the University's mission in the region.

However, all programs must maintain relevancy by being of good quality, with curriculum that is current and attractive to both students and employers or graduate programs, and with sufficient numbers of students/graduates. Faculty have relatively high teaching loads so programs should seek ways to be more efficient even as they continue to update the curriculum (an ongoing process/need). Such efficiencies may need to include offering fewer elective or fewer courses within a program's curricula. Such reductions in courses are always hard for science and technical programs due to an ever expanding array of knowledge within disciplines. However, the review team recommends that faculty think critically about what content is truly critical within each major and focus their efforts on making sure students get that critical content/attainment of learning objectives. Also, program faculty and administrators need to ensure their program curricula exhibit characteristics that allow differentiation in the regional higher educational environment so that they can be effectively marketed. Such differentiation in the marketplace is needed to attract students so all programs are at healthy enrollments. Moreover, as noted below, we suggest that the COSE investigate the possibility of developing more interdisciplinary programs within the college, as well as developing programmatic tracks which allow students to gain expertise in areas beyond their major, which may improve their marketability and future success.

IDENTIFYING PEER INSTITUTIONS AND PROGRAMS

Institutions identify institutions similar in role, scope, and missions as peer institutions for the purpose of strategic planning and decision-making with regards to:

1. Providing benchmarks for assessing institutional or program effectiveness,
2. Pinpointing areas deserving attention and improvement, and
3. Acting as guidance for policy development and budget allocation.

Unfortunately, no data regarding peer institution comparisons at the university, college or program level were provided except in conversation with the President and Provost of the University. A search of the Southern Utah University website (http://suu.edu/academics/provost/pdf/SUU-Peer-Instiution-Set-Approved.pdf) provided the following information. SUUs peer institutions were listed as: Austin Peay State University (Clarksville, TN), Columbus State University (Columbus, GA), Eastern Connecticut State University (Willimantic, CT), Georgia College and State University (Milledgeville, GA), Sonoma State University (Rohnert Park, CA), Southern Oregon University (Ashland, OR), SUNY at Geneseo (Geneseo, NY), Truman State University (Kirksville, MO), and Western Carolina University (Cullowhee, NC). This peer institution set was approved by the Utah State Board of Regents meeting on 15 January 2010. Austin Peay State University, Eastern Connecticut State University, and Georgia College & State University, were listed as 'State Designated' peer institutions. According to SUU Provost, Dr. B. Bradley Cook, Weber State University (Ogden, UT) and Utah Valley University (Orem, UT) were SUU's state peer institutions, while Truman State University, a highly-selective, liberal arts university is SUU's aspirational peer institution.

The web site includes comparisons in terms of (a) estimated annualized student FTE, (b) tuition and state appropriations, (c) average cost per student FTE, (d) percentage of state support and, (e) Carnegie classification. In terms of 'estimated annualized student FTE, SUU was in the upper range at 7198, between a high of 8440 (WCU) and a low of 4464 (SOU). SUU's tuition and state appropriations stood at $54,796,252 between the high of $110,179,759 (WCU) and a low of $37,305,857 (SOU). The average cost per student FTC for SUU was at the lower end at $7,613 between $14,633 (ECSU) and $$8,357 (SOU). SUU receives 53% state support compared to a high of 70% (WCU) and a low of 42% (SOU).

It is recommended that the College of Science and Engineering (COSE) identify two to three peer or aspirational peer programs (departments), from among the list of SUU's peer institution if possible, to establish specific benchmarks for assessing program strengths and weaknesses. This will help the college identify areas deserving attention and improvement. Such comparisons should include comparing results on nationally-standardized tests, such as the National Council Licensure Examination for Registered Nurses (NCLEX-RN®), the ETS® Major Field Tests or the NCEES's Fundamentals of Engineering (FE) examination. These examinations will enable programs to evaluate their student's performance and compare their programs effectiveness to programs at similar institutions nationwide. Based on the program reviews provided by COSE, only the Department of Nursing investigates comparative data based on the National Council Licensure Examination for Registered Nurses (NCLEX-RN®).

GERALD R. SHERRATT LIBRARY

The Gerald R. Sherratt Library is an 82,418 ft^2 facility, opened in March, 1996. According to the 2012 annual report, the library ranked 44% for total staff and 54% for library expenditures/FTE when compared to its peer institutions. These data represented an overall improvement when compared to the provided 2010 data. See (http://www.li.suu.edu/content/26/docs/02-10-12-161428-201112AnnualReportfo.pdf)

As with libraries nationwide, the Gerald R. Sherratt Library continues to suffer budget woos, particularly as the price of archival journals continues to rise. The library has not recovered from a 2008 budget cut and is down 1.75 FTE in terms of staffing. Recently, the library had a increasing percentage of resources being redirected to information literacy classes, but according to John Eye, Dean of the Library, the library staff is more efficient than many other libraries, therefore is not in a crisis at this point. One major concern is whether the library will meet the standards for the pending Phi Beta Kappa certification.

The library provides access to the several electronic data bases, with *Academic Search Premier*, *Business Source Premier, BioOne, Communication and Mass Media Complete*, and *JSTOR* receiving the greatest use. With regards to the College of Science and Engineering (COSE), the American Chemical Society's (ACS) requires the library to maintain very specific data bases in order to retain ACS accreditation, which drives the COSE library budget. According to John Eye, COSE library funding has not increased since 2000. The high expenditure rate, related to the overall COSE library budget, could put other programmatic library holding in jeopardy.

However, there was no information provided in the program review documents about how College of Science and Engineering (COSE) interacts with the library. If not already established, it is recommended that COSE establish a library committee, with representatives from the various departments, to periodically meet with the library staff to address immediate and future issues in order to provide accurate data for budgeting of library resources, especially with regards to the ACS requirement. A question that needs to be asked and answered is "does the allocation of library funds for ACS certification constitute an undue burden?" Related to this question, the college should review if the ACS certification is absolutely necessary for SUU chemistry degree graduates to enter the workforce or graduate school.

IT SUPPORT TO THE COSE

IT support at SUU uses a centralized model. Rather than each college or department hiring their own IT support staff, the centralized IT group provides support. Each department has a specific IT staff member assigned to them. While that IT staff member is not exclusive to that department (meaning they also support other departments on campus), the individual does become a single point-of-contact for issues beyond normal help desk issues. There is also a central help desk that is the first point of triage for routine inquiries.

There are approximately 900 computers on campus available to students. For the most part these computers are funded from a student technology fee. Computers are on a scheduled rotation cycle that ensures modern technology will always be available to students. There are five computer labs on the 3rd floor of the Electronic Learning Center that are used primarily for classes within the Computer Science and Information Systems programs. The vast majority of classrooms in COSE are mediated, with a networked computer, monitor, projector, Elmo (document camera), DVD player, and sound system. Several classrooms also have AppleTVs which allow for AirPlay mirroring from iPads.

Wireless access is ubiquitous with multiple access points in every building (large lecture halls have access points dedicated to just that room) and expanded coverage to include much of the "green" space between buildings in the main part of campus as well. All faculty, staff, and students at SUU have access to the wireless network.

The departments within the College of Science and Engineering are responsible for the IT equipment provided to faculty & staff. The central IT group facilitates this by configuring the equipment when it arrives on campus and maintaining it throughout its lifecycle. The College of Science and Engineering are responsible for their own software needs. The central IT group maintains a Campus Agreement with Microsoft which covers Windows upgrades and Microsoft Office for all campus entities. Central IT also maintains a site license with Apple for operating system upgrades, with McAfee for anti-virus protection, and with SPSS (IBM) for their statistics package. There is no cost back to the individual departments for those items. In addition to these site licenses, centralized IT also maintains a volume license agreement with Adobe which allows departments on campus, including those within the College of Science and Engineering, to purchase Adobe software for a substantially discounted price.

The reviewers found the IT support to COSE to be exceptionally good and commend the IT group for its outstanding service.

DEFINING "SCHOLARSHIP" OR RELEVANT SCHOLARLY ACTIVITIES

According to the COSE Strategic Plan, faculty will model life-long learning by being professionally active and productive scholars within their respective fields. Under the heading of 'professional activity', there are four objectives: (1) active engagement in professional activities, (2) professional service to the communities of interest, (3) meet or exceed departmental scholarship standards, and (4) model and teach with professional behavior and personal accountability. The first three are assessed annually by department chairs using the Faculty Annual Activity Report (FAAR) and annual reports, while the latter is based upon student evaluations and peer faculty observation and assessed annually by the department chairs. With regards to scholarship standards, scholarship appears to be defined according to Boyer's (1990) model as espoused in *Scholarship Reconsidered: Priorities for the Professoriate*, which describes scholarship as discovery, integration, service, application, and teaching. Scholarship involves a lifelong commitment to thinking, questions, and pursuing answers.

It was not clear from the various departmental self-studies what units use as specific scholarship requirements for tenure, promotion, and post-tenure review, e.g. an authored article in a recognized, peer-reviewed journal; presentation at a regional or national meeting; or submission of a major grant proposal to an agency such as NSF, HMMI, or NIH. In visiting with various departmental members, there seemed to be a great deal of confusion, and disagreement, as to what specific items were acceptable forms of scholarship for tenure, promotion, and post-tenure review.

During the site visit, several scholarship documents were provided, and, as an example, in the Biology Department's 'Criteria for Evaluation, Promotion, and Tenure of Faculty' document, the following statement is made.

> *Faculty may pursue scholarly activity in various ways as defined by the department. These include the broad categories of: discovery, integration, application, and teaching. We expect faculty to engage students in research experiences that are personalized, integrative and/or interdisciplinary.*

Scholarship is further defined under the categories of (1) Scholarship of Discovery, (2) Scholarship of Integration, (3) Scholarship of Application, and (4) Scholarship of Teaching. Each of these categories provided a definition, such as the definition for the Scholarship of Discovery. Such definitions could be used in any department within the College of Science and Engineering and probably are, given comments by the Dean. But, there still seems to be a significant issue within the college as to scholarship—what standards are and what sorts of activities will be accepted as such. It was the review team's impression that there is frustration on both sides of the issue—the Dean and the faculty. All are aware that clarity, definition, and dissipation of the uncertainty are needed.

It is recommended that, if not already in place, the college leadership create a college level promotion and tenure document that provides college definitions in a clear manner, with specific examples. This document should provide clarity as to the characteristics of scholarship. If recognition and review by peers in some fashion is necessary to qualify an activity as scholarship, such mechanisms should be clearly explained and examples provided. Department or faculty groups should then be expected to create or revise their promotion and tenure document to provide nuances specific to that unit or faculty group, again with specifics provided. The more specific the requirements, the more clear and transparent it will be for individual faculty members. It is hoped that through this process, recognition will be given to the variety of roles that exist within individual programs and among individual faculty members, both regular and temporary. It is also hoped that the college document will allow flexibility within its expectations to allow individuals to adjust their scholarly, as well as their teaching and service efforts as their interests and priorities change throughout the course of their careers. Obviously, such documents should undergo review and approval as per the University's academic policy requires.

MERIT PAY

From speaking with both administrators and faculty groups, recent merit pay processes seem to be more of a disincentive than an incentive. Department chairs feel uncomfortable selecting from within their department the 'exceptional' member(s), and departmental faculty members feel equally uncomfortable in choosing among themselves. Departmental processes may lead to designation of virtually all the faculty as meritorious while other units may decide that no one is meritorious. By the same token, it would seem unfair for COSE to not be able to use the funds in a constructive manner by insisting a faculty merit system be used. Given the merit pay policies of the institution, this issue is not a simple one to resolve. However, the team suggests the following as possible alternatives for the College and University to consider.

A. Link the monies to faculty awards within COSE, e.g. Outstanding Teaching; Outstanding Research; Outstanding Service, with selection of these awards made by a committee composed of faculty/staff across COSE. Even if merit pay may not be available every year, other money may be found or it may simply be that the award process is only implemented during years when merit or other money is available. One a system is working, such awards may become a development opportunity and receive alumni support.
B. Establish a committee composed of departmental representatives to established a set of specific criteria for each department for award of merit pay, much along the lines of specific scholarship criteria. If one or more departmental members obtain the departmental 'bar', then he/she qualifies for merit pay. If everyone in the department obtains the 'bar' (likely because the departmental bar is set too low), then the monies are equally divided. Since award amounts would be very low in this case, it might serve as incentive to faculty to rethink that unit's criteria.

PROFESSIONAL DEVELOPMENT AND ITS FUNDING

During the visit, the review team members asked faculty members from several departments in the COSE if SUU routinely made funding available for professional development. The most typical response was that funds were made available to help faculty members attend professional meetings to present the results of their research or research done in collaboration with undergraduates. Primarily, faculty indicated that through this type of activity, they could also get a better idea of advances in their areas of disciplinary research. However, most faculty agreed that opportunities for professional development related to improving teaching and learning were less commonly available. Following a discussion of the faculty's responses, the review team recommends that the college or institution consider funding individuals or teams of individuals to participate in education-related professional development opportunities. Such opportunities might consist of workshops, short courses, or conferences that can expose and engage faculty in state-of-the-art pedagogies, methodologies, and technologies that have the potential to improve faculty teaching effectiveness and student learning experiences. As those chosen to participate in such activities bring their new knowledge and/or expertise back to SUU, they should be expected to share with others at SUU in order to help colleagues keep abreast of new educational paradigms. In general, we recommend that the college consider improving its support for education-related professional development activities among its faculty. Such efforts may simply include better on-campus training and professional development opportunities, as well as supporting participation in external opportunities on a national scale.

INTERDISCIPLINARY ACTIVITY

On the basis of the materials provided and the review team site visit, the reviewers noted that the vast majority of programs within the COSE tend to be organized and focused along disciplinary tracks. However,

studies indicate that the nature of work is changing as the 21st Century US economy develops within an increasingly global marketplace. As a consequence, 21st century workers are expected to have as many as 10-15 jobs during their career instead of the 1-2 jobs of 20th century workers. Likewise, instead of mastering one field, the 21st century workers are expected to need breadth, and depth in several fields. At the very least, the 21st century workforce is expected to be agile and able to adapt to changing opportunities and job requirements. Consequently, the review team recommends that departments within COSE consider the development of programs which allow students more flexibility as they shape their educational pathway. For example, how many majors within the COSE provide students with elective space to enable the students to explore minors? For the most part, COSE programs are designed to prepare professionals or send students on to graduate schools. Giving students options to explore other areas could produce better interdisciplinary scientists, as well as scientists with potentially marketable expertise—via a minor or certificate—in areas such as digital design, illustration, international relations, management, marketing, or political science. Such opportunities should not be relegated to a BIS degree, which arguably is not as marketable as a BS or BA degree. Instead, programs may investigate less massive majors which provide enough credit hour breathing space for incorporating minors.

Opportunities for interdisciplinary collaborations also exist within the COSE itself. One example might be the incorporation of geospatial experiences into the agriculture program. Likewise, interdisciplinary environmental sciences or environmental studies programs could bring many disciplines together, as could educational programs that weave together life scientists, earth scientists, and others to help students explore the magnificent natural classrooms in southern Utah. These represent only a few possibilities, but we recommend that the COSE investigate these and other opportunities that draw disciplines together to strengthen the COSE and also provide more learning opportunities for the workforce of tomorrow.

EXPERIENTIAL LEARNING OPPORTUNITY

During the review visit, a large number of faculty members expressed concerns about the SUU experiential education initiative (known at the EDGE program). Some faculty expressed concern that the general education experience of students would suffer because of the loss of a 3-hour general education course to the three required one-hour EDGE courses. Others were concerned that EDGE itself could be detrimental to students within their program, because they feared the loss of prospective undergraduate researchers within their programs to other departments and areas at SUU. Still others were concerned that the EDGE program would result in increased workloads for COSE faculty because of the expected influx of poorly prepared non-science students who will be seeking EDGE creative experiences within COSE. Nonetheless, EDGE has only recently started, and the long-term impacts remain unclear. At the very least, if any of the stated concerns become reality, then SUU faculty have an argument to change EDGE to address issues. Likewise, if the increase in student demand for COSE experiences materializes, COSE can appeal to higher administrators for additional support. It does seem inevitable, however, that some implementation issues will materialize and consequently, future modifications to the EDGE program seem almost certain. But, because EDGE encompasses so many different pathways through which students may gain appropriate credits, the review team recommends that COSE faculty develop and investigate ways through which they can engage students in civic, global, leadership, or outdoor activities related to both their specific COSE disciplines and to interdisciplinary partnerships between disciplines within COSE, as well as with programs in other colleges. We recommend that COSE faculty treat EDGE as an exciting challenge, rather than an obstacle, by proposing innovative partnerships. Such partnerships can be the basis for strategic requests for additional support (faculty lines, etc.) from the Provost's office.

AGRICULTURE PROGRAM REVIEW

Dr. David Matty, the USHE program reviewer from Weber State University, met with Dr. Cynthia B. Wright, Chair of Agriculture and Nutrition Science, and four of the Agriculture faculty members: Dr. Chad Gasser, Mr. Randall Violett, Mr. Dean Winward, and Mr. Lee Wood.

SUMMARY OVERVIEW

The agriculture program and its faculty comprise one of two foci within the Department of Agriculture and Nutrition Science. The agriculture program offers a BIS in Agricultural Science and Industry, a minor in Agriculture, Associates Degrees ins Livestock

FARM MANAGEMENT AND EQUINE STUDIES, AND A CERTIFICATE IN LIVESTOCK FARM MANAGEMENT

The majority of degrees awarded between 2006 and 2011 were BIS degrees, and it appears that although the number of degrees split between agriculture and nutrition have shifted in recent years towards slightly more nutrition graduates, it's also important to

note that the percentage of graduates ultimately employed within the field of nutrition falls far short of the employment rate of those graduates with agriculture BIS degrees. While overall enrollments were not split out between nutrition and agriculture in the data provided, these same data indicate a sustained growth in the number of declared majors and proportionately, the number of graduates over the review period (2006-2012). In fact, these numbers (of majors and graduates) have more than doubled since 2006. Correspondingly, the SCH generated by the department has also increased, although not as strongly. Interestingly, the annualized faculty FTE has remained relatively constant throughout the review period. Taken together, although these data indicate that the overall student/faculty ratio has increased only slightly (from 21.7 in 2006 to 22.9 in 2011) during the review period, the same number of faculty are now coping with over twice the number of majors that they had in 2006, which has the potential to impact the overall faculty workload, especially in upper-level courses.

The assessment plans contained within the self-study appear to be rather weak, and are based upon expected student learning outcomes which are not consistently measurable. For example, how exactly is knowledge measured? The institution should provide appropriate professional development opportunities which engage faculty and allow them to develop an appreciation for assessment and its potential value towards improving their programs.

This reviewer found a strong camaraderie among the agriculture faculty members who participated in the review meeting, and noted that they demonstrated a strong sense of shared purpose focusing on providing the best possible learning experience for their students. The faculty members were open and honest in their comments, and demonstrated respect for their chairperson and for their nutrition colleagues. Privately, all agreed that they enjoyed their association with nutrition faculty, and felt that their department represented a complementary match of disciplinary foci at SUU (see related comments, below). However, at the same time, the agriculture faculty expressed a common sentiment that the time and effort that they invested in their program did not seem to be acknowledged or well understood by others in the college.

The vast majority of the stated mission statement of the agriculture program appears to align with programmatic characteristics and ongoing activities of the faculty and staff. However, one particular statement:

"….faculty will articulate partnerships with colleagues and programs across the university campus" is not strongly realized in practice, and faculty noted this discrepancy during our meeting. This reviewer thought that opportunities to build stronger partnerships between agriculture and, for example: the geospatial sciences in the Physical Sciences Department, and with the botany group in the Biology Department, exist and should be explored. The faculty noted that some courses, which could improve the ability of students to obtain Agricultural Education certification, are absent from the current curriculum, and that past invitations extended to USU to provide such courses to SUU via remote access, ostensibly to enable more persons in the region to obtain certification, have been ignored in the past. Nonetheless, this remains an opportunity for the agriculture program and the COSE to pursue.

APPARENT STRENGTHS:

The apparent dedication of the Ag faculty to their students and their program is strong, and laudable. Clearly, the faculty members are very serious about their courses, their students, and their facilities; they take great pride in producing outstanding graduates, and they have a great placement rate to point at. The curricula appear to be well designed and appropriate for the programmatic purposes, however there appear to be additional opportunities to consider.

CONCERNS AND RECOMMENDATIONS:

Facilities:

The reviewers were not given a tour of the facilities assigned to the agriculture program. However, in addition to faculty offices on-campus, the self-study indicates that the program maintains a nearby farm (ranch?) and a mountain property which largely serve as hands-on learning facilities for majors. While these appear to be exceptional assets to the program, it seems almost certain that they present additional challenges and costs.

The faculty raised several issues concerning their programmatic facilities. First, not all agriculture faculty have adequate office space on campus. In particular, Prof. Violett has an extremely small office which hinders not only his work, but his ability to interact with students.

Likewise, the facilities available for teaching agriculture classes on-campus appear to be inadequate. In particular, there is no designated lecture/lab space available for agriculture faculty to use for teaching, let alone store their teaching equipment and supplies. There was some mention of finding a way to share current lecture/lab space allocated to the Biology Department (specifically Botany), however the faculty thought it best that this issue be communicated and addressed internally. Given the fact that at least two biology (botany) program emphases (Agronomy and Horticulture) allow the Agsc 3565 or AGSC 3705 courses to count as electives for their majors, perhaps a solution to better share space between the two units may be possible.

Lastly, the faculty expressed concerns about the farm, which the program maintains as a teaching facility. However, these concerns seem to fall under "workload" rather than facilities, and are discussed below.

Recommendations: Providing adequate office space necessary for a regular faculty member to carry out his or her duties such as preparing for class, grading papers, and meeting with students, among other things, is a responsibility of the institution and should be made a priority. Space that approximates "a broom closet" is not appropriate, and every effort should be made by the college to provide reasonable space where a regular full-time faculty member can carry out his/her work efficiently and effectively. Likewise, if some agriculture courses are being taught at the main SUU campus, then at the very least, some mechanism should be found

to provide appropriate classroom/lab and materials storage space for their use. This may involve sharing space with other departments, such as biology, which offers programs which include agriculture courses as electives. In both cases, it's essential for the dean to help address these issues.

Workload and related expectations:

The faculty unanimously expressed concerns about the amount of time and effort that they put into maintaining the farm/ranch teaching facilities, and most noted that the work required to maintain these facilities had increased in recent years following the loss of a full-time farm position as a result of budget cuts. Likewise, some faculty members apparently spend a considerable portion of their time traveling throughout the region to locate and purchase livestock appropriate for teaching purposes.* The faculty's perception is, by taking on the support duties required to maintain the farm and ranch - which are essential to the program and necessary for them to continue to provide robust student learning experiences - in addition to maintaining their current teaching loads, that the time available to pursue any significant scholarly activities has become extremely limited.

Recommendations: Given the amount of time provided to meet with faculty and otherwise assess the agriculture program, it's not known whether the perceptions of the faculty are accurate. Consequently, this reviewer recommends that the dean should schedule several days throughout the semester where he can shadow the agriculture faculty and learn more about the support demands either placed on them by the loss of the farm position, or by other activities which are necessary to ensure programmatic success (e.g. provide appropriate livestock). Assessing the results of such activities will provide information necessary to improve the workload conditions, or to help clarify overall expectations, including scholarship, for faculty within this program.

Curricular issues:

Anecdotally, the faculty noted that they had received a number of requests from students wishing to obtain certification in agricultural education. They also noted that many of the courses that they currently offer would contribute to such a program. [Note that this reviewer equates such activities, in part, to the work that a person running a chemical stockroom might be required to do, except that it would be much easier to order chemicals opposed to finding appropriate livestock. Moreover, the programmatic demands for agriculture seem unique within the college. Which other departments must maintain a farm or ranch, or travel to find their own supplies? Consideration of such a question within a larger evaluation of workload demands within the college may prove to be of value when defining faculty expectations within COSE.]

Moreover, as noted above, the faculty indicated that in the past, requests had been made to Utah State University to offer other needed courses at SUU via distance learning, and that there had been no action (or indication of interest) by USU. This reviewer also noted that the agriculture program could be forging stronger interdisciplinary partnerships with other programs on the SUU campus to enhance the preparation of its graduates.

Finally, as noted above, the assessment plan presented within the self-study is weak, and should be strengthened.

Recommendations: This reviewer recommends that COSE should carry out a market study to investigate and document any demand for an agricultural education program within the area. Should significant interest be documented, COSE should contact USU and once again attempt to engage USU in discussions of developing a partnership that will serve the needs of students throughout south-central Utah. Likewise, this

reviewer recommends that the agriculture program faculty should investigate the development of partnerships with other programs that will provide students with options to improve their preparation as agricultural specialists. This reviewer suggests investigating the Agrowknowledge website (www.agrowknow.org) at Kirkwood Community College (Iowa) to learn more about interdisciplinary opportunities in the agricultural sciences. One such opportunity lies in the application of geospatial technology to agriculture, farming, and ranching. Other opportunities may lie along the intersections of AgSci with, for example: botany or business, or in the expansion of courses which focus on adapting agricultural practices to changing climate. Additionally, by repackaging existing course offerings, opportunities to develop new certificate programs which could provide ongoing educational opportunities for graduates or other agriculture professionals within the region, could be explored. Finally, as noted above, the institution should provide effective training in developing strong, and measurable expected learning outcomes, and from these, developing a stronger assessment plan. Such training may best be accomplished by other faculty members with deep understanding of the assessment process rather than by assessment "experts" who often do not understand or comprehend the faculty perspectives.

Overall recommendation: The agriculture program at SUU comprises a dedicated faculty, appropriate curricula, and a significant number of graduates. It appears to meet a regional need, and fills a significant niche. While there are issues to be addressed and opportunities to be investigated, the agriculture program appears to be robust, and continued, if not expanded, support should be provided if possible. The workloads demands of faculty should be reevaluated within a realistic framework of their overall programmatic duties. Finally, the programmatic assessment plan should be strengthened following appropriate training of faculty.

BIOLOGY GENERAL STATEMENT

The on-campus visit for the external review of the Biology Department was part of the program review of the College of Science and Engineering (COSE), Southern Utah University took place on 10-11 January 2013. The external reviewers for the COSE program review were Drs. David Matty (Weber State University), Scott Danielson (Arizona State University) and Larry Davis (College of St. Benedict/St. John's University). For specific departments within COSE, David Matty was assigned physical sciences, agriculture, and mathematics; Scott Danielson was assigned integrated engineering and computing and technology; and Larry Davis was assigned nursing, nutrition, and biology.

Prior to the review, each department completed a self-study in order for the external reviewers to gain a sense of the department and potential issues. For the most part, the departmental self-studies were a reiteration of the previous year's annual report to COSE and of limited value to the reviewers.

Prior to meeting with individual departments, the reviewers met with Dr. Robert Eves and Eric Freden, Dean and Associate Dean of the College of Science and Engineering (respectively), followed by a meeting with Dr. Michael T. Benson, SUU President; Dr. Bradley J. Cook, SUU Provost; and Dr. William J. Byrnes, SUU Associate Provost and Director of Strategic Planning.

BIOLOGY DEPARTMENT

Dr. Larry Davis, program reviewer from the College of St. Benedict/St. John's University, first met with Dr. Paul Larson, Chair of the Department of Biology, and then as a group with Drs. Helen Boswell, Laurie Mauger, Fredric R. Govedich, Jacqualine Grant, Debra Hanson, William Heyborne, Terri J. Hildebrand, Jonhathan Karpel, Paul Pillitteri, and John Taylor.

ASSESSMENT OF CENTRALITY TO MISSION AND VISION

Overall, the Biology Department is characterized by a group of faculty dedicated to student learning. Departmental members were quite vocal in their dissatisfaction of being labeled a 'dysfunctional' department within COSE and by the campus community, at large. During such a short interview, it is difficult to truly develop a feeling regarding whether or not the department is dysfunctional. However, the quality of the department's program review self-study might suggest 'where there is smoke, there is fire'.

The Biology faculty all agree the mission of the department is to cultivate student learning. Yet, the department does not appear to be of one mind in what the details of the mission for the department are and they seem to lack a common vision for the department. While commitment to interdisciplinary, collaborative science appears to be present, the level of interdisciplinary work within and outside the classroom does not appear to be at the maximum level.

Overall, the Biology faculty/staff of 17 is relatively young, with only two members being tenured, 9 full-time non-tenured, and 6 part-time faculty (2010-11 data). Thirteen of the Biology faculty hold PhDs. The department chair is not a biologist, but rather an Associate Professor of Geography and GIS. While the department chair indicates he has established a good rapport with department faculty members, there was an indication of some issues with regards to communication.

ASSESSMENT OF QUALITY

Despite a lack of unanimity of vision, the overall quality of the biology program appears to be sound and well respected. Faculty are dedicated and committed to their role as facilitators of student learning. They

care about their students and they strive for teaching excellence. As a young faculty, they certainly have the potential to produce students of the highest quality in the biological sciences.

The department's program review self-study provided the following data: The number of graduates ranks among the highest of all departments on campus. For the most recent academic year (2011-2012), we note the following:

- 95% acceptance to medical schools
- 89% acceptance to dental schools
- 80% acceptance to pharmacy schools
- 75% acceptance to physical therapy programs
- 90% acceptance to PA schools

These data may or may not be accurate, as these were the exact same data reported on the College of Science and Engineering program review self-study under GOAL #1 Objectives and Assessment. There was no indication that these data represented only the Biology Department, and it is well understood that acceptance into professional schools could easily be students coming from nursing, chemistry, nutrition, or even English. If these data do reflect acceptance to professional programs, then the department is to be commended.

RECOMMENDATIONS

(Note: The order of these recommendations is not prioritized; that is a task for the department)

CURRICULAR MODIFICATIONS

The departmental self-study indicates the offering of Bachelor of Arts and Bachelor of Science degrees in Biology, with emphases in botany, forensics, zoology, and education, as well as a Bachelor of Interdisciplinary Studies and Biology minor. The degrees have a core requirement of General Biology I & II, Ecology, Genetics, Evolution, General Microbiology (added spring semester, 2013), and Seminar. In addition, students complete a capstone course. Supporting coursework includes Statistics and College Algebra, and either Elementary Chemistry and Elementary Organic Biochemistry or Principle of Chemistry I & II and Organic Chemistry I &

II. The latter chemistry sequence is recommended to students seeking advanced degrees in the biological sciences. Students then select from a wide variety of upper division zoology and botany courses (20 courses on offer), which reflect the specialties of the faculty. Additional upper division courses from other departments are also acceptable, depending on the emphasis area.

At first glance, it would appear that the number of upper division courses on offer is too large to be covered by the number of faculty and their commitment to general education (Introductory Biology). However, the number of courses is not out of line with Biology programs at the peer institutions. It was not clear as to the minimum number of students required for an upper division course to be taught, but it seems reasonable to require a minimum of 10 students enrolled in order for an upper division course to be taught. It was not clear from the self-study or the SUU web site whether or not selected upper division courses were offered on alternate semesters/years. Recommendation: Obviously, the core biology courses would need to be offered each year, but some of the more specialized upper division courses should be offered on alternate years and the timing of these offerings should be clearly indicated for the purpose of advising.

Due to input from the Division of Wildlife Resources and the Bureau of Land Management, a proposal is now being considered by the Board of Trustees to eliminate all Biology degree emphases and replace

them with one Biology degree and a second Biology Education degree. Recommendation: This change makes very good sense and the department is encouraged to continue on this course of curriculum change. The change may well impact enrollment in certain upper division courses, and the faculty will need to accept that some courses may need to be eliminated due to low enrollments. If the change does occur, it is strongly recommended the core program in Biology be maintain (which may well be the case).

The department has a large commitment to general education. According to the faculty, 58% of the students enrolled in General Biology are non-biology majors. Faculty see this commitment as a huge drain on their resources and increases their faculty teaching loads. However, it should be understood that without the large enrollment of non-biology majors in General Biology, the number of faculty lines would likely be reduced – a Catch 22.

There seemed to be a general concern regarding the number of students repeating the General Biology course, which impacts the enrollment of incoming freshmen declaring Biology as a major. This can be a serious problem. Recommendation: If freshmen are being turned away from General Biology because of demand by upper classmen, then the University should consider classifying the course as 'IMPACTED' and eliminate or limit the ability of a student to repeat the course, at least for 1 semester. This restriction might also serve to 'prod' students to work more diligently if they understand that repeating the course is going to be difficult.

SCHOLARSHIP

Instruction and service are the primary activities expected of faculty in the College of Science and Engineering. By the same token, the departmental scholarship document states, *"The Biology Department requires that an acceptable level of scholarly contribution, as documented by the faculty member's file, be demonstrated by the third year review and that a general pattern of acceptable performance be maintained thereafter."* Based on the documentation provided and a review of 'professional information' listed on the department's web site, scholarship appears to be a low priority. It is well understood that the web site may need to be up-dated, but as reviewers, we can only rely on the data provided. The scholarly activity appears to be 'all over the board', but with some faculty, no scholarly publications were listed or the most recent publications were from 2003. This would seem to be unacceptable based on the department's statement on scholarly contribution.

Recommendation: Departmental faculty need to be more diligent in providing updated information, or start working harder on scholarly output. With regards to the latter, faculty are not required by COSE to publish in *Nature* or *Science,* therefore the faculty needs to become more aware of other venues for publishing, e.g. working with student researchers to publish in the *American Journal of Undergraduate Research* or thinking about the scholarship of teaching and publications such as *The American Biology Teach* or *The Journal of College Science Teaching.*

The Biology Department, as well as COSE, attaches great importance on undergraduate research. The last statement in the department's 'Student Learning Outcomes' states *"completion of an independent research project".* As we all know, the final phase of any research project is the dissemination of results. The department's self-study stated, "during the 2011-2012 academic year, numerous presentations were made at professional venues on the local, regional, and national level by both faculty and students." However, no documentation was provide beyond this statement, therefore, based on the information that was provided, it would appear that there is little or no activity in the area of undergraduate research.

Recommendation: If undergraduate research is truly important and one of the stated 'Student Learning Outcomes', then provide the appropriate documentation!

One of the areas in the department's 'standard of performance' for scholarship is the submission of a grant proposal. The reviewers certainly believe the writing of a grant constitutes active scholarship and the department is to be applauded in this area. During the 2011-2012, academic year, six grants were obtained by three Biology Department faculty members, which totaled $557,416. Unfortunately, no other information could be found indicating grant submissions or funding from previous years.

Recommendation: Provide more relevant information.

FACILITIES

The reviewers were not provided a tour of the department's facilities, although one of the reviewers had a brief tour in July, 2012. According to the department's self-study, the department has a general biology lab, a microbiology lab, a human anatomy lab (including cadavers), a histology lab, a genetics lab, and two ecology labs. In addition to laboratories, the department has a state-of-the-art animal care facility and a brand new, well-designed greenhouse. The self-study also states the department's genetic teaching lab is the most complete laboratory in the state of Utah, and, as a result, many of SUU Biology graduates have gone to work for genetics laboratories along the Wasatch Front and elsewhere.

All colleges and universities deal with an on-going dilemma – enrollments increase at a rate greater than construction of teaching spaces. There does seem to be a problem with the use of Biology laboratories for ESL classes. The assumption is that if a class is not scheduled in a laboratory, then the space if available and this is simply not true for laboratories. Many science laboratories are not suitable for classes. There are certainly safety issues, as well as the potential loss or breakage of equipment. Additionally, just because a laboratory space is not 'scheduled' does not mean that it is not in use. Laboratory spaces are often being used during non-scheduled times for student and faculty research. Additionally, faculty or laboratories TAs may be setting up laboratory materials for the next scheduled lab.

Recommendation: Remove science laboratories from spaces available for teaching ESL or other non-science classes.

ASSESSMENT

The assessment program for the Biology Department is weak and/or poorly documented. The department's self-study indicates:

> "Assessment of Student Learning Outcomes is performed every year. The framework for assessment is based on examination of course objectives for two Biology core courses plus one core course per specialized emphasis for every Learning Outcome. Raw assessment data consists of student responses to specific homework or test questions or performance in other specific activity as appropriate. Each student response or performance is assigned a "pass" or "fail" status based on objective standards."

An assessment rubric was provided in the self-study for BIOL 1610, 1615, and 1625, and it is assumed that since the 'follow up' section all indicated 'TBA Spring 2013', these data were for the fall, 2012. If that is the case, then the self-study is incomplete with regards to assessment data, IF the Biology Department assesses learning outcomes each year – where are the previous year's data? Based on the data provided, it would appear that student performance for learning outcomes in BIOL 1610, 1615, and 1625 is mostly 'marginal' to 'requiring immediate action'. If this is the case, then there would seem to be a problem! Recommendation: The department needs to provide more relevant data, with some historical context, e.g. data from the past 6-years.

Biology seniors take the ETS® Major Field Test (MFT) in Biology but no performance data was provided. The department chair indicated that he had no idea where the MFT data were located. When the faculty were asked about student performance on the MFT, the gist of the conversation was that they did not feel the MFT was important and provided little information regarding student performance. The example

given by one faculty member was that students generally perform very poorly in the area of botany because not many of the students taking the MFT have taken a botany course. If that is the case, poor performance in botany by most students is to be expected and analysis of the botany portion of the data could be ignored. On the other hand, if student performance was poor in the subject area of genetics, ecology, or evolution, subject areas required of all Biology majors, then the data would suggest there is a problem. If student performance was above average in these subject areas, then it would suggest the department is doing a good job.

Recommendation: If the department is going to the expense of administering the ETS® Major Field Test (MFT) in Biology, then analyze, utilize, and maintain the data, otherwise what is the point!

It is recognized by the reviewers, it can be difficult to encourage students to take the MFT seriously. If there is no consequence for poor performance, why should students be earnest in their efforts? This is a good question!

Recommendation: Establish some consequences, which might include requiring a remedial course (e.g. modified general biology course) before allowing a student to graduate if the performance is poor on the MFT or recording the MFT score on the official transcript. The latter could impact a student's consideration for acceptance into graduate or professional schools, thereby encouraging students to take the exam seriously.

The department chair indicated he was unsure if any form of exit interviews for graduating seniors were conducted and that alumni follow-up was limited.

Recommendation: The department may want to consider conducting exit interviews of graduating seniors, and to develop and conduct periodic surveys of alumni, e.g. 5-years following graduation.

NUTRITION DEPARTMENT

Dr. Larry Davis, program reviewer from the College of St. Benedict/St. John's University met with Dr. Cynthia B. Wright, Chair of Agriculture and Nutrition Science and two of the three nutrition faculty: Mr. Matthew Schmidt and Ms. Artis Grady.

ASSESSMENT OF CENTRALITY TO MISSION AND VISION

Overall, the Nutrition Department is characterized by a small group of faculty dedicated to student learning. The Nutrition faculty all agree the mission of the department is to cultivate student learning. Of the members met, the department appeared quite collegial with a willingness to work together. Like most academic departments, faculty expressed the need for more funding, faculty lines, and space, but the reviewer felt the department was doing well with the resources available, with one possible exception (to be addressed later in this report).

The present program offers a BS in Human Nutrition and a BS in Dietetics in Rural Health is to be added. In the spring, 2012 the major began offering two options: pre-dietetics and pre- allied health to allow students to take classes that best prepare them for their future career goals. The faculty is united in their desire to offer a Registered Dietetics Program in addition to the BS in Human Nutrition and Dietetics in Rural Health. A Registered Dietetics Program would be extremely useful considering the location of Southern Utah University and its outreach into large, surround rural population. At the present time, graduates with the BS in Human Nutrition or Dietetics in Rural Health are required to attend graduate school in order to obtain a certificate as a Registered Dietitian.

ASSESSMENT OF QUALITY

The overall quality of the nutrition program appears to be sound and well respected, but unfortunately no specific data regarding program outcomes were presented in the self-study. Faculty are dedicated and committed to their role as facilitators of student learning.

An excerpt from the self-study states:

> The Bachelor of Science Degree in Human Nutrition degree emphasizes the biological and physical sciences and provides students with the background necessary to understand the function and metabolism of nutrients. The program provides an excellent foundation for students considering careers in dietetics, medicine, dentistry, and other health related science professions. Academic requirements for entering medical school, dental school, or allied health professional may be met though the BS in Human Nutrition degree.

Data from the self-study indicates the program is strong with rapidly increasing enrollments: 116 majors at the beginning of the program in 2006, and 180 majors in 2012 (an average increase in 10 majors/year). There has been a similar increase in the number of graduates, with 15 graduating in 2007 and 33 graduating in 2012.

RECOMMENDATIONS

(Note: The order of these recommendations is not prioritized; that is a task for the department)

CURRICULAR MODIFICATIONS

When asked about support from Chemistry and Biology, the faculty responded hesitantly, "Yes, there was support from these departments." The problem seemed to be with the low scores nutrition students receive in bio- and organic-chemistry, which reduces the student competiveness for graduate and professional programs. As a consequence, nutrition students are often advised to take bio- and organic-chemistry elsewhere.

It is certainly not the recommendation that the Chemistry Department lower the standards in their bio- and organic-chemistry courses. Recommendation: The Departments of Chemistry and Nutrition may want to have a discussion about the appropriate chemical knowledge necessary for nutrition majors. For example, maybe the discussion of polymers, aliphatic and some aromatic compounds, such as benzene and toluene, are not really applicable to nutrition studies, but a course focused on bio-molecules and the aromatic compounds in amino acids are of great importance to nutrition majors (and possibly biology majors). Again, it is not suggested that Chemistry lower their standards but think about designing a rigorous course specifically for nutrition majors.

SCHOLARSHIP

Instruction and service are the primary activities expected of faculty in the College of Science and Engineering, and with regards to scholarship it is expected that faculty members with demonstrate an *acceptable level of scholarly contribution.* Departments are expected to establish the 'scholarship yardstick' for members of the faculty. Unfortunately, no documents were provided with a 'scholarship yardstick', and furthermore a review of the Nutrition Department's web site failed to reveal any level of scholarship. When asked about scholarship, the faculty responded, "the scholarship bar in COSE is too high and it diverts attention from teaching." It is difficult to evaluate the validity of the statement, but it would appear that scholarship activity is of a low priority within the department.

Recommendation: If a 'scholarship yardstick' for the Department of Nutrition has not been set, there needs to be a discussion with COSE on the topic. If such a document exists, then there needs to be a discussion as to whether or not the level of scholarship is appropriate for all members of the Nutrition

department, e.g. maybe there are different criteria for tenure-track vs. non-tenure track faculty. It may be appropriate to include a precise statement regarding scholarship in a faculty member's initial hiring contract, e.g. 'for tenure and promotion (continued employment, etc.) you will produce XYZ by the following dates' or something along those lines. It is further recommended that for future program reviews documents pertaining to scholarship requirement and scholarly activity of departmental members for the period being reviewed be provided in the departmental self-study.

FACILITIES

The reviewers were not provided a tour of the department's facilities. In the departmental self-study it was indicated that there is space for nutrition and food science laboratories and that program has a fully stocked foods lab and accessories for catering meals. All colleges and universities deal with an on-going dilemma – enrollments increase at a rate greater than construction of teaching spaces. There was one rather contentious area regarding GC 209, a room located across from the faculty offices. Faculty members were quite animated in their discussion about GC 209. Allegedly, the room in question had been used by the nutrition department to conduct clinical tests (blood tests, urinalysis) because of its close proximity to faculty offices (a faculty member must present when a student performs a blood test) and a connection to restroom facilities. According to the faculty, the room was 'taken' without consultation and turned over to Visual and Performing Arts (apparently the room also had sewing facilities). In a later discussion with Dr. Robert Eves, Dean of COSE, the review was told that the room was already scheduled to be returned to the Nutrition Department at the end of the spring, 2013 semester and that the department had been told so. Recommendation: There needs to be better communication at some level, just not sure as to where!

ASSESSMENT

The Nutrition Department provides the following statement in their self-study:

> Assessment of Student Learning Outcomes is performed every year. The framework for assessment is based on examination of Course Objectives for two Nutrition courses for every Learning Outcome. Raw assessment data consists of student responses to specific homework or test questions or performance in other specific activity as appropriate. Each student response or performance is assigned a "pass" or "fail" status based on objective standards.

The self-study further states:

> Assessment results following any curriculum changes
>
> We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013) Curriculum changes made based on assessment of SLOs
>
> We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)
>
> Changes made because of input from key stakeholders
>
> Added NFS 4860 (Nutrition Practicum) to replace NFS 4890 (Nutrition Internship) Added NFS 3030 – Diet therapy (3 credits)
>
> Added NFS 4030 – Nutrition assessment (3 credits)

Added NFS 4040 – Nutrition counseling and communication (3 credits)

Assessment results following any curriculum changes

We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)

These statements would suggest a problem with the first indented statement: 'assessment of Student Learning Outcomes is performed every year' and should read, 'assessment of SLOs was first performed last year'!

Not to put too fine of a point on the topic, but the assessment program for the Nutrition Department is either lacking or not documented or both. Apparently, there is a State Articulation Committee with some oversight on curriculum content to maintain state standards, but no documentation was provided as to whether or not the department met the state standards. Apparently, there is no accrediting body for Nutrition, but there would be an accrediting body for Registered Dieticians, should the department secure this program. There is no ETS® Major Field Test (MFT) in Nutrition, therefore there seem not be any way of comparing the department to national norms. However, there is a Registration Examination for Dietitians and a Registration Examination for Dietetic Technicians administered by the Commission on Dietetics Registration, Academy of Nutrition and Dietetics.

Recommendation: Investigate the possibility (ies) of some type of examination when can be utilized for comparing the department's graduates to national norms.

The department chair indicated the department conducted exit surveys of their graduating seniors and phone surveys of alums.

Recommendation: The department may want to consider formalizing the process and providing the data as part of their annual departmental reviews, as well as for future program reviews.

Dr. Larry Davis, program reviewer from the College of St. Benedict/St. John's University met with Dr. Danna J.A. Lister, Chair of Nursing and two of the nine nursing faculty: Dr. Alan H. Pearson and Mr. Kevin D. Tipton.

ASSESSMENT OF CENTRALITY TO MISSION AND VISION

The Nursing program at Southern Utah University has an interesting history and that history is worth repeating in the context of this program review. As reported in their self-study, SUUs Nursing Program is the first "generic" baccalaureate nursing program in the southern Utah region. The school had a 30+ year history of providing associate degree nursing and then RN to BSN education as a cooperative program with Weber State University. The nursing faculty developed the SUU nursing program using experiences, knowledge, and insight gained from the Weber State cooperative experience in combination with skills and perspective from new faculty as they joined the Department of Nursing. The Southern Utah University Nursing Program was conditionally approved by the Utah State Board of Regents in December, 2003, as a pre-licensure baccalaureate of science in nursing program (BSN). Final approval was granted from the Utah State Board of Regents to begin the program in April, 2004. The inaugural class of 20 pre-licensure students was admitted and started course work in August 2004. Subsequent pre-licensure students (including some Practical Nurse (PN) to BSN option students) were admitted spring and fall 2005, consisting of 23 and 36 students respectively. (Because of the nursing shortage, the department received additional private funding to increase the number of graduates. To meet that request, the number admitted went from 23 to 30.) The first group of 36 RN to BSN students was admitted summer term of 2005. The nursing program continued to admit 30 pre-licensure students fall and spring semesters until fall of 2008 when the additional funding was stopped and the number admitted returned to 20 students per semester. The number of RN to BSN students has been consistent at approximately 30 students admitted each summer. Realization that the PN to BSN track was problematic for both students and faculty, resulted in termination of the PN option. PN students did not feel that they were really a part of either the RN to BSN class or the pre- licensure class. Faculty had difficulty with consistently communicating with this group of students to get them the information needed. Since that time, PN students desiring their BSN apply and complete the program with the pre-licensure students. The transition from AD and RN to BSN education (as was offered in the Weber based program) to a "generic" BSN program, combined with new faculty, growth, and integration in Southern Utah University, was not as smooth and seamless as faculty had hoped. Our challenges were most obvious in our poor NCLEX-RN pass rate. While some of the faculty had concerns about our learning/teaching approach prior to the first group testing, once NCLEX-RN results were obtained, the faculty began instituting changes to strengthen individual learning in order to "increase accountability for learning".

ASSESSMENT OF CENTRALITY TO MISSION AND VISION

The Nursing Department is characterized by a group of highly motivated faculty dedicated to student learning. The Nursing faculty see their mission as cultivating student learning and graduating well-prepared and dedicated health professionals. The members met had 'down to Earth' personalities and with very collegial attitudes and a willingness to work together. They appeared to have tremendous respect for each other. It was quite apparent that the department has strong and well-respected leadership. The faculty members interviewed were quite insistent that they [the faculty as a whole] view themselves, as well as the staff, as a TEAM! The department indicates a strong partnership with area clinics and that the surrounding communities hold their graduates in high regards.

The department aspires to develop a Master's program for graduating Nurse Practitioners, which seems to be a very appropriate and reasonable aspiration.

RECOMMENDATIONS

(Note: The order of these recommendations is not prioritized; that is a task for the department)

ASSESSMENT OF QUALITY

Program goals for the BS in Nursing are derived from established professional nursing standards which include the American Association of Colleges of Nursing (AACN) document, *The Essentials of Baccalaureate Education for Professional Nursing Practice* (2008). Student benchmarks for the program have been established by the faculty as practical measures of competency of graduates. These benchmarks include student success on first NCLEX-RN® attempt and resulting state licensure.

The following data were provided from the departmental self-study:

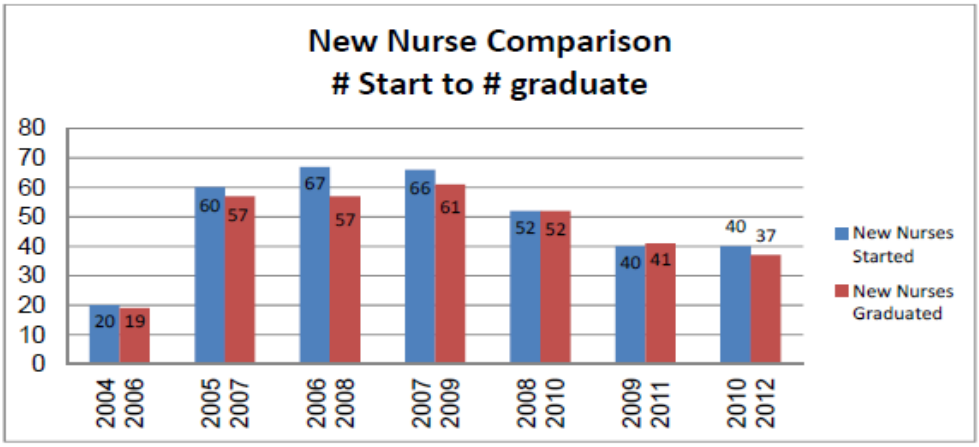
Based on the data provided, it would seem the department is doing very well. Of course, it is useful to point out that entry into the program is highly selective, but nonetheless, difficult to argue with success.

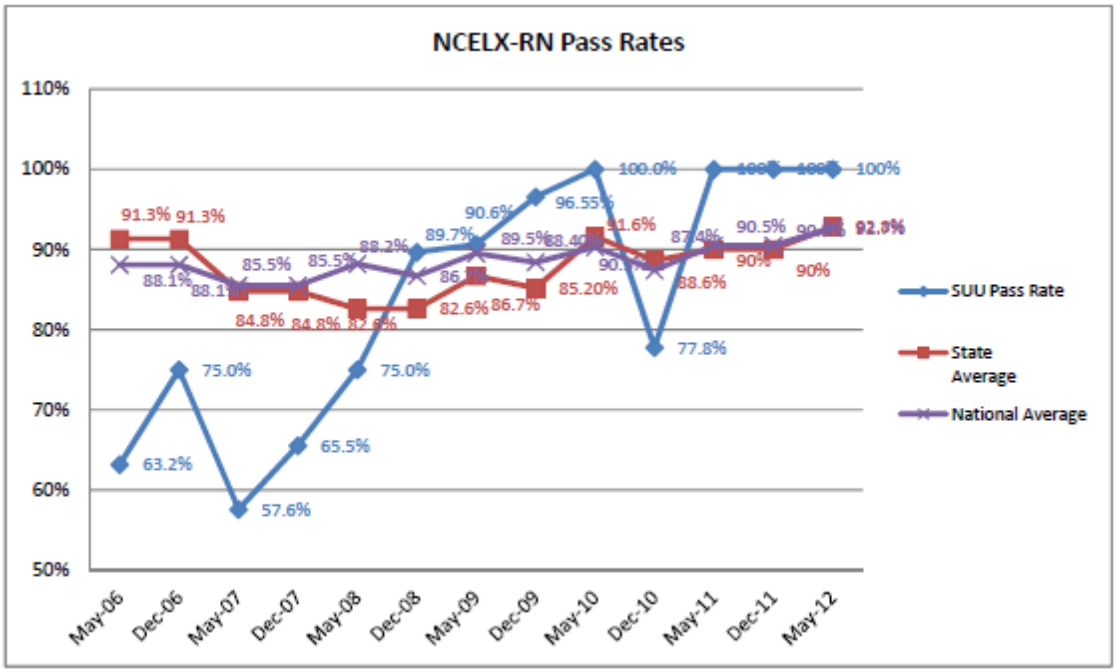
The department had a weak start on the National Council Licensure Examination for Registered Nurses (NCELX-RN) but quickly showed major improvements and were scoring above both state and national standards by December 2008, with only one noticeable downturn in December 2010. The 100% pass rate is very commendable.

Application Statistics

All Classes

Semester/Year Applied	Fall 2012	Spring 2012	Fall 2011	Spring 2011	Fall 2010	Spring 2010	Fall 2009	Spring 2009	Fall 2008	Spring 2008	Fall 2007	Spring 2007	Fall 2006	Spring 2006	Fall 2005	Spring 2005	Fall 2004
# of Applicants	78	49	63	45	43	38	56	29	95	49	35	40	35		115	43	34
Number Accepted	20	22	53	20	20	20	20	21	20	32	31	30	32	30	31	23	20
Number Alternates	8	6	20	7	7	5	15	2	10	2	5	0	0	0	15	7	6
# Physically Started	20	22	13	20	20	20	20	20	20	32	31	30	32	30	31	20	19
Average CUM GPA	3.62	3.68	20	3.6	3.71	3.51	3.57	3.38	3.61	3.52	3.40	3.42	3.42	3.35	3.53	3.60	3.43
Core GPA	3.65	3.69	3.68	3.7	3.72	3.51	3.61	3.31	3.70	3.40	3.40	3.46	3.45	3.35	3.56	3.50	3.52
# from outside SUU	5	7	3.73	4	5	3	12	1	11	12	17	15	8	9	14	4	0
Average Age	24	25.73	4	23	24	27	25	24	24	25	25	26	26	26	25	26	26
Male	5	4	26	4	4	4	4	2	5	2	10	9	7	8	10	3	7
Female	15	18	4	16	16	16	16	18	15	30	21	21	25	22	21	17	12
Ethnicity:			16														
Black Non-Hispanic:					0					0		0	0		0	0	0
Asian or Pacific Islander:					1			2	1	2	1	0	0	2	1	0	0
Hispanic:	1	1		1	1			1		1		1	1		2	0	0
White Non-Hispanic (Caucasian):	19	20	1	19	18	20	20	17	19	29	30	28	31	28	28	19	19
American Indian:			19		0					0		1	0		0	0	0
Other:		1			0					0			0		0	1	0





A review of external documents indicate there is a high degree of professional development among the nursing faculty and the faculty regularly attend professional meetings and workshops, such as National League for Nursing Education Summit, Nursing Campaign for Action-Western Regional Education meeting; NCSBN NCLEX Conference, NLN Simulation workshop, and the Utah Creative Teaching Strategies for the Nurse Educator conference.

RECOMMENDATIONS

(Note: The order of these recommendations is not prioritized; that is a task for the department)

CURRICULAR MODIFICATIONS

Since the Nursing Department follows the guidelines established by the American Association of Colleges of Nursing (AACN) there are no recommendations regarding curricular modifications.

The EDGE Program established by the University to provide an experiential learning component within the universities' core graduation requirements are problematic, in part because students often enter the nursing program with an Associate Degree and assume they have completed the core graduation requirements. Furthermore, the very nature of the nursing program incorporates a substantial amount of experiential learning and in most cases, at a higher level (faculty wording). The reviewer tends to agree.

Recommendation: Because the nursing curriculum is strictly governed by American Association of Colleges of Nursing, which contains a significant component of 'on-hands' training, the University might consider lifting the EDGE requirement for nursing students.

SCHOLARSHIP

Instruction and service are the primary activities expected of faculty in the College of Science and Engineering, and with regards to scholarship it is expected that faculty members with demonstrate an *acceptable level of scholarly contribution.* Departments are expected to establish the 'scholarship yardstick' for members of the faculty. Unfortunately, no documents were provided with a 'scholarship yardstick', and furthermore a review of the Nursing Department's web site only revealed a minor level of scholarship.

Recommendation: If a 'scholarship yardstick' for the Department of Nursing has not been set, there needs to be a discussion with COSE on the topic. If such a document exists, then there needs to be a discussion as to whether or not the level of scholarship is appropriate for all members of the Nursing Department, e.g. maybe there are different criteria for tenure-track vs. non-tenure track faculty. It may be appropriate to include a precise statement regarding scholarship in a faculty member's initial hiring contract, e.g. 'for tenure and promotion (continued employment, etc.) you will produce XYZ by the following dates' or something along those lines. It is further recommended that for future program reviews documents pertaining to scholarship requirement and scholarly activity of departmental members for the period being reviewed be provided in the departmental self-study.

FACILITIES

The Nursing Department is housed in the new addition to the Walter Maxwell Gibson College of Science and Engineering. The teaching spaces and labs are well equipped and well designed. Overall, the facilities are very impressive. Faculty seemed to be quite happy with their facilities. In fact, the Nursing Department is often 'show cased' by the University administration, and visitors are typically shown the department's facility. The faculty did express a desire for administrations to visit with them in order for them [administrators] to become more familiar with the actual workings of the nursing program and the differences between an LPN, RN, and NP. In short, the department would like administrators come over to sit down and talk, rather than conducting an arm-waving walk-through.

Recommendation: No recommendation regarding specific facilities. Would recommend administrators get to know their nursing department on a more intimate level, if the University is going to continue to 'show-case' the department's facilities.

ASSESSMENT

The department provided excellent data concerning NCLEX-RN® pass rates, and the data suggests the department is doing very well.

The self-study indicated the department maintains EBI Data: Educational Benchmarking Inc. (EBI) assessment data, which are used to measure the effectiveness of our programs from the graduating nursing students' perspective. The assessments from EBI are based on CCNE standards for accreditation and address student satisfaction and Student Learning Outcomes. The assessment provides feedback from students concerning their perception of the program's effectiveness and is utilized in comparison with six comparison institutions, SUU previous data, Carnegie Class institutions and all institutions using EBI. Unfortunately, none of these data were provided in the self-study.

The self-study indicated the department conducts periodic Employer Satisfaction

Surveys; informal feedback from Advisory Board Meetings (held at least annually) and interactions from key employers regarding the performance of SUU graduates. Data from the employer surveys demonstrate employer satisfaction with SUU graduates. Unfortunately, none of these data were provided in the self-study.

The department also maintains data regarding plans for employment or graduate school

admissions collected from graduation surveys and the EBI survey completed by all pre-licensure students. The self-study reported those students who are not in graduate school have an employment rate above 90%. But, again, none of these data were provided in the self-study.

Recommendation: Based on the data provided, it seems the department is on the right track and doing well, but the department needs to be more forthcoming in future program reviews by provide specific data supporting all of their assessment programs.

COMPUTER SCIENCE AND INFORMATION SYSTEM

GENERAL

The on-campus visit for the external review of the Computer Science and Information Systems Department, one of two departments in the School of Computing and Technology, was part of the program review of the College of Science and Engineering (COSE), a college within Southern Utah University. The site visit took place on January 10-11, 2013, less than seven days after receiving the self-study from the College. The external reviewer for the Department of Computer Science and Information Systems' program review was Dr. Scott Danielson, P.E., the Associate Dean for Academic Programs of the College of Technology and Innovation at Arizona State University.

Shortly before the review, the College provided a self-study. The self-study included a College-wide section and the Department provided a short department-specific appendix with information related to its programs. The department self-study content was from the previous year's COSE annual report and a summary of information the Department would typically include in an ABET self-study.

Prior to meeting with the department faculty, the review team met with Drs. Robert Eves and Eric Freden, Dean and Associate Dean of the College of Science and Engineering, respectively. The team also met with Dr. Michael T. Benson, SUU President; Dr. Bradley J. Cook, SUU Provost; and Dr. William J. Byrnes, SUU Associate Provost and Director of Strategic Planning.

Dr. Danielson met with the chair of the department and a group of faculty, representing both degree programs, from the department in separate meetings. The following comments are based on those discussions as well as the department's web site and the limited materials presented in the self-study. The following comments are broken into two sections: apparent strengths followed by concerns and recommendations. Please note that there are many aspects of the program and its environment/implementation that are not mentioned here. This simply means they appear to be within the norm for these programs and thus are not singled out for specific comment.

As may be typical in such a report, there is more space given to ways the programs may improve themselves than in lauding their accomplishments. The SUU administrators and departments know the strengths of the unit but hopefully find benefit in another's view of opportunities for improvement. And, it is recognized that some recommendations may be easy to write but difficult to accomplish.

STRENGTHS

Overall, the Computer Science and Information Systems Department appeared to have a group of qualified faculty. The faculty span a range of expertise areas, as expected. Their commitment to fielding their program appears to be genuine, with several apparently teaching overloads fairly often. The chair and faculty all spoke positively about their administration and their faculty roles in the department.

The program has enrollment levels of majors within its programs that allow significant faculty-student interaction, especially in the upper division courses. While I was not able to speak to students, it is my assumption that they benefit from such interactions. There are indications gleaned from the various projects mentioned and documented in the self-study materials and around campus that the faculty and students do good work on projects. Thus, I see such student-faculty interactions and work on projects to be of value to society and industry as a strength.

The fact that the Computer Science and Information Systems programs have obtained ABET accreditation is a strength. Their re-accreditation process in 2013 – 2014 will be a critical validation of the programs and their

assessment programs. These reaccreditation efforts are to be encouraged as they lend significant creditability to SUU's computing-related programs.

There is a need for Computer Science and Information Systems programs in southern Utah and these programs should be of strategic importance to the Southern Utah University. Computing is often a significant part of projects, even those that are focused in other fields. Often engineering projects have a significant computing portion and projects in the science areas also involve such expertise. An example, not from SUU, discussed during the site visit was a project where biology students were tracking snakes and partnered with computing students for acquiring and displaying the tracking data. Typically, local/regional industry and business have a large number of projects they could offer to the CSIS Department. Thus, the Department and COSE may have an opportunity to have a significant positive impact on the region and state as a part of its experiential learning initiative. The Department and College should consider a strategic proposal to the University administration to increase CSIS resources to be able to do such projects. If SUU became known for such assistance to business and industry, it could build significant political support to the University as well as serve as a mechanism to recruit more students. Such applied computing activity is not the forte of Utah's research universities and thus could represent an opportunity for SUU.

It is a strength that the Department has a shared (with two other departments) resource, an academic enhancement coordinator, to help with recruiting students. All those interviewed were very positive about the current person and her contribution and value. This is a great resource and has taken a load off the individual faculty within the program with regard to recruiting.

The Department web site provides a clean and easy to navigate interface, with a good range of information and organizational approach. (It had more information available than the other two departments I reviewed.) I view this as a comparative strength but still suggest improvements (see below).

CONCERNS AND RECOMMENDATIONS

Many of the comments below provide opportunity to leverage the strengths just mentioned. In other cases, recommendations may require analysis and determination to accomplish change in spite of initial difficulties. Accomplishing change takes effort and it is clear that CSIS faculty and administrators have much to do even with just maintaining the norm. So, decisions will have to be made as to which recommendations, if any, to pursue. And, it is hoped that these recommendation spark discussion within teams towards refining ideas towards change that will have positive impact on the program and its offerings.

General Studies. The department has a large commitment to a University general studies course, CSIS 1000. While the inclusion of the course within the University's general studies requirements provides the department with a lot of SCH, it comes at a high cost. Essentially, two and a half faculty lines are devoted to teaching this one class. For a small unit, hosting two degree program suites, this is a significant burden and limits faculty involvement in a number of activities, including updating the primary curricula within the department. It is recommended that the college and department investigate ways to mitigate this load on tenure track faculty. Hiring additional instructors or putting the course in an online format with the lectures recorded by a "master teacher" with face-to-face course components, e.g., a flipped classroom, covered by lower cost resources are possible solutions.

Curricula. The Department offers degrees in two basic areas, Computer Science and Information Systems/Technology, at various levels. The department website lists four AAS degree tracks, three B.S. tracks, and a Master's degree. Four minors are offered as well. Neither the self-study nor the other materials provided by the institution provide any breakout of enrollment or numbers of graduates from this array of degree tracks. However, those data provided in the self-study indicate that there were no master degrees awarded between 2006-7 and 2010-11 and only two associate degrees in the same span.

The program structure/course layout information provided in the self-study indicates an admirable structure where the core of both BS degrees is common. Thus, the two programs appear have an efficient delivery structure.

RECOMMENDATIONS:

The logic behind such an array of degree offerings is not apparent to an outside observer when the numbers of graduate have been so low. So, it is recommended that the degree offerings be reviewed and decisions made as to which to keep and which to disestablish. The administrative costs of maintaining all the records and associated information for all these degrees have to be in excess of their value. Merely the fact that an occasional student enrolls in one of them is not sufficient reason to maintain them.

The department faculty should immediately begin a significant curriculum review. Administrators and current students commented that the curriculum has not kept up with the state-of-the art in computing educational programs. As an example, only within the last year have three new courses been introduced, at the request of the program's Industrial Advisory Board. Such content, e.g., mobile application and web programming, should already have been included in the program as many programs have been teaching courses in these areas for some time. At this point, these courses are only electives and should be moved into a required status as soon as possible. Doing such a curricular review will require faculty to benchmark other computing programs and make decisions about the courses they include in their program. As part of such a review, the programs should consider implementing a project spine, as recommended by Sheppard et al. in ***Educating Engineers*** (2009), and thus becoming leaders in the SUU initiative in experiential learning. This project spine could be tailed to computing, using something like a "software factory" approach.

Even if the project spine is not implemented, the programs should create a two course capstone sequence that aligns with the other ABET-accredited programs. This would enable the programs' capstones to become truly interdisciplinary by mixing students from all these majors into the capstone project teams. Most engineering projects have some sort of computing aspect to them so the CSIS students would be valuable additions. Project teams would be stronger by having the different expertise areas, enhancing their ability to produce better solutions to capstone projects and better mimic industry project teams. It would also create positive perceptions within industry and the University's President and Provost's offices about the programs and their embracing the SUU experiential learning model.

It is recognized that such activity will require time from faculty, both in accomplishing the benchmarking and curriculum review and then implementing the new courses/structure. This means that faculty time has to be created. Elsewhere in this report is a suggestion of additional resources for the CSIS 1000 course but it is also apparent that faculty should not be teaching overloads during the midst of such a curriculum overhaul. The department/college needs to hire part-time instructors or find other ways to create the time and space for curriculum review/revision, including the hiring of a consultant with expertise in computing programs to provide an efficient review of ways the programs might develop.

Enrollment. The enrollment of majors in the Computer Science and Information Systems department is trending upward, reaching 151 in fall 2012. This number of majors is under what the program faculty numbers could sustain, without the large service load referred to earlier.

However, data indicate a reasonable load due when the large service component created by CSIS 1000 and other lower division courses taken by other majors are taken into account, yielding an overall 23.2 student FTE to faculty FTE ratio with an average class size of 25 in lecture classes (2011 data).

Retention data for CSIS show retention rates among the best in the college, with 75% FTFTF retained of the 2011 cohort (down from an admirable 90.9% the year before). (It is assumed that the students leaving due to LDS mission work are accounted for and do not impact retention data). This is generally good news, although retention targets are assumed to be high given SUU's focus on its instructional mission and

differentiation in the marketplace.

Recommendation: Efforts to continue the enrollment growth of majors within the CSIS Department should be continued. The department website, as mentioned below, needs to help differentiate the department's programs and tout their strengths as compared to other programs within Utah. The same should be done in print materials. The Computer Science and Information Systems programs' characteristics, in conjunction with market-tested strategies as outlined in the National Academy of Engineering's *Changing the Conversation* publication, can be used to make the programs attractive to more diverse student population. Use of student ambassadors should be maximized to enable word of mouth recruiting. It was surprising that the number of women in the program dipped significantly in 2011, hopefully this trend has not continued.

Website. As use of the Internet and web sites is pervasive among both prospective and current students as well as industry and the public, the Department web site is an important outreach tool. In this light, the site can be improved to enhance its ability to market the department's programs, specifically targeting the SUU student age group, and value to SUU and the region. Thus, it is recommended that Departmental web site be updated and enhanced towards differentiating it in the computing education landscape and emphasize the strengths of the program (favorable student/faculty ratio, sought after graduates, etc.). Brief video testimonials of current students and recent graduates would be a great addition to the Introduction page that already contains job titles and reasons why students should chose the programs. This information could be its own page with a top level link of "Why Choose CSIS" on the department home page. The guidance and suggestions contained in the *Changing the Conversation* can be adapted to computing and embedded in the website to aid in the recruitment of students. Also, the reference to the programs' ABET-accreditation is not in compliance with the current ABET Policy and Procedures Manual and needs to be corrected.

Scholarship. Instruction and service are the primary activities expected of faculty in the College of Science and Engineering. By the same token, the COSE leadership expects its faculty to be active scholars. This will be difficult for faculty carrying an instructional credit hour load of 12 per semester, or more, in the midst of significant curricula development. Thus, it is imperative that the department faculty and chair fully understand the Dean's criteria regarding scholarship and find ways to accomplish scholarly activity goals in ways that are complementary to the teaching load. These ways will probably include computing education activity done in a scholarly manner and industry funding for projects that fit an undergraduate experiential learning model.

Assessment. The assessment programs for the CSIS Department's programs should be mature, given their years of ABET accreditation. The self-study provided assessment data examples for selected student learning outcomes. However, these data did not show anything since the 2011 academic year. But, discussion with the faculty reinforced that course level assessment is ongoing and a faculty member drives other faculty to accomplish and report these assessment data.

Although the College strategic plan, updated in late 2011, calls for use of standardized assessment instruments and national discipline standards, no evidence of the use of these tools were noted in the self-study or discussion with faculty. If such assessment tools are available for computing programs, they should be utilized. Also, the program did not provide comprehensive summary program learning outcome assessment results. Conflicting evidence about the existence of such data was found, with the department chair indicating they were not available and the faculty indicating they were tabulated. It is suspected that this inconsistency was due to misunderstanding of what was being asked by the reviewer.

Recommendation: The department needs to ensure it has comprehensive assessment system for its ABET-related program learning outcomes. It might be useful to think about this process as being able to provide the sort of information an OEM might ask of a supplier as it qualifies its suppliers. Thus, this system needs to produce summary outcome attainment data, taking into account all data streams related to student

attainment of the learning outcomes, in a well-documented manner. But, such a system should be organic to existing faculty work and minimize the burden of extra work on the faculty due to outcome assessment.

ENGINEERING TECHNOLOGY AND CONSTRUCTION MANAGEMENT DEPARTMENT GENERAL

GENERAL

The on-campus visit for the external review of the Engineering Technology and Construction Management Department, one of two departments in the School of Computing and Technology, was part of the program review of the College of Science and Engineering (COSE), a college within Southern Utah University. The site visit took place on January 10-11, 2013, less than seven days after receiving the self-study from the College. The external reviewer for the Department of Engineering Technology and Construction Management's program review was Dr. Scott Danielson, P.E., the Associate Dean for Academic Programs of the College of Technology and Innovation at Arizona State University.

Shortly before the review, the College provided a self-study. The self-study included a College-wide section and the Department provided a short department-specific appendix with information related to its programs. The department self-study content was from the previous year's COSE annual report and a summary of information the Department would typically include in an ABET self-study.

Prior to meeting with the department faculty, the review team met with Drs. Robert Eves and Eric Freden, Dean and Associate Dean of the College of Science and Engineering, respectively. The team also met with Dr. Michael T. Benson, SUU President; Dr. Bradley J. Cook, SUU Provost; and William J. Byrnes, SUU Associate Provost and Director of Strategic Planning.

Dr. Danielson met with a group of faculty, representing both degree programs, from the department (the chair was out of town). The following comments are based on that discussion as well as the department's web site and the limited materials presented in the self-study. The following comments are broken into two sections: apparent strengths followed by concerns and recommendations. Please note that there are many aspects of the program and its environment/implementation that are not mentioned here. This simply means they are within the norm for these programs and thus are not singled out for specific comment.

As may be typical in such a report, there is more space given to ways that the programs may improve themselves than in lauding their accomplishments. The SUU administrators and departments know the strengths of the unit but hopefully find benefit in another's view of opportunities for improvement. And, it is recognized that some recommendations may be easy to write but difficult to accomplish.

STRENGTHS

Overall, the Engineering Technology and Construction Management Department is characterized by a group of qualified faculty that appears to work well together. The faculty span a range of expertise areas, as expected when such diversity of programs are housed in one unit. All have industry experience, which I believe is very important to these programs. Their commitment to fielding a relevant program appears to be genuine. Thus, the program faculty are an obvious strength of the program. Faculty spoke positively about their administration and their faculty roles in the department.

The program has enrollment levels that allow significant faculty-student interaction. While I was not able to speak to students, it is my assumption that they benefit from such interactions. There are indications gleaned from the various projects mentioned and documented in the self-study materials and around campus that the faculty and students do good work on such projects. Thus, I see such student-faculty interactions and work on projects with the scope and complexity to be of value to society and industry as a strength.

The fact that the engineering technology program has sought ABET accreditation is a strength and indications are that this effort will be rewarded with initial accreditation being awarded in the summer of 2013. Being accredited under the general criteria provides additional flexibility and allows the program to shape itself in ways that a discipline-specific program may not be able to accomplish. Based on conversations with faculty and administrators, the Construction Management program may seek ABET accreditation as well. If not ABET, American Council for Construction Education or similar accreditation should be sought. Such accreditation efforts should be encouraged as they will add strength to the unit and lend additional creditability to SUU's technical programs.

The Engineering Technology and Construction Management program and its faculty appear to have good working relationships with the Integrated Engineering Department. This could be a strength as the two units commit to working together to leverage each other's strengths. For instance, in the area of laboratories, sharing and joint support to keep the equipment maintained and up-to-date is important and a continual challenge for engineering education programs.

There is a need for engineering technology programs in southern Utah and these programs should be of strategic importance to the Southern Utah University. In my view, the Engineering Technology and Construction Management programs are the right kind of program for the institution and region. These programs can differentiate themselves from the Integrated Engineering program and provide alternative choices within SUU of engineering- related topics/programs for students and industry. They provide an alternative pathway for students that may not be attracted to the Integrated Engineering program but still desire a technical education. The unit is recognized by administrative leaders outside of COSE, e.g., registrar and admissions, as being easy to work with towards advancing the program. Also, it was noted that the unit is sensitive to its Industrial Advisory Board, another positive.

It is a strength that the Department has a shared (with two other departments) resource, an academic enhancement coordinator, to help with recruiting students. All those interviewed were very positive about the current person and her contribution and value. This is a great resource and has taken a load off the individual faculty within the program with regard to recruiting.

CONCERNS AND RECOMMENDATIONS

Many of the comments below provide opportunity to leverage the strengths just mentioned. In other cases, recommendations may require analysis and determination to accomplish change in spite of initial difficulties. Accomplishing change takes effort and it is clear that COSE faculty and administrators have much to do even with just maintaining the norm. So, decisions will have to be made as to which recommendations, if any, to pursue. And, it is hoped that these recommendation spark discussion within teams towards refining ideas towards change that will have positive impact on the program and its offerings.

Curricula. The Department offers degrees in two basic areas, Engineering Technology and Construction Management. The Engineering Technology degrees have two emphasis areas, CAD/CAM/GIS and electronics. The SUU website indicates that there are a plethora of degrees within these areas, the presence of which were not discussed in the self-study materials or during the site visit. For instance, apparently the both areas offer AAS degrees as well as a B.A. and B.S. version of the bachelor's degree. Neither the self-study nor the materials provided by the institution provide any breakout of enrollment or numbers of graduates from this array of degrees.

The Engineering Technology and Construction Management degrees do not appear to share much content or courses. It also appears the same can be said for the electronics and the CAD/Cam emphasis areas within the Engineering Technology degree. While there are probably reasons for such divergence of content,

probably based in past history of separate degrees becoming one degree, it is also logical that such curricula are not very efficient to deliver.

Recommendations: The logic behind such an array of AAS and BS/BA degree offerings is not apparent to an outside observer. So, it is recommended that the degree offerings should be reviewed and decisions made as to which to keep and which to disestablish. The administrative costs of maintaining all the records and associated information for all these degrees have to be in excess of their value. Merely the fact that an occasional student enrolls in one of them is not sufficient reason to maintain them. Those same students would likely enroll in one of the similar degrees (e.g., the BS instead of the BA) if that were all that was offered. If nothing else, the ABET-accreditation of the Engineering Technology degree can make having these degrees problematic.

More importantly, the Engineering Technology program should have a significant curriculum review towards making it more efficient to deliver. The Engineering Technology program should have a more common basis for its two emphasis areas. More efficiency in their offerings would reduce the teaching load of faculty and better enable faculty effort to be devoted to scholarly activity or new initiatives within the program. The curriculum could be configured to provide students with a more common core in the first two years. Then beginning in the latter part of the second year, the students could focus on their chosen emphasis area, whether that is electronics, architectural/civil CAD, CAD and manufacturing, or electronics. The Construction Management degree should also seek ways to streamline its degree requirements towards developing room for electives, allowing students to have choices, and greater efficiency. As part of such a review, the programs should consider implementing a project spine, as recommended by Sheppard et al. in ***Educating Engineers*** (2009), and thus becoming even stronger leaders in the SUU initiative in experiential learning.

Even if the project spine is not implemented, the programs should create a two course capstone sequence that aligns with the Integrated Engineering program capstone. This would enable the programs' capstones to become truly interdisciplinary by mixing students from all these majors into the capstone project teams. The teams would be stronger by having the different expertise areas, enhancing their ability to produce better solutions to capstone projects and better mimic industry project teams. It would also create positive perceptions within industry and the University's President and Provost's offices about the programs and their embracing the SUU experiential learning model.

Department website. The Department web site provides a clean and easy to navigate interface, with the fundamental content about programs. It provides the basic information about the program, faculty and courses. The website includes a link to a document explaining the differences between engineering and engineering technology (which is based on, and references, an outdated ASME brochure—the new one is available from the ASME). Such information is useful to potential students but it could be strengthened by both updating the content and adding SUU and ETCM-specific information. The program should also consider illustrating the sort of data recently published in the ***Journal of Engineering Technology*** about engineering technology graduates and their acceptance and value in industry. The program and courses links all provide basic curricula information, with the CAD/CAM page standing out by its inclusion of additional information/links and the use of a degree-specific animation on the right side of the screen. After seeing it, the other two program pages seem dull and limited. The project page is a good example of the sort of information that can interest students but it needs to be updated. Having two of the three projects shown are from 2002 and 2003 make it seem like the programs are comatose with few projects happening. Hardly the message the programs want to send. Construction management projects should also be represented.

As use of the Internet and web sites is pervasive among both prospective and current students as well as industry and the public, the Department web site is an important outreach tool. But, it seems that while the

website has some elements that could be part of an effective marketing tool, they are not consistent or fully developed.

Thus, it is recommended that Departmental web site be updated and enhanced towards differentiating it in the engineering education landscape in southern Utah and emphasize the strengths of the program (favorable student/faculty ratio, sought after graduates, etc.). Brief video testimonials of current students and recent graduates would be a great addition. The guidance and suggestions contained in the National Academy of Engineering's *Changing the Conversation* should be used both in the website material and any other print or video media used by the program/department to aid in the recruitment of students. Also, while a minor point, it is suggested that Isabella Borisova's picture be posted on the faculty page as it is documented that the presence of woman faculty help recruitment of woman students. The fact that her picture is the only faculty picture missing also sends the wrong message.

Enrollment. The enrollment in the Engineering Technology and Construction Management department has been consistently in the 180 range. Correspondently, the number of graduates (bachelor's degree) has stayed pretty consistent, typically in the mid to high 20s with a high of 33 reached in both 2006-7 and 2011-12. However, data indicate the program can grow even with the current number of faculty; since in 2010-11 there was a 10.6 student FTE to faculty FTE ratio with an average class size of 18.4 in lecture classes and 10.6 for laboratories. Unfortunately, retention data (data are combined for IE and ETCM) show low retention rates for 2011, with 53.8% FTFTF retained (and only 66.7% the year before). This low retention rate is unexpected given the nature of the program (it is assumed that the students leaving due to LDS mission work are accounted for and do not impact retention data). The Construction Management program should be a strong program for SUU as similar programs often see strong enrollment with significant industry support. As the nation and region continues to climb out of recession, this program should see growth.

Recommendation: Survey's or other discovery mechanisms need to be used to understand why the retention is so low or which programs are suffering from low retention. The department website, as mentioned above, needs to help differentiate the department's programs and tout their strengths. The same should be done in print materials. The Engineering Technology and Construction Management program's characteristics, in conjunction with market-tested strategies as outlined in the *Changing the Conversation* publication can be used to make the programs attractive to more diverse student population. Use of student ambassadors should be maximized to enable word of mouth recruiting.

Facilities. I did not have a tour of the department's facilities, although they were toured in 2008, so the following is based on walking the building hallway and the department web site. The program has adequate laboratories and equipment (often shared with the Integrated Engineering Department) for its curriculum, with strength in its manufacturing related laboratories. There is one laboratory technician available to the unit but the position is shared with the Integrated Engineering program. Thus, faculty indicated that they are often required to perform their own laboratory set up and occasionally maintenance of equipment. Laboratory staff will probably need to be increased if enrollments grow and if greater experiential learning, e.g., projects, begin happening in these laboratories.

The University and College leadership hopefully recognizes that it is a false assumption that if a laboratory is not fully scheduled, then the space is not being used and can be considered for other uses. Just because a laboratory space is not "scheduled" does not mean that it is not in use. Laboratory spaces are often being used during non-scheduled times for student and faculty research. A major need for engineering technology and construction programs that has students involved in experiential learning is space where students can work on projects!

Recommendation: Seek ways to ensure the current laboratory space is highly utilized by engineering technology, construction management and engineering students—whether it is for formal classroom lab sessions or for project build and test sessions.

Scholarship. Instruction and service are the primary activities expected of faculty in the College of Science and Engineering. By the same token, the COSE leadership expects its faculty to be active scholars. This will be difficult for faculty carrying an instructional credit hour load of 12 per semester. It also means that the program offerings have to be made as efficient as possible. Thus, it is imperative that the department faculty and chair fully understand the Dean's criteria regarding scholarship and find ways to accomplish scholarly activity goals in ways that are complementary to the teaching load. These ways will probably include engineering education work and industry funding for projects that fit an undergraduate experiential learning model.

Assessment. The assessment program for the Engineering Technology and Construction Management Department is relatively young, as the Engineering Technology program just sought initial ABET accreditation. But, the self-study provided no assessment data. In discussion with faculty and resulting inspection of course assessment notebooks, assessment is being done at the course level, mostly related to course learning objectives (which are not program learning objectives). Unfortunately, there were no summary data sets available. Faculty from Engineering Technology and Construction Management indicated that such summary data had not been developed and that course level assessment data were not "rolled up" to present an overall summary of graduate attainment of the program learning outcomes. Although the College strategic plan, updated in late 2011, calls for use of standardized assessment instruments and national discipline standards, no evidence of such tools were noted in the self-study or discussion with faculty.

Recommendation: The Engineering Technology program needs to ensure it has comprehensive assessment system for its ABET-related program learning outcomes (as does the Construction Management program as it works towards ABET accreditation). It might be useful to think about this process as being able to provide the sort of information an OEM might ask of a supplier as it qualifies its suppliers. Thus, this system needs to produce summary outcome attainment data, taking into account all data streams related to student attainment of the learning outcomes, in a well-documented manner. The use of measures like percentage of students passing a course should be discouraged since such information does not aid in understanding specific outcome attainment gaps of the students. But, such a system should be organic to existing faculty work and minimize the burden of extra work on the faculty due to outcome assessment. Thus, the use of the standardized assessment instruments or national discipline standards/normed examinations is very useful. For instance, there is a electronics engineering technology national assessment tool developed by engineering technology educators available via the Society for Manufacturing Engineers (SME)—see http://www.sme.org/eetexam/ . Also the SME provides a manufacturing technologist certification exam that provides both assessment data and a professional certification. It would be a reasonable certification for the CAD/CAM students to seek.

INTEGRATED ENGINEERING

GENERAL

The on-campus visit for the external review of the Integrated Engineering Department was part of the program review of the College of Science and Engineering (COSE), a college within Southern Utah University. The site visit took place on January 10-11, 2013, less than seven days after receiving the self-study from the College. The external reviewer for the Department of Integrated Engineering's program review was Dr. Scott Danielson, P.E., the Associate Dean for Academic Programs of the College of Technology and Innovation at Arizona State University.

Shortly before the review, the College provided a self-study. The self-study included a College-wide section and the Department provided a short department-specific appendix with information related to its programs. The department self-study content was from the previous year's COSE annual report and a summary of information the Department would typically include in an ABET self-study.

Prior to meeting with the department faculty, the review team met with Drs. Robert Eves and Eric Freden, Dean and Associate Dean of the College of Science and Engineering, respectively. The team also met with Dr. Michael T. Benson, SUU President; Dr. Bradley J. Cook, SUU Provost; and Dr. William J. Byrnes, SUU Associate Provost and Director of Strategic Planning.

Dr. Danielson met with two of the faculty from the department (the chair was out of town). The following comments are based on that discussion as well as the department's web site and the limited materials presented in the self-study. The following comments are broken into two sections: apparent strengths followed by concerns and recommendations. Please note that there are many aspects of the program and its environment/implementation that are not mentioned here. This simply means they are within the norm for an engineering program and thus are not singled out for specific comment.

As may be typical in such a report, there is more space given to ways that the program may improve itself than in lauding its accomplishments. The SUU administrators and departments know the strengths of their unit but hopefully find benefit in another's view of opportunities for improvement. And, it is recognized that some recommendations may be easy to write but difficult to accomplish.

STRENGTHS

Overall, the Integrated Engineering Department is characterized by a group of very well qualified faculty, all with terminal degrees in their area of expertise. These areas of expertise include three major disciplines of engineering: mechanical, civil and electrical. All have industry experience, which I believe is very important. Their commitment to fielding an interdisciplinary or integrated engineering program appears to be genuine. Thus, the program faculty are an obvious strength of the program. Faculty spoke positively about the chair and his administrative ability and leadership characteristics, another strength.

The program has enrollment levels that allow significant faculty-student interaction. While I was not able to speak to students, it is my assumption that they benefit from such interactions. There are indications gleaned from the various projects mentioned and documented in the self-study materials and around campus that the faculty and students do good work on such projects. Thus, I see such student-faculty interactions and work on projects with the scope and complexity to be of value to society and industry as a strength.

The fact that the program has maintained ABET accreditation is a strength, although such accreditation is a fundamental requirement for any engineering program. Being accredited under the general criteria provides additional flexibility and allows the program to shape itself in ways that a discipline-specific program may not be able to accomplish.

The Integrated Engineering program and its faculty appear to have good working relationships with the Engineering Technology and Construction Management program. This could be a strength is the two units commit to working together to leverage each other's strengths. For instance, in the area of laboratories, sharing and joint support to keep the equipment maintained and up-to-date is important and a continual challenge for engineering education programs. In addition, faculty expertise and course offerings could be shared to a greater extent.

There is a need for an engineering program in the southern part of Utah and this program is of strategic importance to the Southern Utah University. In my view, the Integrated Engineering program is the right kind of program for the institution and region. Large and successful discipline-specific engineering programs exist in other institution within the state so the Integrated Engineering program is positioned to use it programmatic "bent" to differentiate itself from those programs and provide an alternative choice for students and industry.

It is a strength that the program has a shared (with two other departments) resource, and academic enhancement coordinator, to help with recruiting students. All those interviewed were very positive about the current person and her contribution and value. This is a great resource and has taken a load off the individual faculty within the program with regard to recruiting.

CONCERNS AND RECOMMENDATIONS

Many of the comments below provide opportunity to leverage the strengths just mentioned. In other cases, recommendations may require analysis and determination to accomplish change in spite of initial difficulties. Accomplishing change takes effort and it is clear that COSE faculty and administrators have much to do even with just maintaining the norm. So, decisions will have to be made as to which recommendations, if any, to pursue. And, it is hoped that these recommendation spark discussion within teams towards refining ideas towards change that will have positive impact on the program and its offerings.

Curriculum. The Department offers a pre-engineering Associate degree and a Bachelor of Science degree. The Integrated Engineering bachelor degree program's curriculum appears to be mostly mechanical-engineering related. It does not appear to have much content related to other major engineering disciplines, e.g., electrical (two courses) and civil (apparently two courses). The self-study indicates that there are 88 hours available beyond the SUU required general study requirements. The program has traditional math and science content, with probably more credits in these topics than required by ABET general criteria. The program includes the SUU experiential education requirements and its three credits over the freshman, junior and senior year as well as a senior design/capstone over two semesters. There are no tracks/focus areas/concentrations that appear to be available to students (although, oddly, the pre-engineering degree pages imply that such options are available to those students). In short, the curriculum/program is not noteworthy (please note that this is not a negative statement about its quality) and this probably impacts SUU's ability to recruit students to it (more on that topic below).

Recommendations: First, while the incremental instructional cost may be low, it is not clear that offering the pre-engineering degree is worthwhile. The associate degree in pre- engineering had only five graduates in 2006 -2010 span. Other engineering programs in the state will accept the SUU coursework a student might have taken on a course-by-course basis so not having the associate's degree will not impact the transferability of students away from the program. If students are exiting the university with only the two year degree, it would be more useful to steer them to one of the AAS degrees offered by the Engineering Technology and Construction Management Department (which could also seek ETAC of ABET accreditation for the two-year degree if desired). The department and college should consider disestablishment of the pre-engineering degree or reconfiguring it to something of more interest to students.

More importantly, the Integrated Engineering program should have a significant curriculum overhaul towards

making it more impactful and differentiable in the engineering education marketplace in Utah and the region. The program should consider "doubling down" on the SUU experiential learning initiative by implementing a project spine in the Integrated Engineering program, as recommended by Sheppard et al. in ***Educating Engineers*** (2009). Adopting, and proclaiming loudly, a more project-based and active learning model for engineering education would help set the program apart. Other publications about successful general engineering programs and current education studies outlining the future of engineering education should be reviewed for ideas. For instance, the ASME's Vision 2030 project has published a series of papers detailing recommendations that reach well beyond mechanical engineering education.

The curriculum could be configured to provide students with the fundamentals within engineering in the first two years and then allow students to take tracks or focus areas that represent traditional engineering disciplines in the second two years. Such a configuration allows students to follow their passions and should enhance the program's marketability since traditional engineering disciplines still attract students. This also would enable the program to become truly interdisciplinary as students build different expertise areas within the program, enhancing their ability to form multidisciplinary teams that will produce better solutions to capstone projects and better mimic industry project teams. Such a structure would also allow the program to offer boarder topic areas as, for instance, a computer engineering track composed of courses from the Computer Science and Information Systems Department or a track augmented by offerings in the ETCM Department. Since faculty resources are limited, such reconfiguration must be done within the same number of courses currently taught by faculty, at least until enrollment grows to the point where additional faculty can be hired. As implied above, use of courses taught elsewhere in the college should be considered (and ABET should not be impede such sharing). The math and science requirements should be minimized, while still meeting ABET requirements, to provide additional flexibility in the curriculum. The math and science requirements should also be configured to best prepare students for what they will likely do after graduation. For instance, for most practicing engineers, a good knowledge of statistics is much more useful than the third semester of calculus.

Department website. The Department web site provides a clean and easy to navigate interface, although with minimal content. It provides the basic information about the program (although its reference to ABET-accreditation is not in compliance with the current ABET Policy and Procedures Manual), faculty and courses. There is information about scholarships as well as this spring's Engineering Week-related events, so it appears that it is being kept current. As use of the Internet and web sites is pervasive among both prospective and current students as well as industry and the public, the Department web site is an important outreach tool. But, it seems that the website is not configured to be an effective marketing tool and merely provides the basic information about the program. The page titled "The Discipline" explains the program in a technically correct manner (although the reference to a "discipline" seems out of context for the IE program) but may not generate much excitement among the target market.

Thus, it is recommended that Departmental web site be enhanced in ways that differentiate it in the engineering education landscape in Utah and emphasize the strengths of the program (favorable student/faculty ratio, sought after graduates, etc.). Also, the Integrated Engineering program's nature and the other programs in the COSE are ideal for attracting a higher percentage of women than many engineering education programs manage to enroll. The guidance and suggestions contained in the National Academy of Engineering's *Changing the Conversation* should be used both in the website material and any other print or video media used by the program/department to aid in the recruitment of students.

Enrollments. It is a significant concern that enrollments in the Integrated Engineering program are trending down after holding steady at around 120 for several years. Even at 120 to 125 headcount, the program is

too small. This trend is even more worrisome as engineering enrollments across the country have seen significant increases, especially in the area of mechanical engineering (the apparent primary focus of the Integrated Engineering program). Even with the current faculty, it has too few students by standard measures e.g., in 2010-11 there was a 8.7 student FTE to faculty FTE ratio with an average class size of 15.5 for lecture classes and seven for laboratories. Making things worse, the retention data (however data are combined for IE and ETCM) show low retention rates for 2011, with 53.8% FTFTF retained (and only 66.7% the year before). This low retention rate is unexpected given the small intimate nature of the program and the strong faculty fielding the program (it is assumed that the students leaving due to LDS mission work are accounted for and do not impact retention data). Correspondently, the number of graduates (bachelor's degree) is also trending down, with a significant drop in 2011-12 (to only three).

While the University, College and Department have made recruitment a priority, some ingredient seems to be missing. Other regional general engineering programs (i.e., accredited under the ABET general criteria) have seen significant growth. For instance, at Arizona State University, the College of Technology and Innovation's (CTI) general engineering program has seen double digit growth in enrollment, now at 375 in fall 2012, in each of the past three years. Such growth has occurred even though Arizona State University offers traditional discipline- specific engineering programs in the Fulton School of Engineering as well as engineering technology programs in the CTI.

Recommendation: If the program's curriculum and related marketing are refocused as recommended above, the enrollments should begin to increase. Also, survey's or other discovery mechanisms need to be used to understand why the retention is so low. The department website, as mentioned above, needs to help differentiate the program and tout its strengths. The same focus should be used in print materials. The Integrated Engineering program's characteristics and market-tested strategies as outlined in the *Changing the Conversation* publication can be attractive to more diverse student population than the traditional "strong in math and science male" student population. Use of student ambassadors should be maximized to enable word of mouth recruiting.

Facilities. I did not have a tour of the department's facilities, although they were toured in 2008, so the following is based on walking the building hallway and the department web site. The program has adequate laboratories and equipment (often shared with the other engineering-related department) for its mechanical-related curriculum. However, as in the case of the overall course mix in the curriculum, the labs seem minimal for electrical or civil engineering related courses. It is recommended that as the curriculum is rethought, the laboratory equipment/layout be rethought as well. Such reorientation of labs would have to be done in concert with the Engineering Technology and Construction Management (ETCM) Department.

There is one laboratory technician available to the unit but the position is shared with the Engineering Technology and Construction Management program. Thus, faculty are probably expected to perform their own laboratory set up and maintenance of equipment. Laboratory staff will probably need to be increased if enrollments grow and if greater experiential learning, e.g., projects, begins happening in these laboratories.

The University and College leadership hopefully recognizes that it is a false assumption that if a laboratory is not fully scheduled, then the space is not being used and can be considered for other uses. Just because a laboratory space is not "scheduled" does not mean that it is not in use. Laboratory spaces are often being used during non-scheduled times for student and faculty research. A major need for an engineering program that has students involved in experiential learning is space where students can work on projects!

Recommendation: Seek ways to ensure the current laboratory space is highly utilized by engineering and engineering technology students—whether it is for formal classroom lab sessions or for project build and test sessions.

Scholarship. Instruction and service are the primary activities expected of faculty in the College of Science and Engineering. By the same token, the COSE leadership expects its faculty to be active scholars. This will be difficult for faculty carrying an instructional credit hour load of 12 per semester. Thus, it is imperative that the department faculty and chair fully understand the Dean's criteria and find ways to accomplish scholarly activity goals in ways that are complementary to the teaching load. These ways will probably include engineering education work and industry funding for projects that fit an undergraduate experiential learning model.

Assessment. The assessment program for the Integrated Engineering Department should be a mature one, given its years of ABET accreditation. The self-study provided assessment data tables for the standard ABET criterion three outcomes. These tables were for 2009 - 2010 and 20109 – 2011 and were based on percent of student passing the course. However, using such a measure is generally considered poor assessment practice. In discussion with faculty, each course has a "green sheet" for assessment and documentation of how the learning outcome was met. Although the College strategic plan, updated in late 2011, calls for use of standardized assessment instruments and national discipline standards, no evidence of the use of these tools were noted in the self-study or discussion with faculty. For instance, the self- study indicated that seniors take NCEES Fundamental of Engineering (FE) exam but no performance data were provided. Also, the program did not provide comprehensive summary program learning outcome assessment results. Unit representatives from Integrated Engineering indicated that such summary data had not been developed and that course level assessment data were not always rolled up to present an overall summary of graduate attainment of the program learning outcomes.

Recommendation: The department needs to ensure it has comprehensive assessment system for its ABET-related program learning outcomes. It might be useful to think about this process as being able to provide the sort of information an OEM might ask of a supplier as it qualifies its suppliers. Thus, this system needs to produce summary outcome attainment data, taking into account all data streams related to student attainment of the learning outcomes, in a well-documented manner. The use of measures like percentage of students passing a course should be discouraged since such information does not aid in understanding specific outcome attainment gaps of the students. But, such a system should be organic to existing faculty work and minimize the burden of extra work on the faculty due to outcome assessment.

MATHEMATICS PROGRAM REVIEW

Dr. David Matty, the USHE program reviewer from Weber State University, met with Dr. Seth Armstrong, the department chair, and also with Dr. Armstrong and most of the other mathematics faculty members during his site visit. The reviewer was unable to collect all of the names of those faculty members who participated in the meeting.

SUMMARY OVERVIEW

The Mathematics Department at SUU offers three emphases - Pure Mathematics, Mathematics Education, and Actuarial Science - which may lead to a minor or, if taken as a major, to a BS degree in mathematics. An emphasis in bioinformatics was recently eliminated for a variety of reasons. Twelve of fourteen faculty members hold a doctorate in math or math education, and all permanent faculty have at least a master's in mathematics. The majority of faculty appear to be associate or assistant professors, and consequently, the paucity of full professors is somewhat surprising. It appears that the total number of faculty have fluctuated since 2006, but are now back at close to what they were during the first three years of the review period. Faculty members appear to be active in scholarship and in seeking external funding. Nearly all math faculty demonstrate scholarship through publications or presentations at regional through international conferences, and several faculty are actively involving undergraduates in scholarship, which has resulted in co- authorship and student presentations at professional meetings. Annually, the department takes a group of students to present and participate in student contests at regional Mathematical Association of America meetings. Impressively, one math faculty member – Dr. Lunt - recently received a five-year $580K S-STEM (scholarships) grant from the NSF,which will enable more students to become majors in COSE.

The total number of mathematics majors has grown considerably during the review period, increasing from 72 in 2006 to 99 in 2011. Conversely, the total number of mathematics graduates has not consistently kept up with the growth of majors. The number of graduates averages about 11 students/year with a range from 8/year to 18/year. The reason for the inconsistency is unclear, and it is not discussed within the self study. Likewise, the number of majors and graduates within individual programs is not reported within the self-study, and so drilling down into individual programs to determine their programmatic impact is difficult. The self-study does state that 100% of math education graduates who wish to teach have been placed in secondary teaching positions, however the number of such graduates remains unknown. The self-study also reports that all math and math education students are required to pass the ETS Major Field Exam in Mathematics and score at the 25^{th} percentile before graduation, and that more than 90% of students pass the test at the required level on the first try. The report goes on to state that several students have passed the test at the 90^{th} percentile, and two have achieved the 99^{th} percentile. How this translates to actual achievement among students graduating from the program is questionable. For example: Is passing at the 25^{th} percentile an achievement of note, and where does such a score place SUU graduates among those from other institutions? More information about this particular assessment technique would have been helpful.

The curricula for each program appears to be broadly comparable to those at similar USHE institutions and therefore appears to be appropriate. At the same time, there appears to be little opportunity available within the current programs to explore a minor. This reviewer wonders whether prospective employers might find such an option attractive, and whether such an option would attract additional students into the program.

The department assessment plan presents reasonably stated expected measurable learning outcomes,

with the exception of (2), which expects students to "demonstrate knowledge," which is not easily measurable. A curricular map tying the expected learning outcomes to individual courses within the mathematics program also is provided, however, the assessment method of choice appears to rely strongly on student performance relative to specific test questions - either multiple choice or short answer. Moreover, the assessment in individual courses appears to be related to student performance on only one question per semester per expected learning outcome. How this translates into a robust assessment of student learning is questionable. Consequently, as with other programs within COSE evaluated by this reviewer, it appears that the programmatic assessment plans would benefit from additional training of faculty in their importance, design, development, application, and formative use.

In his meeting with the department chair and faculty, this reviewer found a strong camaraderie among the faculty and a strong sense of shared purpose in providing their students with the best learning experiences possible. The faculty appear to be proud of their work with students, and clearly are engaging their majors through a variety of efforts, including mentoring undergraduate research, facilitating attendance at regional meetings and participation in regional competitions, maintaining an active math club, and engaging students in educational outreach activities such as the State Math Contest. Overall, the math faculty gave the impression that they were happy with the support they receive from the institution, from the college, and from the dean. At the same time, they had several concerns and suggestions, which appear below.

CONCERNS AND RECOMMENDATIONS:

Workload issues and related expectations:

The majority of faculty expressed concerns about the challenges related to balancing their workloads appropriately between teaching and research. Although the majority considered the department to have a good mix of teaching and research among the faculty, many shared concerns that the teaching workload restricted their ability to engage in scholarly activities at the levels which were perceived to be expected by the college and institution. This reviewer asked if faculty were happy with the instructional technology provided or whether faculty could utilize this more effectively to provide more time for research. Several faculty suggested that could be an option, but that training and professional development to learn how to use IT more effectively would be needed. Some faculty members were outspoken in their disappointment that appropriate training had not been provided to them relative to specific software used in their department and throughout campus. Other faculty suggested that they could be more efficient and also improve student learning if they had additional support such as TAs to help facilitate group work in their classes, or additional graders to assist with that activity.

Recommendation: The COSE and the department should investigate avenues by which upper-level math majors might be engaged as in-class TAs or as graders. Perhaps math education majors could receive internship credit for serving as TAs. The extent to which additional graders might be needed should be explored. Finally, the COSE should investigate more deeply the perceived professional development needs of the mathematics faculty, and work with other institutional personnel to provide appropriate software and IT training as required. This seems to be an especially critical need for some faculty.

Curricular issues:

Math faculty were concerned that student progress appears to be impeded because they cannot offer all upper division electives every year. In addition, the department is concerned that there are no standardized course rigor requirements for prerequisite courses. Moreover, the department is concerned about difficulties that they are encountering with "pinning down" appropriate questions for assessment and matching them with existing learning outcomes.

Recommendations: Regarding the concern about upper division electives, it's not clear if students are being properly informed well ahead of time about planned course scheduling, or if the students are being involved in the scheduling process. One relatively simple prospective solution would be to poll majors prior to scheduling upper division electives to ascertain demand and guide the scheduling process.

It's not clear to this reviewer whether the department's issues with standardized course rigor requirements represent an institutional problem or a larger issue within the USHE system. If institutional, then these should be resolved by the department. If USHE issues, then lobbying the USHE math community, and through the dean, engaging the Utah Science and Math Education Council (USMEC) in discussions to improve standardization, is encouraged.

Finally, with respect to assessment issues, this reviewer recommends that the COSE engage other SUU faculty with understanding of developing a strong assessment plan to assist the math department in strengthening their current assessment plan. One solution to the specific challenge noted above is to provide students with several different problems, all of which address the expected outcomes, and to evaluate student achievement throughout a course rather than by one single question on one exam.

OTHER ISSUES:

Math faculty were concerned about several other issues, none of which is directly related to program, but which this reviewer notes in the context of improving morale and efficiency. First, the faculty expressed concerns with the IDEA course evaluation tool currently implemented throughout SUU. Specific issues are 1) that there are too many questions on the survey instrument, which ostensibly results in inaccurate results as students lose interest in the survey, and 2) that the institution cannot adequately interpret the results provided by the survey in a way that is helpful to faculty. Second, the faculty expressed concerns about the required EDGE program, its potential negative impact on engaging undergraduates in math-related research or activities, and the demands it could place on math faculty asked to accommodate experiences for non-math students. Third, the faculty expressed concerns about the current SUU policy related to evaluating faculty for merit pay.

Recommendations: The concerns with the IDEA evaluation tool appear to be reasonable, and should be discussed within the Faculty Senate, or through the dean, with appropriate administrative offices. Recommendations related to issues with the EDGE program and with the evaluation/merit pay are discussed more fully in the general overview section of this report.

PHYSICAL SCIENCE PROGRAM REVIEW

Dr. David Matty, the USHE program reviewer from Weber State University, met with Dr. Ty Redd, and well as a group of faculty members representing the Chemistry, Physics, and Geosciences components of the Physical Science program. The reviewer was unable to collect all of the names of those faculty members who participated in the meeting, but noted that the vast majority were associated with the Chemistry program.

SUMMARY OVERVIEW

The Physical Science Department comprises programs in Chemistry, Geosciences, Geographic Information Systems, and Physics. Within each program area, there are a variety of majors and minors available. In addition to chemistry and chemistry teacher education minors, the chemistry program offers four composite emphases (Professional, Health Care, Teacher Education, and Forensic), which lead to a BS degree. In addition to minors in Geography, Geography Teacher Education, and Geology Teacher Education, the geosciences program offers a BS in Geology, and a BIS in GIS, as well as certificates and emphases in GIS. The physics program offers Physics and Physics Education minors.

The number of faculty within the physical science department has grown annually throughout the review period, or at least between 2006 and 2011, to the 19 presently employed within the department. According to the self-study, 16 hold the PhD degree, and three hold Masters Degrees. However, of these, only 12 are full-time, whether tenured or non-tenured. Information on the distribution of faculty among the various programs, and the distribution of rank among faculty was not included in the information provided to the reviewers. During the period 2006-2012, the number of physical science majors increased from 131 to 209, reaching a peak of 229 in 2011. However, during this same period, the number of graduates oscillated considerably – from 20 in 2008-09 to 7 in 2010-11, averaging 14/year throughout the review period. The reason for this inconsistency is unclear, and is not discussed within the self-study. Likewise, the self-study does not indicate how the numbers of majors or graduates align with various programs in the department, so it is impossible to assess the productivity of each program. This is a key omission. Departmental SCH has also grown over the review period, as has, apparently, the student-faculty ratio within the department.

The curricula in each program appear to be broadly comparable to those at similar USHE institutions and therefore each appears to be appropriate. At the same time, there appears to be little opportunity available within the current programs for students to explore beyond what appear to amount to professional majors which prepare students primarily for graduate school. This reviewer wonders whether prospective employers might find curricula that provide options for adding minors, or which represent combined subject areas attractive, and whether such options would attract additional students into the disciplines represented within the department.

With exception of the expectation to “demonstrate knowledge”, which isn’t easily measurable, the assessment plans for chemistry and physical science teacher education present some of the best measurable student learning outcomes that this reviewer has seen within COSE. On the other hand, those presented for the geosciences are by far the weakest and least measurable that have been encountered. The mechanism to assess student learning outcomes in chemistry includes evaluation of student responses to test questions or homework assignments. Whether these involve multiple indicators of achievement or

not is unclear. The geology assessment plan also consists of evaluating responses to specific test questions, field exercises or projects. However, how these relate to the specific learning outcomes noted previously remains mysterious. Assessment for the physical science teacher education program involves evaluation of assessment activities carried out through the chemistry and geology assessment plans as well as assessment of student success in physics courses. How exactly this relates to the stated student learning outcomes, which are essentially equivalent to those for the chemistry program, is unclear. Consequently, while chemistry appears to have a relatively robust assessment plan in place, it seems apparent that the department would nonetheless benefit from additional training of faculty in the design, development, application, and formative use of strong assessment plans.

In his meeting with the department chair and with the faculty, this reviewer noted a strong camaraderie among at least the chemistry faculty. Only one geosciences faculty member and two physics faculty members attended the meeting, so it's difficult to gauge their sense of community both within their disciplinary group and within the larger department. Of those faculty who did participate, it's clear that they are proud of their accomplishments as a department, and consider themselves to be the campus leaders in mentoring undergraduate researchers. They were pleased to have endowments and equipment, and many were excited about their efforts to integrate pedagogical methods such as POGIL and PLTL into their curricula. Overall, the faculty were upbeat about their department and the college, but some concerns were also expressed, and appear below.

CONCERNS AND RECOMMENDATIONS:

Facilities:

Although the reviewers did not receive a tour of the facilities available to the physical sciences department, those listed for the various programs within the self-study appear to be excellent. In particular, the range of scientific instrumentation and equipment necessary for instruction, and that can be used to facilitate faculty and student research is impressive. Having said this, some faculty indicated that the availability of adequate research space was an issue that restricted research productivity with undergraduates and as individuals.

Recommendation: The chair should discuss this issue with the dean in hopes of developing a plan to better utilize existing space or to identify other space on campus which could be used to facilitate faculty and student research. Shared spaces should also be considered.

Workload issues and related expectations:

While faculty were proud of their leadership in the area of undergraduate research, most also noted that they didn't feel that they received enough credit for such efforts as they should from a workload perspective. Most identified time as the biggest issue they face in this regard. Other faculty members questioned the research requirement by the dean for all faculty members. In particular, the question of whether this requirement was "fair" for adjunct faculty who were hired to teach more courses and more students than regular faculty was raised. Finally, the physics faculty who were present noted that they felt overloaded with teaching duties.

Recommendation: With respect to undergraduate research, the Regents workload policy may be averaged throughout an institution, or throughout subsets (college, department) of an institution. Consequently, the COSE may wish to develop its own workload policy (with institutional approval) that provides appropriate

recognition for undergraduate research activities, yet nonetheless meets Regents policy. Likewise, with the approval of COSE, the department may choose to develop its own workload policies. Given that workload often directly translates into issues of roles and rewards, the department, or the COSE, or SUU may wish to revise rank and tenure expectations to include a more flexible workload policy that would reward variable contributions from individual faculty members. With respect to the research requirement, a more concrete explanation of what "research" entails should be shared with all faculty within COSE. This is discussed elsewhere in the reviewers report. Finally, I recommend that the department chair should review the teaching loads of the physics faculty, assess their concerns relative to others within the department and COSE, and produce a short data-based report that quantitatively addresses their concerns.

Should their concerns be valid, the chair should discuss changes to the program with the dean.

OTHER ISSUES:

Several faculty raised concerns about the EDGE program. Some were concerned with the EDGE experience, while others were concerned that the EDGE program would result in increased loads for faculty that they would not be able to accommodate. Recommendation: Please see the reviewers' comments about the EDGE program within the general overview section of this report.

APPENDICES BY COSE DEPARTMENT

APPENDIX I – AGRICULTURE & NUTRITION

Agriculture

Mission

The mission of the agriculture program is to offer all students the opportunity to understand the discipline of agriculture as an applied science and a model for the principles of bio-economics. The program is closely allied to the concept of service to the agricultural community. Recognizing the diversity of agriculture, faculty will articulate partnerships with colleagues and programs across the university campus. The agriculture program demonstrates teaching excellence by maintaining a faculty of well-educated and experienced agriculturists. The agriculture program promotes a strong, hands-on, structured learning atmosphere and provides opportunities for independent inquiry and scholarship of application by students.

Agriculture Student Learning Outcomes

1. Students will demonstrate knowledge of scientific principles related to agriculture.
2. Students will demonstrate knowledge of agricultural industries including structure, production practices, and management principles.
3. Students will demonstrate effective application of agricultural knowledge and resources to solve problems and perform relevant activities.
4. Students will demonstrate effective communication appropriate to the discipline.

Agriculture Program Goals and How They Link to Institutional Counterparts

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of Human Cultures and the Physical and Natural World
2. Intellectual and Practical Skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and Social Responsibility, including
    a. Civic knowledge and engagement—local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and Applied Learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates a mapping between Agriculture Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of human cultures and the physical and natural worlds.
2. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

The following table demonstrates the mapping between Agriculture Student Learning Outcomes and SUU Learning Outcomes

Agriculture / SUU	A. Science knowledge	B. Industry knowledge	C. Application	D. Communication
1	X	X	X	X
2a	X	X	X	
2b	X	X	X	X
2c				X
2d	X	X	X	
2e	X	X	X	X
2f			X	X
3a			X	
3b				
3c			X	
3d	X	X	X	X
4a			X	X

Nutrition

Mission

The mission of the agriculture program is to offer all students the opportunity to understand the discipline of agriculture as an applied science and as a model for the principles of bio-economics. The program is closely allied to the concept of service to the agriculture community. Recognizing the diversity of agriculture, faculty will promote partnerships with colleagues and programs across the university campus. The agriculture program demonstrates teaching excellence by maintain a faculty of well-educated and experienced agriculturalists. The agriculture program promotes a strong, hands-on, structured learning atmosphere, and provides opportunities for independent inquiry and scholarship of application.

Recognizing the critical role of nutrition to all human endeavors, the mission of the nutrition program is to provide sound, science-based principles, theories, and applications to students whose personal or professional interests embrace the discipline. The nutrition program at SUU prepares students for a number of related careers or entrance into graduate programs upon degree completion at SUU. Additionally, the program promotes wellness by offering a minor and support courses that compliment a variety of other disciplines, especially those related to health and human services and athletics. The program demonstrates dedication to outstanding teaching by maintain a faculty of well-educated, professionally-qualified professor-practitioners.

Nutrition Student Learning Outcomes

The Human Nutrition Bachelor degree is designed to provide graduating students with the following learning outcomes:

A. Students will demonstrate an understanding of nutrition, its language, history, findings, and applications,
B. Students will demonstrate effective and professional oral and written communication and use of current information technologies when communicating with individuals, groups, and the public.
C. Students will synthesize new knowledge from scientific literature; students will demonstrate their knowledge and understanding of the following:
    1. the scientific method.
    2. reading, understanding, and critiquing peer-reviewed literature.
D. Students will use appropriate tools to carry out investigations in nutrition courses

In addition, all course to be counted in Human Nutrition major and minors must be passed with a “C” or better. Nutrition courses older than 10 years may not be counted toward degree requirements.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates a mapping between Nutrition Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of human cultures and the physical and natural worlds.
2. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

The following table demonstrates the mapping between Nutrition Student Learning Outcomes and SUU Learning Outcomes

Nutrition / SUU	A. Demonstrate knowledge of the nutrition discipline at a level appropriate to the course	B. Communicate effectively in oral, written and/or other formats	C. Demonstrate understanding of knowledge from scientific literature	D. Use appropriate tools to carry out investigations in nutrition courses
1	X			
2a	X			X
2b		X	X	X
2c		X		
2d			X	X
2e				
2f				X
3a				
3b				
3c				
3d			X	
4a	X	X		X

Agriculture and Nutrition Overview of Program Data Profiles:

Program Profile					
	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE generated	96	119	202	202	272
Annualized faculty FTE	7.17	6.86	7.26	7.13	7.44
Student/faculty ratio	21.7	23.4	22.3	23.9	22.9
Average annual undergraduate class size for lectures	25.1	26.8	28.2	29.8	33.5

Average annual undergraduate class size for labs	14.6	14.5	17.1	17.4	15.0
Bachelor's degrees awarded based on first degree	15	17	25	25	33

Majors				
2006-7	2007-8	2008-9	2009-10	2010-11
116	133	146	156	180

Student Demographics						
		2007	2008	2009	2010	2011
Gender	Male	35	33	45	49	60
	Female	81	100	101	107	120
Race/Ethnicity	Caucasian	105	122	134	143	160
	Non-Caucasian	10	10	11	13	20

Graduate Placement: Agriculture							
Year	Number of Graduates	Number of Responses	Employed in Field	Employed Out of Field	Percent Employed	Post-BS Studies	Percent Post-BS
2007-2008	10	7	7	0	70	0	0
2008-2009	11	11	11	0	100	0	0
2009-2010	15	12	11	1	80	1	7
2010-2011	10	10	7	3	100	1	10
2011-2012	16	11	11	0	69	0	0

Graduate Placement: Nutrition							
Year	Number of Graduates	Number of Responses	Employed in Field	Employed Out of Field	Percent Employed	Post-BS Studies	Percent Post-BS
2007-2008	10	10	2	2	40	6	60
2008-2009	13	13	6	0	46	7	54
2009-2010	14	12	3	0	19	3	25
2010-2011	19	16	1	2	19	5	31
2011-2012	19	16	1	3	25	8	50

Appendix II

Agriculture - Program Resources

Facilities

- Faculty offices located in the General Classroom building
- SUU Valley Farm
- SUU Mountain property

Labs

- SUU Valley Farm
  - Beef Center
  - Outdoor riding arena
  - Lab and research plots
- SUU Mountain property

Equipment

The Agriculture program has equipment necessary to maintain a hay, cattle, sheep, horses, and crops enterprises.

Organizational resources

- Physical science laboratories (Science Center)
- SUU library resources
- Multi-subject indexes for articles
- Internet access for all students
- Excellent government resources from state and federal reports to books on agriculture
- Numerous journals in the areas of agriculture and physical science

(Nutrition)
Program Resources

Facilities

- Faculty offices located in the General Classroom building

Labs

- Nutrition and food science laboratory and accessory space (General Classroom 204 and 206)

Equipment

The Human Nutrition program has a fully stocked foods lab and accessories for catering meals, including:

- Washer (1)
- Dryer (1)
- Consistometer (1)
- Viscometer (1)

To support clinical classes, the program has acquired the following equipment:

- Achilles Exp III bone ultrasonomter (1)
- Body Media armbands (25)
- ReeVue machine (2)
- Koor VO2/RMR resusable mask kits (2)
- Blood pressure monitor (2)
- Portable statiometer (1)
- Electronic scales (2)
- Blood glucose monitors (10)
- Biodynamics bioimpedance analyzer (3)
- Pulse oximater (3)
- Refractometer (3)
- Jamar grip dynamometer (1)
- Circumference measuring tapes (100)
- Cholestech (2)
- Centrifuge (1)
- HemoCue AB glucose 201 analyzer (1)
- HemoCue Glucometer (1)
- Skinfold calipers (3)

Organizational resources

- Physical science laboratories (Science Center)
- SUU library resources
- Multi-subject indexes for articles
- Internet access for all students
- Excellent government resources from state and federal reports to books on nutrition
- Numerous journals in the areas of nutrition and physical science

Appendix III

Agriculture Curriculum matrix

The following table outlines how Student Learning Outcomes are mapped to the courses in the Agriculture degree program (shaded boxes indicate courses in which outcomes are regularly assessed).

Courses	Agriculture Program Student Learning Outcomes			
	1. Science knowledge	2. Industry knowledge	3. Application	4. Communication
Agriculture Core				
AGSC 1010	X	X		
AGSC 1100	X	X		
AGSC 1110	X	X		X
AGSC 1120			X	
AGSC 1990		X		X
AGSC 3020		X	X	
AGSC 3400	X			X
AGSC 3410			X	
AGSC 3560	X			
AGSC 3570			X	
AGSC 4990		X		X
Core Course Coverage	5	6	4	4
Animal Science Emphasis				
AGSC 2615	X	X	X	
AGSC 2630	X	X	X	X
AGSC 2760			X	X
AGSC 2820	X	X	X	
AGSC 3100	X	X	X	X
AGSC 3150	X		X	X
AGSC 3250	X	X	X	X
AGSC 3350	X	X	X	X
AGSC 3500	X		X	X
AGSC 3510		X	X	
AGSC 3760	X		X	X
Plant Science Emphasis				
AGSC 3030	X	X		X
AGSC 3040			X	
AGSC 3230	X			X
AGSC 3240			X	
AGSC 3700	X			
AGSC 3710			X	

Natural Resources/Range Management Emphasis				
NR 1010	X			
NR 3000	X			
RANG 3600	X			
RANG 3610			X	
RANG 3800	X			
RANG 3805			X	
RANG 4200	X			
RANG 4400	X			
RANG 4405			X	
Major Electives				
AGSC 1750			X	
AGSC 1950			X	X
AGSC 2890			X	X
AGSC 2950			X	X
AGSC 3600	X	X	X	X
AGSC 4850	X	X	X	X
AGSC 4890			X	X
AGSC 4920	X	X	X	X
RANG 4850	X	X	X	X
RANG 4890			X	X
RANG 4920	X	X	X	X

Assessment of Student Learning Outcomes

Explanation: Assessment of Student Learning Outcomes is performed every year. The framework for assessment is based on examination of Course Objectives for two Agriculture courses for every Learning Outcome. Raw assessment data consists of student responses to specific homework or test questions or performance in other specific activity as appropriate. Each student response or performance is assigned a "pass" or "fail" status based on objective standards.

Course Objectives Evaluation:

If the mean percentage of "pass" scores is not met for *two* consecutive assessments, action will commence in the form of curriculum adjustment.

Evaluation of Student Performance for Agriculture Learning Outcomes *Percent of Students Passing Assessment and Corresponding Action*	
Meet passing requirement (≥75% by class)	Less than passing requirement (< 75% by class)
No action needed	Action will be taken

Learning Outcome Evaluation:
If at least one course for each Learning Outcome needs no action (*i.e.* the mean percentage of "pass" scores is at or above 75 percent for at least one course), the Agriculture program will declare that our students have achieved this Learning Outcome. In the case that *no* course that maps to this Outcome has "pass" scoring mean of 75 percent or better, immediate action will commence in the form of curriculum adjustment.

The Role of Key Stakeholders
The Agriculture Program has an Agriculture Advisory Board that is made up of 18 individuals who are key stakeholders in the field of agriculture in Iron County. Board members are involved in the livestock industry, plant production industry, agribusiness, government, and/or are former higher education faculty members. The Board meets annually to provide input to SUU Agriculture faculty on curriculum issues, provide support, and advice (specific examples of such recommendations are provided in Appendix IV). Minutes of each meeting are submitted to the Director of Career and Technical Education.

Nutrition Curriculum Matrix
The following table outlines how the Student Learning Outcomes are mapped to the courses in the Human Nutrition degree program (shaded boxes indicate courses in which outcomes are assessed).

	Shading indicates courses to be assessed for the specified Student Learning Outcome			
	Student Learning Outcome			
	A Demonstrate knowledge of the nutrition discipline at a level appropriate to the course	B Communicate effectively in oral, written and/or other formats	C Demonstrate understanding of knowledge from scientific literature	D Use appropriate tools to carry out investigations in nutrition courses
NFS 1020	X			X
NFS 1240	X			
NFS 1241	X			X
NFS 2020	X	X	X	X
NFS 3020	X	X	X	
NFS 3030	X	X	X	X
NFS 4020	X		X	X
NFS 4200	X			
NFS 4210	X			X
NFS 4480	X	X		
NFS 4950	X	X	X	
Core Course Coverage	11	5	5	6

Assessment of Student Learning Outcomes

Explanation: Assessment of Student Learning Outcomes is performed every year. The framework for assessment is based on examination of Course Objectives for two Nutrition courses for every Learning Outcome. Raw assessment data consists of student responses to specific homework or test questions or performance in other specific activity as appropriate. Each student response or performance is assigned a "pass" or "fail" status based on objective standards.

Course Objectives Evaluation: If the mean percentage of "pass" scores is not met for *two* consecutive assessments, action will commence in the form of curriculum adjustment.

Evaluation of Student Performance for Nutrition Learning Outcomes *Percent of Students Passing Assessment and Corresponding Action*	
Meet passing requirement (≥75% by class)	Less than passing requirement (< 75% by class)
No action needed	Action will be taken

Learning Outcome evaluation:

If at least one course for each Learning Outcome needs no action (*i.e.* the mean percentage of "pass" scores is at or above 75 percent for at least one course), the Nutrition program will declare that our students have achieved this Learning Outcome. In the case that *no* course that maps to this Outcome has "pass" scoring mean of 75 percent or better, immediate action will commence in the form of curriculum adjustment.

The Role of Key Stakeholders

Feedback from graduates and colleagues at other USHE institutions as well as feedback from graduate programs accepting SUU graduates in Human Nutrition have provided impetus for changes to program curriculum (as noted in Appendix IV).

Appendix IV

(Agriculture)

Curriculum changes made based on assessment of SLOs

We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)

Changes made because of input from key stakeholders

Input from the Agriculture Advisory Board led to the creation of the Range degree, addition of the new Range classes, and the addition of a new faculty member.
Changed credit hours for AGSC 2950 from 6 to 5
Changed content of AGSC 3750 credit hours from 1.5 to 2
Added a Range Emphasis including the following classes:

- RANG 3800 – Wildland plant identification (3 credits)
- RANG 4000 – Rangeland- ungulate animal relations (3 credits)
- RANG 4200 – Wildlife ecology (3 credits)
- RANG 4400 – Wildland restoration (3 credits)
- RANG 4405 – Wildland restoration lab (1 credit)
- RANG 4890 – Internship (1 to 4 credits)
- RANG 4920 – Workshop (1 to 3 credits)
- RANG 4850 – Undergraduate research (1 to 5 credits)

Assessment results following any curriculum changes

We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)

(Nutrition)

Curriculum changes made based on assessment of SLOs

We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)

Changes made because of input from key stakeholders

Added NFS 4860 (Nutrition Practicum) to replace NFS 4890 (Nutrition Internship)
Added NFS 3030 – Diet therapy (3 credits)
Added NFS 4030 – Nutrition assessment (3 credits)
Added NFS 4040 – Nutrition counseling and communication (3 credits)

Assessment results following any curriculum changes

We are too early in the process to have assessment results from curriculum changes (but we will have results for two classes by the end of spring 2013)

APPENDIX II - BIOLOGY

Biology Program Mission

The Department of Biology maintains a highly educated and an academically, philosophically, and culturally diverse faculty in order to:

1. Offer all students the opportunity to understand and use scientific thinking and techniques in the study of living things, to realize the relationships of science to other modes of thought, and to become familiar with contemporary models of biological functions and with regional ecosystems of Southwest Utah and its neighbors;
2. Offer interested students the rigorous opportunity to prepare for advanced study in biology and for careers in agriculture, health care, secondary teaching and biological aspects of land management;
3. Build partnerships for service within the regional community;
4. Foster productive scholarship by students and faculty;
5. Create a collegial department atmosphere with free exchange of ideas.

Department of Biology Program Goals

1. Maintain a highly qualified faculty, with diverse areas of specialization covering the scope of the biological world.
2. Foster student inquiry into science and experiential education using a variety of pedagogical approaches including laboratory and field-based activities.
3. Provide a personalized learning environment where students are educated in critical thinking, effective communication and lifelong learning skills in scientific literacy.
4. Provide opportunities for research, scholarship, and other professional experiences with qualified faculty mentors.
5. Prepare students for post-baccalaureate pursuits including:
   - graduate programs
   - professional health programs
   - science teaching careers
   - natural resources management
   - other biology-related careers
6. Provide service courses for general education purposes and that adequately prepare students for acceptance to and success in other academic programs.
7. Establish short-term and long-term goals defining the future direction of the department and establish specific policies to describe departmental governance.
8. Develop departmental criteria to define excellence in teaching, exceptional service and outstanding scholarly activities and establish support mechanisms to encourage and reward those efforts.
9. Periodically review and modify curriculum to ensure that we are meeting our students' needs while remaining current within our discipline and the evolving goals of SUU.

APPENDIX III – CSIS

Department of Computer Science and Information Systems Mission Statement

The Department of Computer Science and Information Systems (CSIS) supports the mission of the University and the Walter Maxwell Gibson College of Science & Engineering by providing high quality

graduate and undergraduate education to students through certificate, associate, baccalaureate, and master degree programs.

The mission of the CSIS Department is to provide a learning-centered environment that enables students, faculty, and staff to achieve their goals and to empower our students to compete on a global level for careers in government, industry, secondary education, and acceptance to graduate school.
The Department provides programs in computer science and information systems. The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as specialized theories, practices, and ethics that enhance their learning.

The CSIS faculty is committed to providing high-quality education, individual guidance and assistance to students, helping them to develop the attributes of critical thinking, effective communication, lifelong learning, and individual integrity while pursuing their academic goals as well as engaging in scholarly activities to enhance our classes, involve students and, to assist in the economic development of the region through partnerships with industry, inventors, and entrepreneurs.

Student Learning Outcomes

The Computer Science Composite program has measurable Student Learning Outcomes (SLOs), based on the needs of the program's (see also Appendix III). The program uses a documented process incorporating relevant data in regularly assessing its Student Learning Outcomes and evaluates the extent to which they are being met. The list of the Student Learning Outcomes is identical to the ABET requirement as follows:

The program enables students to achieve the following attributes by the time of graduation:

a) An ability to apply knowledge of computing and mathematics appropriate to the discipline;
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
d) An ability to function effectively on teams to accomplish a common goal;
e) An understanding of professional, ethical, legal, security, and social issues and responsibilities;
f) An ability to communicate effectively with a range of audiences;
g) An ability to analyze the local and global impact of computing on individuals, organizations and society;
h) Recognition of the need for, and an ability to engage in, continuing professional development;
i) An ability to use current techniques, skills, and tools necessary for computing practices;
j) (CS only) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
k) (CS only) An ability to apply design and development principles in the construction of software systems of varying complexity.
l) (IS only) Understanding of processes that support the delivery and management of information systems within a specific application environment

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates mapping between CSIS Department Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

5. Knowledge of human cultures and the physical and natural worlds.
6. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
7. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
8. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

The following table demonstrates the mapping between Computer Science and Information Systems Student Learning Outcomes and SUU Learning Outcomes

Table A-1

CSIS / SUU	A	B	C	D	E	F	G	H	I	CS-J	CS-K	IS-J
1												
2a		X	X				X		X	X	X	X
2b		X	X		X		X	X	X	X	X	X
2c						X						X
2d	X		X						X	X	X	
2e	X								X			
2f		X	X	X		X						
3a							X	X				
3b				X		X						X
3c				X	X		X					
3d				X	X			X				
4a	X									X	X	

Program Educational Objectives of the CSIS Department

PEOs are statements that designate what our graduates should know 3-5 years *after* graduation, based on a natural progression of knowledge in the field of study.

1. Provide excellent (undergraduate, AAS, and minor) programs in Computer Science and Information Systems.
2. Prepare graduates for careers enabling them to compete on a global level in government, industry, secondary education, and acceptance to graduate school.
3. Provide excellent General Education and service to the degree programs of other Departments and the University community.
4. Engage in research and other scholarly activities that enhance, promote, and support our degree programs, our instructional activities, and the intellectual and professional growth of our students and our faculty.
5. Provide an environment that promotes collegiality, collaboration, and the joy of learning.
6. Recruit and retain highly qualified students to Computer Science and Information Systems.

The CSIS Department Mission Statement is in direct correspondence with the SUU Mission Statement, as shown below:

Table A-2: SUU and CSIS Department Mission Statement Comparison

SUU Mission Statement	CSIS Department Mission Statement
Southern Utah University is a comprehensive, regional institution offering graduate, baccalaureate, associate, and technical programs. SUU is committed to providing an excellent education through a diverse, dynamic and personalized learning environment. The university educates students to be critical thinkers, effective communicators, lifelong learners and individuals who demonstrate integrity and empathy as they pursue their lives' ambitions	The mission of the CSIS Department is to provide a learning-centered environment that enables students, faculty, and staff to achieve their goals and to empower our students to compete on a global level for careers in government, industry, secondary education, and acceptance to graduate school. The Department provides programs in computer science and information systems. The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as specialized theories, practices, and ethics that enhance their learning. The CSIS faculty is committed to providing high-quality education, individual guidance and assistance to students, helping them to develop the attributes of critical thinking, effective communication, lifelong learning, and individual integrity while pursuing their academic goals as well as engaging in scholarly activities to enhance our classes, involve students and, to assist in the economic development of the region through partnerships with industry, inventors, and entrepreneurs.

There is a direct correlation between Program Educational Objectives and the mission statement of Southern Utah University. "The university educates students to be critical thinkers (Program Educational Objectives 1 and 2), effective communicators (Program Educational Objective 5), lifelong learners (Program Educational Objective 3) and individuals who demonstrate integrity and empathy as they pursue their lives' ambitions (Program Educational Objectives 4 and 6)."

Each of the Program Educational Objectives is mapped to the Department Mission Statement as follows:

Table A-3

Program Educational Objective	*Mission Statement Mapping*
Analyze, model, manage, and develop solutions to computing problems.	"The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as ***specialized theories, practices, and ethics that enhance their learning.****"*
Understand the fundamentals of mathematics and computing areas.	"The curricula are rich with opportunities for students to develop ***a sound understanding of fundamentals****"*
Demonstrate professionalism in their work and grow professionally through continued learning and involvement in professional activities.	"enable students … to achieve their goals and to empower our students to compete on a global level for careers in government, industry, secondary education, and acceptance to graduate school."
Contribute to society by modeling ethical and responsible behavior.	"The CSIS faculty is committed to providing high-quality education, individual guidance, and assistance to students, as well as ***helping them to grow intellectually, professionally, and personally*** while pursuing their academic goals."
Communicate effectively in oral, written, and newly developing modes and media.	"The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as specialized theories, ***practices****, and ethics* ***that enhance their learning.****"*
Assume a variety of roles in teams of diverse membership.	"enhance and maintain a learning-centered environment that enables students … to achieve their goals and to ***empower our students to compete on a global level."***

Table A-4: CSIS Department Profile Data

Department	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE Generated by Program	175.30	184.07	210.02	231.80	241.13
Annualized Faculty FTE	9.52	10.38	10.00	11.24	10.37
Student/Faculty Ratio	18.4	17.7	21.0	20.6	23.2
Average Annual Class size (Lectures)	21.5	21.7	22.9	24.4	24.8
Average Annual Class size (Labs)	1.5		1.0	1.0	
Bachelor's Degrees Awarded	11	4	10	5	13

Table A-5: Student Demographics-Gender– Duplicated Headcount (Double majors count twice)

Department	Fall Semester 3rd Week									
	2007		2008		2009		2010		2011	
	F	M	F	M	F	M	F	M	F	M
CSIS	16	79	13	86	16	94	19	109	13	123

Table A-6: Student Demographics-Race/Ethnicity– Duplicated Headcount (Double majors count twice)

Department	Race/Ethnicity	Fall Semester 3rd Week				
		2007	2008	2009	2010	2011
CSIS	Caucasian	84	85	91	105	106
	Non-Caucasian	9	14	18	22	29

Appendix II - CSIS

Program Resources

Facilities

- Faculty offices are located in the Electronic Learning Center (ELC) building
- Computer labs are used in ELC to teach courses in both the CS and IS programs. Labs in other buildings on campus are used on an as-needed basis.

We currently have nine full-time faculty in the Department of Computer Science and Information Systems, as seen in the above data form. Courses taught in our Department share the following facility resources with other departments on campus. The Dedicated/Specialty labs help students receive hands-on specialized experience with industry software and hardware which provides continued reinforcement of concepts relating to each SLO associated with those courses.

Table A-7: Computer lab facilities utilized in the Department of Computer Science and Information Systems courses.

Lab-space Classroom	Number of Students Accommodated
ELC 310	30
ELC 311	30
ELC 312	34
ELC 313	32
Dedicated (Specialty Labs)	Number of Students Accommodated
ELC 306 (Networking/Ethical Hacking lab)	26
ELC 210 (Forensic lab)	18

The outcomes listed in Appendix I are covered in multiple classes throughout our CS and IS curriculum. Within each course, assignments and exams are used to help assess student understanding.
Through the assessment of the outcomes in our courses, we identify where we are achieving our outcomes and goals, and where we need to improve. In the event assessment indicates a change is needed, procedures are in place to make those changes and improvements, through faculty and Department resources. See Appendix III for assessment procedures.

Appendix III

The following two tables illustrate Student Learning Outcome coverage in our CS and IS courses. At the top of each table, there is an explanation relating to the numbers and shading in the table. Here is a summary of how to read the tables:

- A number one indicates normal or introductory coverage of the SLO.
- A number two indicates high or deeper coverage of the SLO.
- The shaded cells indicate that the course conducts a periodic assessment of the corresponding SLO.

Procedural descriptions for the actual assessment process follow the tables.

Table A-8: Mapping Student Learning Outcomes to CS Courses (with importance and indicators)

Level of importance is indicated as 1 (Normal) and 2 (High) *The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcome*												
	Student Learning Outcome											*Objective*
	A	B	C	D	E	F	G	H	I	J	K	*Coverage*
Common Core												
CSIS1400	2	2	2	1	1	1		1	2	1	1	10
CSIS1410	1	1				1			1	1	2	6
CSIS2420	1	1	1			1			1		2	7
CSIS2600				1		1	1	1				4
CSIS2810	1	1	1				1			1		5
CSIS3100		1	1	1	1	1	1	1	1			8
CSIS3200	2	2	2	2	1	1	1	1	2			9
CSIS3600				1		1						2
CSIS3650				1	1		1		1			4
Common Core Coverage	5	6	5	6	4	7	5	4	6	4	3	
Computer Science Composite with no emphasis (CS Core Required)												
CSIS3000	1	1	1			1			1		2	6
CSIS3150		1	1									
CSIS3550								1				
CSIS4550	1									1		2
CSIS4800	1	1	1	2	1				2	1	2	8
CSIS Core Coverage	3	2	2	1	1	1	0	0	2	2	2	
CS with no emphasis Program Coverage	8	8	7	7	5	8	5	4	8	6	5	
Computer Science Composite with emphasis in Forensic Science (CS Core Required)												
CSIS 3000	1	1	1			1			1		2	6
CSIS3150		1	1									
CSIS 3500	1	1	1				1			1		5
CSIS 3700					1				1			1

Level of importance is indicated as 1 (Normal) and 2 (High) *The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcome*												
	Student Learning Outcome											*Objective*
	A	B	C	D	E	F	G	H	I	J	K	*Coverage*
CSIS 4700					1				1			1
CSIS Core Coverage	2	2	2	0	2	1	1	0	1	1	1	
CS with Forensic Science emphasis Program Coverage	7	8	7	6	6	8	6	4	7	5	4	

Table A-9: Mapping Student Learning Outcomes to the Course Objectives and Their Coverage within the Information System's Program

Level of importance is indicated as 1 (Normal) and 2 (High) *The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcome*											
Common Core	Student Learning Outcome										*Objective Coverage*
	A	B	C	D	E	F	G	H	I	J	
CSIS1400	2	2	2	1	1	1		1	2		8
CSIS1410	1	1				1			1		4
CSIS2420	1	1	1			1			1		5
CSIS2600				1		1	1	1			4
CSIS2810	1	1	1				1				4
CSIS3100		1	1	1	1	1	1	1	1		8
CSIS3200	2	2	2	2	1	1	1	1	2	2	10
CSIS3600				1		1					2
CSIS3650				1	1		1		1		4
Common Core Coverage	5	6	5	6	4	7	5	4	6	1	
IS Core Required											
CSIS2000		1		1		1			1		4
CSIS2620			1		1		1	1	1		5
CSIS2670		1		1				1			3
CSIS3050				1	1	1	1	1	1		6
CSIS4810	1	1	1	1	1	1	1	1	1	1	9
IS Core Coverage	1	3	2	4	3	3	3	4	4	1	
Program Coverage	6	8	7	10	7	10	8	8	10	2	

Program Educational Objective Assessment

Program Educational Objectives (PEOs) are associated with our Department's ABET accreditation. These are statements that designate what our graduates should know 3-5 years *after* graduation, based on a natural progression of knowledge in the field of study. These PEOs are tied to our Student Learning Outcomes (SLOs), which are statements outlining what the students should know, or have learned by the time they graduate. These SLOs are then tied to individual course objectives. All of these are tied back to the mission and goals of our Department and the University.

Annually our Department holds an Industrial Advisory Board (IAB) meeting, and Board members review our PEOs. It should be noted that surveys have also been sent out to all Board members to get their feedback on them, regardless of whether they are able to attend the annual meeting. (Recently, ABET has made changes to their procedures that no longer require the PEOs be voted on and approved by IAB members. ABET made this change effective for the 2013-2014 accreditation cycle.) Minutes of the annual IAB meeting are recorded and kept. This meeting provides our board members the opportunity to suggest changes to our course offerings and curriculum content, based on industry needs. See Appendix IV for details.

Course Objective Assessment

In each indicator course, in the above curriculum matrix, assessment is done through either assignments or exams, determined by the instructor. These assessment tools are graded by the instructor and use a pass/fail rubric associated with the assessment tool to determine what percent of the students passed/failed the question/problem. The results are reported on a common department form (See Appendix IV). The Department determines whether action needs to be taken to change/improve based on the following scale:

- 80% - 100%, No Action needed: If more than 80% of the students pass the assessment of the outcome, then no action needs to be taken to change the curriculum.

- 70% - 79%, Marginal: If results fall within this range, then that course is put on watch, and if results remain in this range for two consecutive teachings of the course, then action will be taken.

- 0% - 69%, Immediate Action: If results fall within this range, then the instructor brings suggestions to the rest of the faculty in the Department of ways they can improve the course to help students meet the outcome for that course. Other faculty provide input and possibly other suggestions. Once appropriate changes have been agreed upon, then the instructor is responsible for implementing those changes for the next time they teach the course. Courses that fall here are addressed every semester.

Student Learning Outcome Assessment

Courses listed in Tables A-8 and A-9 that are indicated as the responsible course for the assessment, completes an assessment of the SLO annually, meaning, each course listed there is taught at least once a year. Provided that at least one Course Objective assessment tied to a given Student Learning Outcome meets the 80% threshold described in the previous paragraph, the target for given Student Learning Outcome is declared to be satisfied for that academic year.

Appendix IV

Curriculum changes made based on assessment of SLOs

The following tables contain the assessment results for each of the Student Learning Outcomes in our Curriculum that required follow-up actions from the assessment. Other courses also assess the SLOs, however, those assessments met the SLO standard and required no additional action. Full reports can be provided upon request.

Tables A-10: Assessment Results

Course Objective assessment results tied to SLO - A (An ability to apply knowledge of computing and mathematics appropriate to the discipline)

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 1410	Instructor graded assignment	Spring 2009 18/26 = 60%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. 1. Include a lecture on Software Engineering principles with an emphasis on Test Code. 2. Provide Test Code in order to allow students to have immediate feedback.	The following semester this outcome was 85% and no further action was deemed necessary
CSIS 1400-02	Instructor graded assignment	Fall 2009 11/17 = 65%	1) The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee decided that the following adjustment should be made beginning Spring Semester 2010 2) The Instructor will emphasize computational efficiency in the context of recursive programs in a different manner.	The following semester the two sections of the course (CSIS 1400) moved to Marginal.
CSIS 4550	Instructor graded assignment	Fall 2011 2/3 = 66.7%	The CSIS Department Curriculum Committee reviewed this item January 12, 2012. Due to the small number of students enrolled, the Committee decided to re-evaluate this Performance Indicator after the next offering of this course	TBD - The result of this semester (Fall 2012) is not out.

Course Objective assessment results tied to SLO - B (An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 1410	Instructor graded assignment	Spring 2009 18/26 = 60%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee decided that the following curriculum adjustments should be made beginning Fall Semester 2009: a. Include a lecture on Software Engineering principles with an emphasis on Test Code. b. Provide Test Code in order to allow students to have immediate feedback.	The following semester this outcome was 85% and no further action was deemed necessary

Course Objective assessment results tied to SLO - C (An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3150	Instructor graded assignment	Spring 2010 5/10 = 50%	c. The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee suggested that the instructor place more emphasis on algorithmic complexity.	The following semester this outcome was 83% and no further action was deemed necessary

Course Objective assessment results tied to SLO - D (An ability to function effectively on teams to accomplish a common goal).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3600	Instructor graded assignment	Spring 2010 9/16 = 56%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. As other courses seem to be meeting Learning Outcome D, the Committee decided that the following curriculum adjustments should be made: Increase the number of team members from 2 to 4	The following semester this outcome was 96% and no further action was deemed necessary

Course Objective assessment results tied to SLO - E (An understanding of professional, ethical and social responsibilities). This particular SLO did not require continued follow-up action. A full list of results can be provided upon demand.

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3650	Instructor graded assignment	Fall 2010 10/14 = 71%	The CSIS Department Curriculum Committee will re-evaluate this course in Fall 2011	The following semester this outcome was 100% and no further action was deemed necessary

Course Objective assessment results tied to SLO - F (An ability to communicate effectively with a range of audiences).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3600	Instructor graded assignment	Spring 2010 8/16 = 50%	The CSIS Department Curriculum Committee thinks the question is geared more heavily towards course content and less on a student's ability to communicate effectively with a range of audiences. The Committee decided that the following adjustments should be made: The Learning Outcome assessment criteria should be revised to better evaluate Learning Outcome F.	The following semester this outcome was 96% and no further action was deemed necessary

CSIS 2600	Instructor evaluation of team performance	Spring 2011 16/26 = 62%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The instructor explained that the students were told at the first of the semester about the audience involvement criteria, but the document given to the student for the assignment at the end of the semester did not detail the criteria. The Committee suggested that the group project requirement document detail the criteria for the audience involvement category.	The following semester this outcome was 100% and no further action was deemed necessary

Course Objective assessment results tied to SLO - G (An ability to analyze the impact of computing on individuals, organizations, and society, including ethical, legal, security and global policy issues). This particular SLO did not require continued follow-up action. A full list of results can be provided upon demand.

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3650	Instructor graded assignment	Fall 2010 10/14 = 71%	The CSIS Department Curriculum Committee will re-evaluate this course in Fall 2011	The following semester this outcome was 100% and no further action was deemed necessary
CSIS 2810	Instructor graded assignment	Spring 2011 13/18 = 72%	The CSIS Department Curriculum Committee will re-evaluate this course in Spring 2012	The following semester this outcome was 94% and no further action was deemed necessary

Course Objective assessment results tied to - H (Recognition of the need for, and an ability to engage in, continuing professional development).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 1400-01	Instructor graded assignment	Spring 2009 5/15 = 33%	The CSIS Department is investigating whether CSIS 1400 is an appropriate course to assess Learning Outcome H. A decision will be made during a Fall 2009 CSIS Department Curriculum Committee meeting.	The CSIS Department Curriculum Committee decided that assessing Learning Outcome H in CSIS 1400 is not appropriate. Learning Outcome A will be measured instead starting Fall 2009.
CSIS 1400-02	Instructor graded assignment	Spring 2009 4/8 = 50%	The CSIS Department is investigating whether CSIS 1400 is an appropriate course to assess Learning Outcome H. A decision will be made during a Fall 2009 CSIS Department Curriculum Committee meeting.	The CSIS Department Curriculum Committee decided that assessing Learning Outcome H in CSIS 1400 is not appropriate. Learning Outcome A will be measured instead starting Fall 2009.

Course Objective assessment results tied to SLO - I (An ability to use current techniques, skills, and tools necessary for computing practice). This particular SLO did not require continued follow-up action. A full list of results can be provided upon demand.

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 3200	Instructor graded assignment	Fall 2009 19/25=76%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee decided that the following curriculum adjustments should be made beginning Fall Semester 2010: The Instructor will spend more time teaching database query concepts.	The following semester this outcome was 82.35% and no further action was deemed necessary

Course Objective assessment results tied to SLO - J (IS) (An understanding of processes that support the delivery and management of information systems within a specific application environment). This particular SLO did not require continued follow-up action. A full list of results can be provided upon demand.

Course Objective assessment results tied to SLO – J (CS) (An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices).

Course ID	Assessment Method	Assessment Result	Action	Follow-Up
CSIS 14140	Instructor graded assignment	Spring 2009 18/26 = 69%	The CSIS Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee decided that the following curriculum adjustments should be made beginning Fall Semester 2009: Include a lecture on Software Engineering principles with an emphasis on Test Code. Provide Test Code in order to allow students to have immediate feedback.	The following semester this outcome was 85% and no further action was deemed necessary

Course Objective assessment results tied to SLO - K (CS) (An ability to apply design and development principles in the construction of software systems of varying complexity). This particular SLO did not require continued follow-up action. A full list of results can be provided upon demand.

Curriculum changes made based on ABET suggestions

A proposal to change and clarify the science requirement for Computer Science degree in the catalog from "approved Science to complete 12 credits of Science" to "science courses to complete 12 credit hours of science, which must include one of the following sequences BIOL1610, 1615, 1620, 1625 or CHEM 1210, 1215, 1220, 1225 or PHYS 2210, 2215, 2220, 2225" was submitted and approved

- Proposed: 11/13/2008
- Changed Catalog: Expected 2013

A proposal to remove CSIS 3150 (C & C++ programming) as an upper elective and make it a required course for the computer science composite degree and reduce the upper division elective from 12 to 9 so that the total required credit remains the same.

- Proposed: 11/13/2008
- Change Catalog: 2009

A proposal to make CSIS 3150 (C & C++ programming) a required course for the computer science forensic science emphasis degree and reduce the upper division elective from 5 to 2 so that the total required credit remains the same.

- Proposed: 11/13/2008
- Change Catalog: 2009

The pre-requisite for CSIS 4550 (Programming Languages) was changed from CSIS 3000 (Advanced Algorithm and Data Structures) to CSIS 3550 (Foundation of Computation Theory). The department believed that CSIS 3550 is a more appropriate pre-requisite for the CSIS 4550 course.

- Proposed: 11/08/2007 Effective Fall 2008
- Changed Catalog: 2011

A new course CSIS 3550 (Foundation of Computation Theory) was proposed so that in combination with CSIS 4550 (Programming Languages) to teach the students both theoretical foundation of computation theory and to make them acquainted with the paradigms of the programming languages. This was to overcome ABET weakness in our computer science program.

- Proposed: 11/08/2007 Effective Fall 2008
- Changed Catalog: 2011

Changes made because of input from advisory boards, alumni, employers, etc.

This past year's IAB meeting in Spring 2012, board members recommended that we add the following courses to our curriculum: Software Engineering, Web Programming, and Mobile Applications. These courses are in the process of being developed and taught. The following reflect the curriculum and catalog changes made based on our IAB recommendations.

A proposal to offer CSIS 4210 (Software Engineering) course as an elective for Computer Science/Information systems majors. This change was initiated based on department IAB meeting.

- Proposed: 09/11/2012
- Change Catalog: Expected 2013

A proposal to offer CSIS 4300 (Mobile Application Development) course as an elective for Computer Science/Information Systems majors. This change was initiated based on department IAB meeting.

- Proposed: 09/11/2012
- Change Catalog: Expected 2013

A proposal to offer CSIS 4350 (Web Programming) course as an elective for Computer Science/Information Systems majors. This change was initiated based on department IAB meeting.

- Proposed: 09/11/2012
- Change Catalog: Expected 2013

Curriculum changes based on Department Faculty recommendations

The pre-requisite for CSIS 2000 (Web Development) was changed from CSIS 1010 (Electronic Commerce and Global Society) to CSIS 1000 (Intro to Computer Applications & the Internet) or ART 2210 (Digital Imaging) to reduce the additional pre-requisite course the student would need to take in order to get into CSIS 2000.

- Proposed: 02/11/2010
- Changed Catalog: 2011

A proposal to add the following context in the "Note" section of each of the CSIS degree offered. "The CSIS department limits the number of years to accept transfer classes to 10, anything beyond this will be considered on a case-by-case basis, due to the rapid change of the industry."

- Proposed: 03/08/2012
- Changed Catalog: Expected 2013

A proposal to change the offering of CSIS 2810 (Computer Organization & Architecture) from Fall semester to Spring semester and offering of CSIS 3150 (C & C++ Programming) from Spring semester to Fall in order to allow students to take CSIS 2810 in Spring of their second year and CSIS 3150 in the Fall of their third year in preparation for CSIS 3600 (Operating System) in the Spring of their third year.

- Proposed: 03/02/2010
- Changed Catalog: 2011

A proposal to delete CSIS 2660 (Network Services & support) was submitted due to the fact that EET 2750 (PC Hardware) covers similar material.

- Proposed: 03/08/2009
- Changed Catalog: 2010

A proposal to offer a new course CSIS 2670 (Information Security & Assurance) was submitted in order to replace the deleted course (CSIS 2660). In all degree requirements where CSIS 2660 was required, 2670 will be required. This course was also created to improve the Security offerings in the Information Systems Degree.

- Proposed: 03/08/2009
- Changed Catalog: 2010

Department of Biology Student Learning Outcomes

The Department provides undergraduate programs in biology with emphases in botany, forensics, teaching, and zoology. Prescribed course work in the department supports the general education program of the University, builds a solid basis for graduate or professional study, prepares public school teachers, and provides the instructional foundation necessary for careers in many fields.

Biology degrees are engineered to provide graduating students with the following learning outcomes. Specific course learning objectives or required skills and experiences are listed beneath each learning outcome:

A. Students will demonstrate an understanding of general knowledge of biology: its language, history, findings and applications, including:
    1. the basic chemistry of life, DNA, RNA, proteins
    2. the processes associated with inheritance
    3. cell structure and function
    4. physiological systems and processes
B. Students will demonstrate an understanding of the dynamics of interactions and adaptations within and among biological systems, including:
    1. population biology and the importance of organismal interactions
    2. the importance of the interaction between biotic and abiotic components of an ecosystem
    3. the diversity of living organisms and the evolutionary relationships among them
    4. evolutionary processes and their importance
C. Students will demonstrate an understanding of the methodologies of science and will synthesize new knowledge from scientific literature; students will demonstrate their knowledge and understanding of the following:
    1. the scientific method
    2. reading, understanding, and critiquing peer-reviewed literature
D. Students will communicate effectively in oral, written, and other formats; students will demonstrate their skills in the following areas:
    1. oral presentation of scientific work or synthesis of knowledge from the field
    2. written presentation of scientific work or synthesis of knowledge from the field
E. Students will use appropriate tools to carry out investigations in their intended fields, including:
    1. demonstrating competency in use of appropriate field and/or laboratory equipment
    2. successful completion of an SUU-approved experiential learning activity
    3. acquiring sufficient knowledge and training to successfully enter graduate or professional school
    4. completion of an independent research project.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates mapping between Biology Department Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of Human Cultures and the Physical and Natural World
2. Intellectual and Practical Skills, including
    - 2a. Inquiry and analysis
    - 2b. Critical and creative thinking
    - 2c. Written and oral communication
    - 2d. Quantitative literacy
    - 2e. Information literacy
    - 2f. Teamwork and problem solving
3. Personal and Social Responsibility, including
    - 3a. Civic knowledge and engagement—local and global
    - 3b. Intercultural knowledge and competence
    - 3c. Ethical reasoning and action
    - 3d. Foundations and skills for lifelong learning
4. Integrative and Applied Learning, including
    - 4a. Synthesis and advanced accomplishment across general and specialized studies

Mapping between Biology Student Learning Outcomes and SUU Learning Outcomes

The following table demonstrates the mapping between Biology Student Learning Objectives and SUU Learning Outcomes

Table A-1: mapping between Program SLOs and Institutional Los

Biology / SUU	A Understanding of general knowledge of biology; language, history, findings, applications	B Understanding of dynamics of interactions and adaptations within biological systems	C Understanding of methodology of science; synthesis of knowledge from scientific literature	D Effective communication in oral, written, and other formats	E Use of appropriate tools to carry out investigations in intended fields
1	X	X			
2a	X	X		X	X
2b			X	X	X
2c				X	
2d			X		X
2e					
2f					X
3a					
3b					
3c				X	
3d			X		
4a	X	X			X

Tables A-2: Biology Academic Profile Data

	Academic Year				
	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE Generated by Program	336	367.42	366	419.67	462.71
Annulaized Faculty FTE	13.93	15.26	15	13.62	15.72
Studetn/Faculty Ratio	24.1	24.1	24.4	30.8	29.4
Average Annual Class Size (Lectures)	38.7	38.9	39.1	49.7	50
Average Annual Class Size (Labs)	20.6	18.5	18.5	21.4	22.4
Bachelor's Degrees Awarded	82	57	85	64	73
Majors by Department	752	731	750	782	706

Department	Fall Semester 3rd Week									
	2007		2008		2009		2010		2011	
	F	M	F	M	F	M	F	M	F	M
BIOL	313	439	329	402	348	402	368	414	304	402

Department	Race/Ethnicity	Fall Semester 3rd Week				
		2007	2008	2009	2010	2011
BIOL	Caucasian	665	640	648	657	587
	Non-Caucasian	78	84	97	122	117

Appendix II Biology

The following table outlines department facilities, including those necessary to teach laboratories in a variety of subjects. We maintain a general biology lab, a microbiology lab, a human anatomy lab (including cadavers), a histology lab, a genetics lab, and two ecology labs. In addition to these laboratories, the department maintains a state-of-the-art animal care facility. This facility is designed to house live animals which are used for research purposes. The SUU Biology Department has the most complete genetics teaching laboratory in the state of Utah. This is an area that has been neglected by many universities, and yet, it is one of the cutting edge areas of Biology. Our graduates have gone to work for genetics laboratories along the Wasatch Front and elsewhere. In spite of our success in this area, genetics laboratory equipment, including thermal cyclers and DNA analysis equipment, is expensive. We are constantly searching for ways to enhance the teaching of biology in this and other areas of biology.

Faculty members of the Department of Biology are active scholars, and they frequently involve their students in research. During the 2011-2012 academic year, numerous presentations were made at professional venues on the local, regional, and national level by both faculty and students. Scholarly publications and external grants were also obtained. Also, numerous service activities were completed and memberships in professional organizations maintained by the department faculty. One of the three distinguished educators honored at the 113th SUU Annual Commencement May 4, 2012, was Biology's own Dr. Betsy Bancroft.

During the 2011-2012 academic year, six grants were obtained by three faculty members, which totaled $557,416 in this year alone. They include the following:

Terri Hildebrand

• *NPS* Grant through Colorado Plateau Cooperative: Ecosystem Studies Unit (CPCESU) Correlation between Wetland Vegetative and Microbial Community Diversity of Bryce Canyon National Park's Southern Region. May 2011-December 2012 ($9,997)
• *NPS* Grant through Colorado Plateau Cooperative: Ecosystem Studies Unit (CPCESU) Targeted Vegetation Survey and Preparation of NPS Technical Report on the Flora of the Grand Canyon-Parashant National Monument, AZ – Phase II. June 2010-April 2012 ($49,893)

Ron Martin

• *Dixie National Forest* Native Plant Restoration August 2011-June 2012 ($333,526)

John Taylor

• *NPS* (CPCESU) Implement cooperative study to understand bat ecology of Pipe Spring National Monument and the Kaibab Paiute Reservation. September 2010-December 2013 ($40,000)

• Title II, Part B. Mathematics and Science Partnership. Teachers as Scientists Program. Taylor, J.R., D. Merrell, D., A. Johnston. July 2011-September 2012. ($104,000)
• CFDA Title: Fish, Wildlife, and Plant Conservation Resource Management. Cedar City Field Office Bat Habitat Inventory and Population Monitoring. September 2011-November 2012 ($20,000)

Table A-3: Department of Biology Facilities and Equipment (continues on next page)

Quantity	Description	Quantity	Description
1	3130 Genetic Analyzer	10	Metabolism Apparatus
6	Analog Vortex Mixer	3	Microcon Centrifugal Filter Devices
	Analytical Centrifuge	2	Microprocessor Controlled Water Bath
2	Aquarium 50 Gal.	356	Microscope
1	Audio Generator SS 1	1	Microscope Digital Camera
1	Autoclave Model 3870M	1	Microscope slide projector
1	Autopsy Saw	5	Microwave
1	Bacteria Chamber	1	Milli-Q Advantage A10
20	Balance Scale	2	Mini Plate Spinner MPS 1000
1	Barcode Reader	5	Mini Trans-Blot Cell/MTB Module
1	Barometer	1	Ultraviolet lamp Multiband UV-254/366
	Numerous plant, animal, and anatomical teaching models	1	NI-150 High Intensity Iluminator
6	Bio-Rad Mini-Protean Tetra System	1	Paper Shredder
2	Blender	20	Personal computers
3	Blender	1	PCR System 2400
1	Blood Centrifuge	12	pH Electrode Accumet
14	Blood Pressure Monitor	20	pH Meter
2	BloodSugar Meter Advantage	15	Pipet Stand Clear Plastic
2	Cadaver Table rolling	4	Pipette Pump II Blue
6	Calculator HISTO	4	Pipette Pump II Green
2	Calibration Syringe Model AFT 6	4	Pipette Pump II Red
2	Camera WV-CL454	54	Pipetter
1	Camera AF-5 Micro	11	Power Ball
15	Centrifuge	11	Power Supply
1	Colony Counter	2	Projector LCD
1	Colour-Blindness Test Book	1	Programmable Thermal Controller
2	Conductivity Meter	1	Pulse Monitor ES 110
1	Copier Canon Image Runner 5055	2	Pulse Plethysmagram BSL Sdcr SS4LA
1	Critical Point Dryer	1	PureYield Plasmid MiniPrep System
1	Cryostat HM505E	50	QIA Prep Spin Mini Prep Kit (50)
1	CS-21 Copystand/Digital Cat No 421102	50	QIA Quick Gel Extraction Kit (50)
1	Cyro Bath	50	QIA Quick PCR Purifaction Kit (50)
1	Digital Graphic Printer UP-D897 Sony	50	QIA Quick PCR Purifaction Kit (50)
1	Dishwasher	1	Qiaquick Gel Extractor Kit (50)

Quantity	Description	Quantity	Description
3	DNA Gel PCR Purifaction Kit (50)	4	Reflex Hammer Transducer BSL SS36L
3	Dri Bath	1	Refrigerator Circulator R 40
1	Drying Oven Model 6	1	Refrigerator/Incubator Heratherm IG 3180
3	Electric Balance Scout Pro SP 202	2	Respirometer
2	Electric Scale	50	RNeasy Mini Kit (50) Cat #74104
13	Electronic Scale	1	RNEasy Plant Mini Kit
34	Electrophoresis Apparatus	1	Scantron
1	Electrophoretic Gel System	1	Scintillation Counter LS3801
	Explorer Pro balance	13	Spectrophometer
	Fax Machine	3	Sphygmomanometer
2	FiberOptic Lite Source	5	Spirometer Handheld
1	Fixed Angle Rotor	2	Square Wave Stimulator 82415
1	Seconic Model L-308S light meter	2	Stainless Steel Washing Cart
1	Flask Shaker	1	Stationary Bike
1	Flex Camera	1	Step Ladder
6	Freezer	9	Stethoscope Sprague
1	Freezer Low Temp Model 5476 VWR	2	Stimulating Electrode
10	Fridge/Freezer	12	Stirrer
1	Gene Quant II RNA/DNA Calculator	3	Stirrer/Hot Plate
1	Glassware Washer	1	Strobe Light Model 2001W
4	Goniometer Twin Axis BSL	1	Ice Machine
12	Gyroscope Exerciser	1	SV Total RNA Isolation System
3	Hand Dynamometer BSL SS25LA	1	Swinging Bucket Rotor
1	Hand Refractometer	4	Tension Adjuster HDW 100A SS12LA
10	Heart Rate Monitor	2	Thermal Cycler
25	Hot Plate	1	Treadmill Ergo/Smart
3	Hot Plate/Stirrer	1	Ultra low freezer So low
1	HP Color LaserJet 4700dn	1	Vacuum Pump
1	HP LaserJet P4014n	1	Vacuum Steam Sterilizer Model 533LS
1	Hybridization Oven Maxi 14	1	Variable Force Transducer BSL SS12LA
3	Incubator	4	Vortex Genie Mixer
1	Infrared Thermometer MT-4 Minitemp	4	Water Bath
1	iPod 20GB	1	Water Still
9	Lap Top computers	1	Wizard DNA Clean-Up System
12	Mac Computer, Keyboard, Mouse	1	Wizard PlusDNA Purification System
1	Medium Airflow Transducer	1	YSI Model 2788 PM Kit

Appendix III – Biology
Curriculum Matrix

Program: Bachelor of Arts (BA) or Bachelor of Science (BS)
The following tables outline how the Student Learning Outcomes are mapped to the core courses in our Biology program.

Tables A-4 -- Mapping Biology Student Learning Outcomes to Course Objectives and their coverage

	Shading indicates courses to be assessed for the specified Student Learning Outcome					
	Student Learning Outcome					*Objective*
	A	B	C	D	E	*Coverage*
Core Courses for all Emphases						
BIOL 1610	X		X			2
BIOL 1615	X		X	X		3
BIOL 1620		X	X	X		3
BIOL 1625		X	X	X	X	4
BIOL 3030	X	X				2
BIOL 3035			X	X	X	3
BIOL 3060	X	X	X			3
BIOL 3065	X		X	X	X	4
BIOL 3110		X	X			2
BIOL 4990			X			1
Core Course Coverage	5	5	9	5	3	

	A	B	C	D	E	*Coverage*
Additional Core Courses for Botany Emphasis						
BIOL 3510	X	X	X			3
BIOL 3515	X	X	X	X	X	5
BIOL 3530	X	X	X			3
BIOL 3535	X	X	X	X	X	5
BIOL 3550		X	X			2
BIOL 3555		X	X		X	3
Botany Core Coverage	4	6	6	2	3	

	A	B	C	D	E	*Coverage*
Additional Core Courses for Education Emphasis						
BIOL 2420	X			X	X	3
BIOL 2425	X			X	X	3
BIOL 2060	X	X			X	3
BIOL 2065		X	X	X	X	4
BIOL 4650	X	X	X			3
BIOL 4070	X		X	X		3
BIOL 4900	X	X		X		3
BIOL 4980	X	X	X	X	X	5
Education Core Coverage	7	5	4	6	5	

	A	B	C	D	E	*Coverage*
Additional Core Courses for Forensics Emphasis						
BIOL 2420	X			X	X	3
BIOL 2425	X			X	X	3
BIOL 2320	X					1
BIOL 2325	X					1
BIOL 3250	X					1
BIOL 3255					X	1
BIOL 3310	X			X		2
BIOL 3315			X			1
BIOL 4310			X		X	2
BIOL 4315			X		X	2
BIOL 3430		X	X	X		3
BIOL 3435		X	X	X	X	4
BIOL 3510	X	X	X			3
BIOL 3515	X	X	X	X	X	5
Forensics Core Coverage	8	4	7	6	7	

	A	B	C	D	E	*Coverage*
Additional Core Courses for Zoology Emphasis						
Students must complete 12 credits of the following 3000-level courses:						
BIOL 3250	X					1
BIOL 3255					X	1
BIOL 3270	X					1
BIOL 3275	X		X	X	X	4
BIOL 3290	X		X			2

	A	B	C	D	E	*Coverage*
Additional Core Courses for Zoology Emphasis						
BIOL 3295	X		X	X		3
BIOL 3310	X			X		2
BIOL 3315			X			1
BIOL 3390	X	X				2
BIOL 3395			X	X		2
BIOL 3410		X	X	X	X	4
BIOL 3415		X	X	X		3
BIOL 3430		X	X	X		3
BIOL 3435		X	X	X	X	4
BIOL 3450		X	X	X	X	4
BIOL 3455		X	X	X		3
BIOL 3370	X	X	X			3
BIOL 3375				X		1
BIOL 3470		X	X	X		3
BIOL 3475		X	X	X	X	4
BIOL 3490	X	X				2
BIOL 3495			X	X		2
Students must complete any one of the following 4000-level courses:						
BIOL 4070	X		X	X		3
BIOL 4310			X		X	2
BIOL 4315			X		X	2
BIOL 4410		X	X	X	X	4
BIOL 4620					X	1
BIOL 4650	X	X	X	X		4
Zool. Core Coverage	11	13	20	17	10	

Assessment of Student Learning Objectives

Explanation: Assessment of Student Learning Outcomes is performed every year. The framework for assessment is based on examination of Course Objectives for two Biology core courses plus one core course per specialized emphasis for every Learning Outcome. Raw assessment data consists of student responses to specific homework or test questions or performance in other specific activity as appropriate. Each student response or performance is assigned a "pass" or "fail" status based on objective standards.

Course Objective evaluation: If the mean percentage of "pass" scores is 80 percent or above, no action is required. If the mean percentage of "pass" scores is between 70-79 percent for *two* consecutive assessments, immediate action will commence in the form of curriculum adjustment. If the mean percentage of "pass" scores for the given Performance Indicator is below 69 percent, immediate action will commence in the form of curriculum adjustment.

Table A-5: Evaluation of Student Performance for Learning Outcomes Percent of Students Passing Assessment and Corresponding Action		
80-100%	70-79%	0-69%
No action needed	Marginal	Immediate Action

Learning Outcome evaluation: If at least one course for each Learning Outcome needs no action (*i.e.* the mean percentage of "pass" scores is at or above 80 percent for at least one course), the Biology department will declare that our students have achieved this Learning Outcome. In the case that *no* course that maps to this Outcome has "pass" scoring mean of 80 percent or better, immediate action will commence in the form of curriculum adjustment.

Key stakeholders of the Department of Biology include employers (including the genetics laboratories mentioned in Appendix II, federal and state government departments, and others), grant providers (including National Park Service and Dixie National Forest), Iron County School District (including SUCCESS Academy and North Elementary School, a STEAM Partnership school with SUU), and alumni.

Appendix IV – Biology

Curriculum changes mandated by the University

The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. As new majors come to SUU, we encourage them to carry out undergraduate research with a Math faculty member to fulfill the EDGE requirements. These requirements are composed of three courses: Univ 1010, 3925 and 4925 and are listed in the degree tables given earlier in this report.

Changes made because of input from key stakeholders

Input from the stakeholders listed in Appendix III influences curriculum decisions. For example, a new course, General Microbiology (BIOL 3010/3015), was approved during the 2011-2012 academic year and will be taught for the first time during Spring Semester, 2013. Our previous microbiology course (BIOL 2060) was geared mostly for Nursing majors and did not adequately serve the needs of the Biology degree student. The new course will become part of the Biology degree core and will be required of all Biology majors. This course was proposed at the encouragement of alumni to promote consistency between SUU and other Utah universities. In another instance, due to input from the Division of Wildlife Resources and the Bureau of Land Management, a proposal is now being considered by the Board of Trustees to eliminate all Biology degree emphases and replace them with one Biology degree and a second Biology Education degree. Several students who had completed the Biology degree with the Zoology emphasis applied for positions with the Wildlife Resources department. They were told that their program of study did not include enough courses in botany to meet the needs of the agency. Therefore, the new degree, if it is approved, will include a greater variety of courses in the upper division elective section. Students wishing to become employed with those agencies may vary their program of study accordingly.

Curriculum changes made based on assessment of SLOs

The Biology Department is too early in the process to have assessment results following curriculum changes. The Department has and will continue to use assessment data to make curriculum changes as needed. The following page shows a table describing actions taken based on assessment results.

Tables A-6: Assessment Results (continues for 3 pages)

Course ID	Course Learning Outcome	Assessment Method	Assessment Result	Action	Follow-Up
BIOL 1610	Students will demonstrate an understanding of general knowledge of biology, including the basic chemistry of life, DNA, RNA, and proteins.	Exam Question: How are the concepts of DNA, genes, proteins and phenotype related? How are the traits that determine an individual phenotype inherited? Answer Part 1: Students should discuss DNA's role as the blueprint for all life, i.e., 1. DNA codes for genes through the process of transcription, 2. Genes code for proteins through the process of translation, and 3. Proteins contribute to the traits that define an individual phenotype. Answer Part 2: Students should discuss the transmission of DNA to offspring, 1. Mendel's Law of segregation states that each parent contributes one copy of each gene to its offspring, 2. Different alleles of an inherited gene interact and contribute to an offspring's phenotype, and 3. DNA inherited from both parents provides the molecular information for the next generation. Pass: Students will pass if they correctly list all 3 of the elements for Part 1 and at least 1 of the above elements for Part 2	70/136 = 51.5% passed	Faculty members teaching this course have concluded that they need to readdress the question and the criteria for a pass, because they do not match up well. They stated that the question does appropriately address concepts for which the students should be assessed, but that the scoring mechanism is not informative in reflecting the students' true understanding.	TBA Spring 2013
BIOL 1615	Students will demonstrate an understanding of the methodologies of science, and will demonstrate their knowledge and understanding of the scientific method.	Final Lab Activity: Design an experiment to test the following hypothesis: "Eating chocolate causes zits." Include sample size, independent variable, dependent variable, the most important variables to standardize, and an experimental control. Answer: Pass: Students will pass if they include at least five of the following seven elements in their experimental design: 1) Does the student state the problem that needs to be solved? 2) Is a null hypothesis formulated and included in the report? 3) Do the students make at least one prediction about the outcome? 4) Does the student inquire about making time for background research? 5) Did the student propose at least one experiment to test the hypothesis? 6) Is an appropriate control included in the experiment? 7) Was an appropriate statistical analysis proposed to analyze the data?	28/64 = 43.8% of students passed	Immediate action required. Faculty members teaching this course felt that this question had to be redesigned. The students did what the question asked, which was to design an experiment. However, the assessment rubric asked for much more. These extra elements were asked in another question later in the exam, and should be incorporated in future assessments. Alternatively, the original question and rubric should be reformatted so that the question matches the rubric.	TBA Spring 2013

Course ID	Course Learning Outcome	Assessment Method	Assessment Result	Action	Follow-Up
BIOL 1625	Students will demonstrate skills in written presentation of scientific work and results	Paper assignment Students must write a final paper based upon their research project from the semester. For this requirement, they must include the following information and elements within the following sections: Introduction Methods: Results: Figure or Table: Written component: Discussion: Bibliography: Laboratory Notes: Assessment of Pass: There are 22 elements that are required for this paper assignment. Completion of at least 18 of these elements will be considered a "pass".	43/61 = 70.1% of students passed	Marginal. Review after second assessment of this topic	TBA Spring 2013
BIOL 3030	Students will demonstrate an understanding of the dynamics of interactions and adaptations within and among biological systems, including the importance of the interaction between biotic and abiotic components of an ecosystem	Exam Question: We have discussed a community of organisms in Flathead Lake, Montana. Recall, the community includes: phytoplankton, zooplankton, aquatic insects, kokanee salmon, Mysis shrimp, bull trout, lake trout, lake whitefish, and bald eagles. Select one of the species from this community and list three abiotic factors that could be used to describe that organisms niche. Now select two pairs of organisms that interact in different ways and identify those two interactions. Answer: 3 elements: Students must list three of the following abiotic factors: depth at which they are found, distance from the shoreline, time of day during which they forage, water temperature in which they are found, light availability. 2 elements: Students must list two interactions: predator - prey for lake trout and kokanee salmon and competition between lake trout and bull trout. Pass: Students will pass if they correctly list at least 4 of the above elements.	48/63 = 76.2% of students passed	While this was a marginal result, the two instructors currently teaching this course did got together to discuss ways in which curriculum could be improved. The original assessment was based upon one specific case study that was taught by a single instructor in Fall, 2011. The instructors made two curriculum changes: (1) they came up with multiple case studies that could potentially be taught for this topic in Ecology and adjusted the specific details of the exam question to match the case study (e.g., by substituting organisms) (2) they incorporated additional assignments called "application papers" in which students are given practice applying the concepts that they learned in lecture to real-world situations	The curriculum action allowed the target to be met for the next assessment cycle. See May 4, 2012 assessment for BIOL 3030.

Course ID	Course Learning Outcome	Assessment Method	Assessment Result	Action	Follow-Up
BIOL 3060	Students will demonstrate an understanding of general knowledge of biology, including the basic chemistry of life, DNA, RNA and proteins.	Exam Question: Drosophila virilis is a diploid organism with 6 pairs of chromosomes. Complete the following table for this organism. Phase/Process Chromatid Number Chromsome Number Number of DNA Molecules Metaphase/Mitosis Anaphase I/Meiosis Metaphase II/Meiosis End of Telophase II/Meiosis Answer: Phase/Process Chromatid Number Chromsome Number Number of DNA Molecules Metaphase/Mitosis 24 12 24 Anaphase I/Meiosis 12 6 12 Metaphase II/Meiosis 12 6 12 End of Telophase II/Meiosis 0 6 6 Students must answer 9/12 correctly to get a passing grade.	47/70 = 67% passed	30% of the students got the question right, however an additional 37% showed that they understood the question (however they used the wrong chromosome number). In the future, this question will be written so that students do understand whether the haploid or diploid number is given in the problem.	
BIOL 3065	Students will use appropriate tools to carry out investigations in their intended fields, including acquiring sufficient knowledge and training to successfully enter graduate or professional school.	Exam Question: Considering the region sequenced, its function, and evolutionary processes, explain why the protein translations are nearly identical despite any sequence data differences you observed in your contig. Answer: Students must include the following points in their answer: a. Rubisco is an important enzyme in photosynthesis b. all the lineages perform photosynthesis, implying a protein that is conserved and was derived early c. changes in the protein sequence of rubisco could reduce fitness and these changes would be selected against d. multiple codons code for the same amino acid. This will increase sequence variation, but the protein translation will have fewer changes. Students must answer 3/4 correctly to get a passing grade.	40/53 = 75% of students passed	Marginal - Review after second assessment of this topic	TBA Spring 2013
BIOL 3110	Students will demonstrate an understanding of the dynamics of interactions and adaptations within and among biological systems, including the diversity of living organisms and the evolutionary relationships among them	Assignment question: Students will be asked to produce a cladogram including branch lengths from the following hypothetical data showing % difference between taxon groups: A B C D A --- --- --- --- B 8 --- --- --- C 4 12 --- --- D 14 16 10 --- (Note: actual numbers in the problem will differ. The above matrix is given as an example) Pass: Students must produce this cladogram with 100% of the organisms placed correctly and at least 3 out of 4 of the branch lengths calculated correctly.	35/45 students (77.8%) passed this assessment	The instructor will incorporate more classtime for students to work on a practice problem of this type prior to the assessment exercise.	TBA Spring 2013

Course ID	Course Learning Outcome	Assessment Method	Assessment Result	Action	Follow-Up
BIOL 3250	Students will demonstrate an understanding of general knowledge of biology: its language, history, findings and applications, including cell structure and function	Exam Question: Circle all of the following cell types that can normally be found in this areolar connective tissue: a. adipose cells b. monocytes c. mesenchymal stem cells d. mast cells e. macrophages f. lymphocytes g. fibroblasts h. platelets i. red blood cells j. histiocytes k. osteoclasts l. eosinophils Pass: Students must circle the following choices: a, c, d, e, f, g, l Students must NOT circle the following choices: b, h, i, j, k To pass, students must correctly circle or not circle at least 9 of the 12 choices.	37/47 = 78.7% Passed	Marginal result ? Will review after second assessment of this topic	TBA Spring 2013
BIOL 3275	Students will use appropriate tools to carry out investigations in their intended fields, including completion of an independent research project.	Research project: Students will be scored in 8 areas as follows: Title: Abstract: Introduction: Methods: Results: Discussion: References: Overall: Pass: Students must miss no more than one criterion on at least 7 of the 8 required sections to pass.	21/44 = 47.7% of students passed	Immediate action required. In grading these assignments for points, the faculty member teaching this course felt that the assessment criteria and what the students were learning were not well matched. The lowest score on the papers was an 82%, yet only 47.7% of the students passed under the assessment criteria. The rubric will be reexamined for the following spring.	TBA Spring 2013

APPENDIX IV – ETCM

Department Vision Statement

The Department of Engineering Technology and Construction Management will be globally renowned for its excellence in education and scholarship within all of its comprehensive programs, ultimately becoming a role model for other institutions.

Department Mission Statement

The Engineering Technology and Construction Management programs provide students with a broad range of academic instruction and in-depth skill development, in the program discipline areas of Construction Management, Electronics Engineering Technology, CAD/CAM Engineering Technology, CAD/GIS Engineering Technology, through professional, credentialed faculty, using state of the art facilities and equipment. Furthermore, we aim to provide meaningful service to industry, government, and all

communities served by the university. The mission of the Department of Engineering Technology and Construction Management is to provide a learning-centered environment that enables students, faculty, and staff to achieve their goals and to empower students to compete on a global level for careers in government, industry, secondary education, and acceptance to graduate school.

The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as specialized theories, practices, and ethics that enhance their learning experience. The Engineering Technology and Construction Management faculty are committed to providing high-quality education, individual guidance and assistance to students, helping them to develop the attributes of critical thinking, effective communication, lifelong learning, and individual integrity while pursuing their academic goals to assist in the economic development of the region through partnerships with industry, inventors, and entrepreneurs.

Engineering Technology CAD/CAM emphasis: Program Educational Objectives

Program Educational Objectives are skills and knowledge that graduates are expected to possess 3-5 years *after* graduation.

A. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to apply mathematics, science, engineering, and technical knowledge to Engineering Technology problems.
B. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to design systems, components, or processes for broadly-defined engineering technology problems.
C. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to function effectively as a member of a team.
D. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to function effectively as a leader of a team.
E. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to apply written communication.
F. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to apply oral communication.
G. Southern Utah University CAD/CAM Engineering Technology graduates have the ability to apply graphical communication.
H. Southern Utah University CAD/CAM Engineering Technology graduates have knowledge of the impact of engineering technology solutions in a societal and global context.

Engineering Technology CAD/CAM emphasis: Student Learning Outcomes

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined CAD/CAM engineering technology activities;
b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
d. an ability to design systems, components, or processes for broadly-defined CAD/CAM engineering technology problems appropriate to Program Educational Objectives;

e. an ability to function effectively as a member or leader on a technical team;
f. an ability to identify, analyze, and solve broadly-defined CAD/CAM engineering technology problems; technical environments; and an ability to identify and use appropriate technical literature;
g. an understanding of the need for and an ability to engage in self-directed continuing professional development; an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
h. a knowledge of the impact of CAD/CAM engineering technology solutions in a societal and global context;
i. a commitment to quality, timeliness, and continuous improvement.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates mapping between CAD/CAM Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

5. Knowledge of human cultures and the physical and natural worlds.
6. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
7. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
8. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

Table A-1: demonstrates the mapping between Engineering Technology CAD/CAM emphasis Student Learning Outcomes and SUU Learning Outcomes

CCET / SUU	a	b	c	d	e	f	g	h	i	j	k
1											
2a	X	X	X	X		X					
2b	X	X	X	X		X					
2c							X				
2d			X			X					

2e							X	X			
2f					X						
3a										X	
3b											
3c					X				X		
3d		X		X				X			X
4a	X	X	X	X		X	X				

Engineering Technology Electronics emphasis: Program Educational Objectives

Program Educational Objectives are skills and knowledge that graduates are expected to possess 3-5 years *after* graduation.

A. Southern Utah University Electronics Engineering Technology graduates have the ability to apply mathematics, science, engineering, and technical knowledge to Engineering Technology problems.
B. Southern Utah University Electronics Engineering Technology graduates have the ability to design systems, components, or processes for broadly-defined engineering technology problems.
C. Southern Utah University Electronics Engineering Technology graduates have the ability to function effectively as a member of a team.
D. Southern Utah University Electronics Engineering Technology graduates have the ability to function effectively as a leader of a team.
E. Southern Utah University Electronics Engineering Technology graduates have the ability to apply written communication.
F. Southern Utah University Electronics Engineering Technology graduates have the ability to apply oral communication.
G. Southern Utah University Electronics Engineering Technology graduates have the ability to apply graphical communication.
H. Southern Utah University Electronics Engineering Technology graduates have a knowledge of the impact of engineering technology solutions in a societal and global context.

Electronics Engineering Technology: Student Learning Outcomes

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined Electronics engineering technology activities;
b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
d. an ability to design systems, components, or processes for broadly-defined Electronics engineering technology problems appropriate to Program Educational Objectives;
e. an ability to function effectively as a member or leader on a technical team;
f. an ability to identify, analyze, and solve broadly-defined Electronics engineering technology problems;
g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;

h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
j. a knowledge of the impact of Electronics engineering technology solutions in a societal and global context;
k. a commitment to quality, timeliness, and continuous improvement.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates mapping between Electronics Student Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of human cultures and the physical and natural worlds.
2. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

Table A-2: demonstrates the mapping between Electronics Student Learning Outcomes and SUU Learning Outcomes

EET / SUU	a	b	c	d	e	f	g	h	i	j	k
1											
2a	X	X	X	X		X					
2b	X	X	X	X		X					
2c							X				
2d			X			X					
2e							X	X			
2f					X						

3a										X	
3b											
3c					X				X		
3d		X		X				X			X
4a	X	X	X	X		X	X				

Construction Management: Program Educational Objectives

Program Educational Objectives are skills and knowledge that graduates are expected to possess 3-5 years *after* graduation.

A. Southern Utah University Construction Management graduates have the ability to apply knowledge of mathematics, science, and applied sciences

B. Southern Utah University Construction Management graduates have the ability to function as a member or leader on a multidisciplinary team

C. Southern Utah University Construction Management graduates have the ability to understand professional and ethical responsibility

D. Southern Utah University Construction Management graduates have the ability to understand the impact of solutions in a global and society

E. Southern Utah University Construction Management graduates understand the need to engage in life-long learning

Construction Management: Student Learning Outcomes

a) an ability to apply knowledge of mathematics, science, and applied sciences
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to formulate or design a system, process, or program to meet desired needs
d) an ability to function on multidisciplinary teams
e) an ability to identify and solve applied science problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of solutions in a global and societal context
i) a recognition of the need for and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates mapping between Construction Management Learning Outcomes and SUU Learning Outcomes.

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of human cultures and the physical and natural worlds
2. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

Table A-3: demonstrates the mapping between Construction Management Student Learning Outcomes and SUU Learning Outcomes

CM / SUU	a	b	c	d	e	f	g	h	i	j	k
1											
2a	X	X	X		X					X	X
2b	X	X	X		X						X
2c						X	X				
2d		X									
2e						X					
2f				X							
3a								X			
3b											
3c						X					
3d									X		
4a	X	X	X		X		X			X	X

Tables A-4: ETCM Academic Profile Data

Program Profile					
	2006	2007	2008	2009	2010
Annualized FTE generated	77.33	69.03	75.23	84.40	88.34
Annualized faculty FTE	6.55	5.58	6.97	7.80	8.36
Student/faculty ratio	11.8	12.4	10.8	10.8	10.6
Average annual undergraduate class size for lectures	16.1	14.3	16.3	18.7	18.4
Average annual undergraduate class size for labs		13.6	10.9	11.9	10.6
Bachelor's degrees awarded based on first degree	33	25	28	28	25

Majors				
2007	2008	2009	2010	2011
189	184	189	188	171

Student Demographics						
		2007	2008	2009	2010	2011
Gender	Male	171	168	164	168	147
	Female	18	16	25	20	24
Race/Ethnicity	Caucasian	169	165	168	159	133
	Non-Caucasian	16	16	20	27	36

Demonstrated Quality of Graduates:

Placement of Engineering Technology and Construction Management Graduates

Teresa Christensen: Upon graduation from SUU's Engineering Technology program Tereasa Christensen was hired at Wilson Electronics in St. George, Utah as a test and quality control engineer related to the development of cell phone signal amplifiers.

Daniel Heaton: Upon graduation from SUU's Engineering Technology program Daniel Heaton applied to BYU's Masters of Mechanical Engineering degree program. After enrolling in some remedial courses, Daniel was accepted to BYU's Master of Mechanical Engineering degree program. He graduated from BYU with his Master's degree in Mechanical Engineering in spring of 2007. He now lives in Dearborn Michigan and works for Ford Motor Company. Daniel is a designer on the new Mustang. His starting salary was $84,000. http://www.fordvehicles.com/cars/mustang

Nick Bailey: Upon graduation from SUU's Construction Management program Nick Bailer was hired by AFM and Revamp-Enginuity as a Project Manager Enginuity which is based in Fort. Collins, Colorado.

Construction Management regional competition information: Article from SUU University Journal

Southern Utah University students take first-place in the regional collegiate Construction Management Competition.

Six Construction Management students worked as a group against five other universities in the competition hosted on Brigham Young University's campus; SUU took first place in the health care division of the competition.

The weeklong event kicked off with the Salt Lake City based company Layton Construction—who also sponsored the competition—giving all groups a hypothetical to build a medical center meeting certain specifications, schedules and estimates. The SUU cohort focused their efforts on conceptualizing a rehabilitation center and then had just one week to complete a comprehensive building proposal, which consisted of a building schedule, insurance claims, price estimates and a blueprint.

The competition was judges by construction managers from Layton Construction.

SUU's construction management students have been competing at this annual competition for the last few years, but this is SUU's first year to come out on top, thanks to six talented, hard-working students. In addition to Wilson, the winning group of students included construction management majors Jeff Lister, Ryan Hedstrom, Robert Bonds and Tony Aguirre, as well as architectural design major Zane Hunzeker. Last April, the same team of six took first place at the Associated Schools of Construction regional competition. "Winning these competitions is one of the best things we can do in our education and for our future," said Wilson. "It gets us in contact with the leading construction businesses and puts us at the top their hiring lists."

Appendix II - ETCM

(Electronics Emphasis)

Resources

The Electronics Lab located in TH 112 and TH 119 contains the following equipment.

- Several digital multi-meters
- Soldering stations
- Digital trainers
- An LPKF PCB routing machine
- 15 networked computers with appropriate electronics software installed
- 15 PLC trainers
- 11 student workstations each equipped with:
    - A digital storage oscilloscope
    - A function generator
    - A triple output DC power supply
    - A variable AC power supply
- 15 FPGA trainers
- 15+ up-to-date PC's for A+ instruction
- Networking equipment for A+ instruction
- 15 National Instruments computer interfacing units

- 15 Microchip microcontroller programmers
- 1 IFR spectrum analyzer
- 2 16 channel digital storage oscilloscopes

(CAD/CAM Emphasis)
Resources

The CAD lab located in TH 120 contains the following hardware:

- Dimension 3D printer
- 30 Dell Precision T3500 workstations with
  - Quad Core Xeon Processors
  - 6 GB RAM
  - 1 GB nVidia graphics card
  - Dual Flat screen monitors

Each of these workstations has the following CAD/CAM software:

- AutoCAD 2013
- Autodesk Inventor 2013
- Revit 2013
- AutoCad Map 2013
- AutoCad 3D 2013
- SolidWorks 2012-2013
- CATIA V5 R22
- Google Sketchup Pro
- Google Earth
- MasterCAM V6

The Board Drawing/CAD lab located in TH 015 contains the following hardware:

- 24 Dell Optiplex 780 workstations with:
  - Dual Core Processors
  - 4 GB RAM
  - 256 MB ATI Radeon graphics card
  - Single flat screen monitors
- Combination Board Drawing/CAD workstations

Each of these workstations has the following CAD/CAM software:

AutoCAD 2013

- Autodesk Inventor 2013
- Revit 2013
- AutoCad Map 2013
- AutoCad 3D 2013
- SolidWorks 2012-2013
- CATIA V5 R22
- Google Sketchup Pro
- Google Earth
- MasterCAM V6

The CAM lab located in the TH 101 contains the following equipment:

- 6 Manual lathes various brands and sizes
- 6 Manual milling machines
- 1 CNC VMC Haas VFOE
- 1 CNC Tool room mill Haas TM1
- 1 CNC Tool room lathe Haas TL1
- 1 Manual horizontal band saw
- 1 surface grinder
- 1 Horizontal manual milling machine

The Casting, Molding and Fabrication Lab located in LEC 113 contains:

- Foundry for casting and molding
- 1 Manual Lathe
- 1Manual Vertical Mill
- 1 wire feed MIG welder
- 1 hydraulic tubing bender
- 1 cut off saw
- 1 pedestal grinder
- 4 steel tables
- Torchmate Plasma Cutter

The renovation of the old Automotive area LEC 113 into a Fabrication/Casting and Molding lab includes:

- Complete foundry for the Fabrication/Casting and Molding facility
- 1 Manual Lathe
- 1Manual Vertical Mill
- Torchmate Plasma Cutter
  - 1 wire feed MIG welder 110V
  - 1 hydraulic tubing bender
  - 1 cut off saw
  - 1 pedestal grinder
  - 4 steel tables

(Construction Management)

Resources

In addition to access to the above listed resources for the CAD/CAM emphasis, the CM program possesses:

- 3 cargo trailers
- 1 utility trailer
- Symons concrete forms
- Concrete finishing tools
- Framing tools
- Wood working tools
- Concrete testing instruments

Appendix III - ETCM

Curriculum matrix

Course curriculum in both emphases is mapped to each ABET Student Learning Outcome. Completion of all required courses in either emphasis meets all ABET Student Learning Outcomes.

(CAD/CAM Emphasis)

The following table outlines how the ABET Student Learning Outcomes map to required core courses in the CAD/CAM emphasis.

Table A-5: mapping CAD/CAM Student Learning Outcomes to required core courses

The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcomes												
	Student Learning Outcomes											Objective
	a	b	c	d	e	f	g	h	i	j	k	Coverage
Required Courses												
CCET 1010	X	X		X		X	X			X	X	7
CCET 1030	X	X		X	X	X	X	X		X	X	9
CCET 1040	X	X		X	X	X	X	X		X	X	9
CCET 2620	X	X		X		X	X			X	X	7
CCET 2650	X	X	X	X	X	X	X	X	X	X	X	7
CCET 3610	X	X		X		X	X	X		X	X	8
CCET 3630	X	X	X	X		X	X	X		X	X	9
CCET 3670	X	X		X	X	X	X	X	X	X	X	9
CCET 3680	X	X		X	X	X	X			X	X	8
CCET 4600	X	X	X	X		X	X	X	X	X	X	8
CCET 4960	X	X	X	X		X	X	X		X	X	8
CCET 4610	X	X		X	X	X	X	X		X	X	9
ET with CAD/CAM emphasis Program Coverage	12	12	4	12	6	12	12	9	3	12	12	

(Electronics Emphasis)

The following table outlines how the Student Learning Outcomes (ABET) are mapped to required core courses in the Electronics Emphasis.

Table A-6: mapping Electronic Student Learning Outcomes to required core courses

The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcomes												
	Student Learning Outcomes											Objective
	a	b	c	d	e	f	g	h	i	j	k	Coverage
Required Courses												
EET 1700	X		X		X		X					4
EET 1730	X	X	X	X	X		X		X			7
EET 2700		X		X	X		X		X			5
EET 2710	X	X	X	X	X	X	X		X			8
EET 2750		X			X		X		X		X	5
EET 2760	X	X	X		X	X	X	X	X			8
EET 2780	X	X	X	X	X	X	X	X	X		X	10
EET 3080	X	X	X	X	X	X	X	X	X			9
EET 3710	X	X		X	X	X	X	X	X			8
EET 3720	X	X	X	X		X	X	X	X	X		9
EET 3760	X	X	X		X	X	X		X		X	8
EET 3780	X	X	X	X	X	X	X	X	X	X		10
EET 4960	X	X	X			X	X		X	X	X	8
ET with Electronics emphasis Program Coverage	11	12	10	8	11	9	13	6	12	3	4	

(Construction Management)

The following table outlines how the Student Learning Outcomes (ABET) are mapped to required core courses in the Construction Management degree program.

Table A-7: mapping Construction Management Student Learning Outcomes to required core courses

The shaded ones are the indicator courses to be assessed for the specified Student Learning Outcomes												
	Student Learning Outcomes											Objective
	a	b	c	d	e	f	g	h	i	j	k	Coverage
Required Courses												
CM 1290	X	X	X		X		X		X		X	7
CM 2010			X	X	X		X		X		X	9
CM 2015			X	X	X		X		X		X	9
CM 2050	X	X	X	X	X	X		X	X	X	X	7
CM 2055	X	X	X		X	X		X	X			7
CM 2100			X	X	X		X		X		X	8
CM 2105			X	X	X		X		X		X	9
CM 3240	X	X	X	X	X	X	X	X	X	X	X	9
CM 3270	X		X		X	X	X	X	X	X	X	8
CM 3650		X	X		X	X		X	X	X	X	8
CM 3880		X	X	X	X	X	X	X	X	X	X	9
CM 4000	X	X	X	X	X	X	X	X	X	X	X	7
CM 4550	X		X	X	X	X	X	X	X	X	X	8
CM Program Coverage	11	7	13	13	13	13	15	9	13	7	12	

The Assessment Process

Direct Assessment of Student Learning Outcomes is performed every semester. Each semester, a department meeting is held during which the performance data for the previous semester are reviewed and recommendations considered, evaluated, and acted on for course modification based on the results obtained. Not every course is evaluated every semester, in part due to the fact that most courses are only taught once per year or every other year.

Course Objectives Assessment

The framework for this assessment is based on examination of Course Objectives for several courses that map to Student Learning Outcomes. The raw assessment data consists of student responses to specific project presentation, homework, experiment or test questions. A major source of information is course assessment data collected from each section at the end of the semester, indicating the number of students enrolled versus the number who successfully accomplish the designated learning outcomes. Each student response or performance is assigned a boolean “pass” or “fail” status based on objective standards. For each Course Objective a frequency distribution is created that lists the number of “pass” and “fail” incidents.

The Department standard for course assessment evaluation is that 80 percent of students in a given section should “pass” the specific project presentation, homework, experiment, or test question.

The Engineering Technology & Construction Management Department meets at the end of every semester to analyze assessment data at both the course and program level. If the mean percentage of “pass” scores for the given Course Objective is below 69 percent, immediate action will commence (in the form of curriculum adjustment). If the mean percentage of “pass” scores is between 70-79 percent for two consecutive assessments, immediate action will commence (in the form of curriculum adjustment). If the mean percentage of “pass” scores is 80 percent or above, no action is required.

Assessment of Student Learning Outcomes

If at least one course associated with a given Student Learning Outcomes needs no action (i.e. the mean percentage of “pass” scores is at or above 80 percent for at least one course), the Engineering Technology Department has declared that this Student Learning Outcome has been achieved. In the case that no course that maps to this Student Learning Outcome have a “pass” scoring mean of 80 percent or better, immediate action will commence (in the form of curriculum adjustment).

Results

Course assessments are used to adjust course content and for consideration of appropriate curriculum modifications. Results are also used in preparing periodic self-study reports for ABET, which are typically prepared at least every six years as part of the re-accreditation process (as well as for seven year program reviews).

The Role of Key Stakeholders

An Industry Advisory Boards has been organized at the Department level. Comments and advice from the members are collected and summarized. See Appendix IV for specific results associated with such input.

Assessment of Program Educational Objectives

Data collection for Program Educational Objectives from each program was achieved by mailing Industry Advisory members/employers a survey made up of Program Educational Objectives along with a self-addressed stamped envelope. Approximately 60 surveys were mailed out and a return rate of approximately 25% was experienced. 16 surveys were returned.

The frequency with which these assessment processes are carried out is annually, during the month of April, starting in 2012.

The expected level of attainment for each of Program Educational Objectives survey was 80%. The level of attainment for all Program Educational Objectives was above 80%. The lowest level of attainment was for number 2, 5 and 8 all of which were at 85.71%.

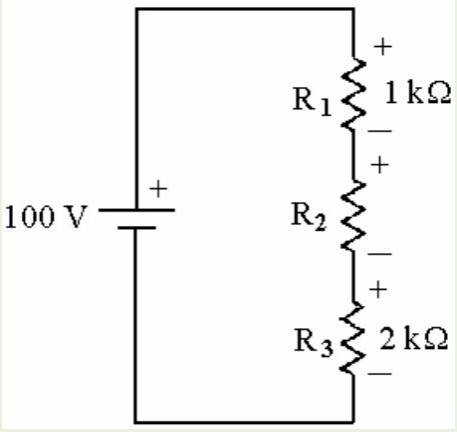
Course Assessment Samples:

Student Learning Outcome a: An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities.

Courses mapped to Student Outcome a: EET 1700, EET 1730, EET 2710, EET 2750, EET 2760, EET 2780, EET 3080, EET 3710, EET 3720, EET 3760, and EET 4960.

Student Performance Ranges for Student Outcome a (The Percent of Students Passing values is the frequency distribution of pass / fail for each Course Objectives)		
80-100%	70-79%	0-69%
No action needed	Marginal	Immediate Action

EET 1700 Circuit Analysis I

Time of Data Collection	Fall
Assessment Coordinator	Borisova
Assessment Method(s)	Direct Evaluation of Student Performance
Evaluation of Results	Course Monitor
Course Objectives	Difference between Passing and Failing
1. Become aware of how an applied voltage will divide among series components and how to properly apply voltage divider rule.	The following Direct Assessment Mid Term test question was answered correctly. SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.  See Figure 5.6. Use the voltage divider rule to choose R2 such that VR1 = 30 V. Ans. 333.3 Ω

Semester	Course Objective	Percent of Students Passing	Action Taken
Fall 2011-01	1	7/11 = 64%	The EET Department Curriculum Committee has reaffirmed that the assessment question is relevant and appropriate. The Committee decided that the following adjustment should be made beginning Fall Semester 2012: 1. The Instructor will include additional examples in a lecture on Series dc Circuits with emphasis on Voltage Divider Rule (VDR). 2. Instructor will demonstrate VDR application and computations in the lab.
Fall 2012-01	1		
Fall 2013-01	1		

Appendix IV - ETCM

Results of the evaluation processes for Program Educational Objectives and Student Learning Outcomes is used as input for continuous improvement to enhance curriculum. It is also used to address any deficiencies in Program Educational Objectives or Student Learning Outcomes that are identified by the constituents.

(CAD/CAM emphasis)
Curriculum changes made based on assessment of SLOs
We have started an assessment process in the fall 2011. The results will be available spring 2013.

Changes made because of input from key stakeholders
Added COMM 4240 – Technical Writing (3 credits)

List any changes made because of input from ABET.
Added MATH 1220 – Calculus II (4 credits)
Removed MATH 1040 – Introduction to Statistics (4 credits)
Added HSS 1120 – Introduction to diversity (3 credits)

List assessment results following any curriculum
The Department started an assessment process in the fall 2011. Assessment results will be available spring 2013. Addition of the above mentioned courses has addressed current program deficiencies.

(Electronics emphasis)
Curriculum changes made based on assessment of SLOs
We have started an assessment process in the fall 2011. The results will be available spring 2013.

Changes made because of input from key stakeholders
Added COMM 4240 – Technical Writing (3 credits)

List any changes made because of input from ABET.
Added MATH 1220 – Calculus II (4 credits)
Added MATH 1040 – Introduction to Statistics (4 credits)
Added HSS 1120 – Introduction to diversity (3 credits)

List assessment results following any curriculum changes
The Department started an assessment process in the fall 2011. The results will be available spring 2013. Addition of the above mentioned courses has addressed current program deficiencies.

(Construction Management)
Curriculum changes made based on assessment of SLOs
We have started an assessment process in the fall 2012. The results will be available fall 2013.

List any changes made because of input from key stakeholders
Added ENGR 2000 – Statics and Strength Materials for Construction (3 credits)
Added CM 4000 – Sustainable Practices and Designs (3 credits)
Added CM 4550 – Construction Safety and Administration (3 credits)
Added CM 3880 – Scheduling and Cost Control (3 credits change from elective to required course)
Deleted CM 2000 – Statics for Construction Management (2 credits)
Delete HVAC 4405 – HVAC & Plumbing Principles and Design Lab (1)

List assessment results following any curriculum
The assessment process for CM started in Fall 2012. Results are pending Spring 2013 data.
Addition and deletion of the above mentioned courses has addressed current program deficiencies.

APPENDIX V – INTEGRATED ENGINEERING (IE)

Mission

The mission of the Integrated Engineering program is to support and realize with excellence the overall mission and vision of the university and to provide a broadly based, cross disciplinary engineering education founded upon a design-oriented curriculum which integrates several disciplines into a whole, enabling graduates to undertake the wide variety of design and manufacturing challenges that modern industry faces.

Program Educational Objectives

Program Educational Objectives are accomplishments of the educational program as reflected in student capabilities and success potential that are manifest in student progress over a period of several years *following* graduation. Graduates of the Southern Utah University Integrated Engineering Program will be considered successful if after four years from their graduation they:

1. Are employed in the engineering profession or are engaged in further education or work in another field that makes use of the fundamentals of mathematics, physical science, and engineering science.
2. Have become or are aspiring to become licensed professional engineers if engaged in the engineering profession where it is needed.
3. Demonstrate commitment to professionalism, ethical responsibility and a concern for society and the environment, such as by active participation in professional societies or similar organizations fostering continued professional and personal development and service.

Student Learning Outcomes

Student learning outcomes are identified by ABET for accredited engineering programs. The Integrated Engineering program has adopted these outcomes verbatim and enables students to achieve the following attributes by the time of graduation.

(a) Ability to apply knowledge of mathematics, science and engineering

(b) Ability to design and conduct experiments, as well as to analyze and interpret data

(c) Ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) Ability to function on multi-disciplinary teams

(e) Ability to identify, formulate, and solve engineering problems

(f) Understanding of professional and ethical responsibility

(g) Ability to communicate effectively

(h) Broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context

(i) Recognition of the need for, and ability to engage in life-long learning

(j) Knowledge of contemporary issues

(k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

In addition to these student learning outcomes, graduation from the Integrated Engineering program requires students to take the Fundamentals of Engineering (FE) examination administered by NCEES (the National Council of Examiners for Engineering and Surveying). This national examination is the first step toward becoming licensed as Professional Engineers.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. Undergraduate students graduating from SUU will demonstrate

1. Knowledge of human cultures and the physical and natural world
2. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and social responsibility, including
    a. Civic knowledge and engagement—local and global

b. Intellectual knowledge and competence
c. Ethical reasoning and action
d. Foundations and skills for lifelong learning

4. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

Integrated Engineering Student Learning Outcomes were identified in the previous section. These thirteen outcomes correspond exactly with ABET EAC Criteria (a) through (k) and represent capabilities all engineering graduates should have acquired in the course of their education. There is a direct correspondence between the Integrated Engineering SLOs and the Southern Utah University Institutional Learning Outcomes. This correspondence is indicated in Table A-1 below. Student Demographics and class sizes are summarized in Tables A-2 and A-3.

Table A-1. Comparison of SUU Institutional Learning Outcomes and Integrated Engineering Student Learning Outcomes.

SUU Learning Outcomes	Corresponding Integrated Engineering Student Learning Outcomes
1.	(a), (e), (h)
2. a	(a), (b), (c), (e), (j), (k)
2.b.	(a), (b), (c), (e), (k)
2.c.	(g)
2.d	(a), (b), (c), (e), (k)
2.e	(b), (e), (h), (k)
2.f	(d), (e)
3. a	(c), (f), (h), (j)
3.b.	(a), (b), (c), (e), (h), (k)
3.c	(c), (f), (h)
3.d	(i), (j), (k)
4. a	(a), (b), (c), (e), (j)

Table A-2 Program Profile

	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE generated	41.77	45.00	46.43	48.30	46.73
Annualized faculty FTE	3.53	4.88	3.10	3.99	5.35
Student/faculty ratio	11.8	9.2	15.0	12.1	8.7
Average annual undergraduate class size for lectures	17.8	18.9	19.8	18.5	15.5
Average annual undergraduate class size for labs	9.4	13.4	13.7	9.3	7.0
Bachelor's degrees awarded based on first degree	4	10	10	14	12

Table A-3. Student Demographics (Fall Semester 3rd Week)

Year	2007		2008		2009		2010		2011	
Gender	F	M	F	M	F	M	F	M	F	M
	17	107	15	96	16	109	19	101	10	112
Race/Ethnicity	Cau.	Non-Cau.	Cau.	Non-Cau.	Cau.	Non-Cau.	Cau.	Non-Cau.	Cau.	Non-Cau.
	102	18	100	10	111	12	109	8	110	9

Appendix II - IE

Program Resources

Faculty Offices

Each faculty member has a personal office with a PC computer that performs adequately. All faculty offices except the department chair's are located close to their labs. The chair's office is adjacent to the department administrator's office. A high speed digital network allows professors to effectively perform research. Faculty members have continuous access to their offices. The offices allow faculty to adequately and effectively interact with the student body.

In addition, the Engineering and Technology building is equipped with wireless Internet access. Faculty and students can also use open labs and library facilities. The Integrated Engineering Department has a designated IT person, Mr. Larry Gardner, who takes care of the faculty's computer needs and problems. The server is backed up to tape nightly to a remote disaster site in Richfield, UT.

Classrooms

The typical classroom is equipped with wireless Internet access, projectors that are connected to computers, video equipment, and an ELMO Visual Presenter. The instructors are able to use this technology to provide an interactive experience in the classrooms. Each classroom has more seats than pupils.

Laboratories

Students have modern resources available. Integrated Engineering has one computerized instructional lab with 25 computers. Another has 15 computers. There is also a student computer lab dedicated to student individual use with 15 computers in it. All teaching rooms in use are furnished with instructor computers and supporting video and audio systems. The lab computers are replaced on a three to four year rotation; this ensures that the technology is always current.

Software contracts are maintained with multiple vendors ensuring access to current software versions. Computing resources are available, accessible, systematically maintained and upgraded, and otherwise adequately supported to enable students to achieve the program's outcomes and to support faculty teaching needs and scholarly activities. Students and faculty receive appropriate guidance regarding the computing resources and laboratories available to the program.

The Fluids Laboratory contains state-of-the-art equipment to facilitate effective instruction. This lab includes an Aero Lab wind tunnel to test aerodynamics. The fluid flow profiler, hydraulics bench, wave tank, force-of-a-jet apparatus, and flow-measurement apparatus are used to study fluid mechanics properties with water as the medium. Another apparatus demonstrates the development of boundary layers in an air-flow tube.

The Materials and Mechanics Laboratory houses equipment used in materials science, statics, dynamics and strength of materials. The Lucifer furnaces have digital thermostats capable of temperatures to 2.000˚F. They have various uses but are mainly used for heat treating metals. This lab also houses an Instron tension and compression tester, used to analyze mostly metal specimens. The lab also includes a Dillon tensile tester. A hardness tester and a micro hardness tester are used to measure the hardness of materials. This laboratory also features a sophisticated diffusion demonstration facility based on a Fisher Prolab quadropole mass spectrometer. This system can measure gas concentrations in ambient pressure streams to a precision of a few parts per million and allows students to watch hydrogen permeate metals at high temperature. Other equipment supporting the strength of materials course includes a shear force and bending moment apparatus and a torque apparatus. There are also two microscopes equipped with cameras for capturing images, and one has a computer interface with sophisticated software for image analysis. Other items available for use in the lab are an x-ray diffraction machine for Bragg scattering measurements and a soils oven. A preparation room has several uses including cutting, mounting and polishing specimens for use in the lab using an appropriate sample mounting press and polishing machine.

The Mechatronics Laboratory includes a National Instruments platform to digitally control analog circuits. There are also work benches, or pods, for students to work together and have the resources they need to run electrical equipment.

As part of the curriculum, the students take part in a practicum in which they make use of drafting skills to modify and customize the design of a class project Item. They generate a production plan and a quality plan. Then, students utilize a machine shop under the direction of the department engineering technician, which includes various standard machining items such as saws, drill presses, mills and lathes. It also has two CNC mills, one CNC lathe and other equipment necessary to prepare materials to be machined (for example: saws, grinders and polishers). The shop features a plasma cutter for cutting profiles in sheet stock. A foundry is also available for casting metals such as aluminum.

Appendix III - IE

Curriculum Matrix - The mapping of course objectives to these student learning outcomes is shown in Table A-4 where contributions of individual courses are indicated for the (a) through (k) student learning outcomes. The small "x" symbols indicate evaluation for course success, and the large "X" symbols denote these course outcomes are used to assess Integrated Engineering SLOs.

Table A-4 Mapping of Integrated Engineering Course Objectives and Student Learning Outcomes. Integrated Engineering Student Learning Outcomes

ENGR	Name	a	b	c	d	e	f	g	h	i	j	k
1010	21st Cen	x	x		X	x	x	x	X	X	x	x
1030	CAD	x		x				x				X
2030	Dynamics	x				X		x				x
2010	Statics	X				x		x				X
2140	Str of Mat	x				x		x				
2145	Lab		X					x				x
4050	Struct En	x				x	X	x				x
4070	Conc & Stl	x				x	X	x				x
3000	Thermo	X				x	x		x			x
3050	Fluids	x				X						x
3055	Lab		X					x				x
4010	Heat Tran	x		x		x	x	X	x			x
2270	Circuits	X		x		x						x
2275	Lab	x						x				x
4030	Electron	x		X		x					X	x
4035	Lab	x						x				x
4000	Mechatron	x		x		X						X
4005	Lab	x		x				x				x
3010	Materials	x				x						x
3015	Lab	x	X			x		X				x
4060	Manuf	x		x				x	X		X	x
3045	Design I	x	x	X	x	x	x	x	X		X	x
3095	Design II	x	x	x	x	x	Xx	x	x		x	x
4025	IE Des I			x	X			x	x	X	x	x
4085	IE Des II			X	X		x	X	x	X	x	x

x *–this outcome is assessed by instructor*. X *–this outcome is also assessed for Integrated Engineering student learning outcome evaluation purposes.*

The Assessment Process

Assessments of course objectives trigger changes in course management and configuration. Table A-5 in Appendix IV below is an example. Attainment of IE Student Learning Outcomes is gauged by evaluation of course objectives. Course objectives are quantified by establishing criteria for each course and determining the percentage of students that "pass" by achieving the designated outcomes. If the mean percentage of "pass" incidents for the given student learning outcome is below 69 percent, immediate action will commence (in the form of curriculum adjustment). If the mean percentage of "pass" incidents is below 80 percent for two consecutive assessments, immediate action will commence (in the form of curriculum adjustment). If the mean percentage of "pass" incidents is 80 percent or above, no action is required.

The courses identified in Table A-4 are only those whose outcomes are used to assess IE Student Learning Outcomes. At least three courses are identified as contributing to the assessment of each IE Student Learning Outcome. If at least one course for this IE Student Learning Outcome needs no action (i.e. the mean percentage of "pass" scores is at or above 80 percent for at least one course), the Integrated Engineering department deems that this IE Student Learning Outcome has been achieved. In the case that no course that maps to this IE Student Learning Outcome has a "pass" scoring mean of 80 percent or better, immediate action will commence (in the form of curriculum adjustment). Courses not in this table are also evaluated for course student learning outcomes using similar criteria.

Surveys are taken of graduating seniors and of graduates four and eight years after graduation. Graduating seniors report opinions about curriculum content and course value as they see it having just finished. Four-year and 8-year graduates are asked similar but more general questions about the value of their SUU education to their present careers. Responses to these surveys are included in assessment of IE Student Learning Outcomes, Program Educational Objectives, and in decisions about course offerings and emphases.

Appendix IV - IE

The Integrated Engineering program was instituted in 2002. It originally included 128 credit hours (CR) of coursework consisting of 29 CR in mathematics and basic sciences, 54 CR of engineering courses (17 of which included a significant design component), 36 CR of general education classes and nine other CR (6 of general electives and three CR in project management processes). Several changes have made in courses required for the degree.

Program Changes based on Utah State Board of Regents

It was required that baccalaureate programs be trimmed to require no more than 120 CR of course work. To meet that requirement for Integrated Engineering and still maintain an adequate program, some courses were removed from the curriculum, some courses were added to it, and some were merely changed or substituted as follows.

Course Removals

COMM 4240 Technical Writing (3 CR)

ENGR 3030 Project Management Processes (3 CR)

ECON 1740 US Economic History (3 CR)

ECON 2010 Principles of Microeconomics (3 CR)

MATH 1040 Introduction to Statistics (4 CR)

MATH 3600 Numerical Analysis (3 CR)

Course Additions

ENGL 1010 Introduction to Academic Writing (3CR – State requirement)

ENGR 4060 Manufacturing Processes (3 CR)

UNIV 1000 First Year Seminar (1 CR – University requirement)

Course Changes

ENGR 1020 Fundamentals of Engineering (3 CR) changed to ENGR 1010 Engineering in the 21st Century (3 CR)

ENGR 2270/75 Electro-Mechanical Systems and Lab (4 CR) replaced ENGR 3070/80 Electric Circuits and Lab (4 CR)

ECON 3010 Managerial Economics (3 CR) was replaced by FIN 3250 Managerial Finance I (3 CR)

ENGR 4000 changed from System Dynamics and Control to Mechatronics (3 CR)

ENGR 4030 Electronics increased from (2 CR) to (3CR)

CS 1100 Object Oriented Programming (3 CR) changed to a choice of CSIS 1040 Introduction to Programming with MatLab (3 CR) or CSIS 1400 Fundamentals of Programming (3 CR).

The number of formal design courses changed from six to four (8 CR went to 11 CR)

University–required changes

The university has required students to take three one-hour courses in connection with their newly required experiential education experience. These courses are

UNIV 1010 Introduction to Experiential Education (1 CR)

UNIV 3925 EER Proposal (1 CR)

UNIV 4925 Reflection and Synthesis (1 CR)

The university requirement to take UNIV 1000 Student Success (1 CR) was removed.

Changes suggested by key stakeholders

In the spring of 2010, with a change in university policy implementation, a weakness in writing skills that had been observed by faculty and by our Industry Advisory Board was addressed. The curriculum was changed to require in addition to the other courses ENGL 3120 Writing in the Sciences (3 CR).

A further change in graduation requirements was also instituted in 2010. Until then, passing of the national Fundamentals of Engineering examination administered by NCEES (the National Council of Examiners for Engineering and Surveying) was required for graduation. After a review of practices of other engineering programs across the country and within the state, and in response to requests from students and advice from the Integrated Engineering Industry Advisory Board, the requirement was changed such that even though all graduates have to take the examination, those who do not pass it the first time must take it a second time to graduate. They need not pass it on the second trial to get their diploma.

Changes based on assessment of SLOs

In response to surveys of graduates and to make more credit hour room available in the curriculum, another change was implemented that took advantage of a willingness by our Mathematics Department to offer MATH 2250 Differential Equations and Linear Algebra as a combined course, to cover in one 4-CR course what was previously covered in MATH 2270 Linear Algebra (3 CR) and MATH 2280 Differential Equations (3 CR).

Another change based on evaluation of student learning outcomes modified the computer programming course required. Whereas either CSIS 1040 or CSIS 1400 had been allowed, at the present time, students take only CSIS 1040 Introduction to Programming with MatLab (3 CR).

Table A-5 below lists course objective assessments for the 2009-2010 academic year and the attainment of student learning outcomes.

Table A-5 Assessment of Student Learning Outcomes for 2009-2010 Academic Year

Outcome	Course	Percent Passing	Conclusion
a.	ENGR 2010 Statics	86.7	
	ENGR 2270 Electromechanical Systems	91.9	
	ENGR 3000 Thermodynamics	96.9	Student Learning Outcome Achieved
b.	ENGR 2145 Strength of Materials Lab	88.9	
	ENGR 3055 Fluid Mechanics Lab	86.0	
	ENGR 3015 Materials Science Lab	100	Student Learning Outcome Achieved
c.	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4005 Mechatronics Lab	100	
	ENGR 4030 Electronics	92.3	Student Learning Outcome Achieved
d.	ENGR 1010 Engineering in the 21st Century	96.8	
	ENGR 4025 Integrated Engineering Design Lab I	93	
	ENGR 4085 Integrated Engineering Design Lab II	93	Student Learning Outcome Achieved
e.	ENGR 2030 Dynamics	90.9	
	ENGR 3050 Fluid Mechanics	69	On watch list
	ENGR 4000 Mechatronics	100	Student Learning Outcome Achieved
f.	ENGR 3095 Engineering Design Lab II	100	
	ENGR 4050 Structural Analysis	100	
	ENGR 4070 Intro to Steel and Concrete Design	100	Student Learning Outcome Achieved
g.	ENGR 3010 Materials Science	100	
	ENGR 4010 Heat Transfer	62	Student Outcome not achieved; corrective action taken
	ENGR 4085 Integrated Engineering Design Lab II	100	Student Learning Outcome Achieved
h.	ENGR 1010 Engineering in the 21st Century	96.8	
	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4085 Integrated Engineering Design Lab II	84.6	Student Learning Outcome Achieved

i.	ENGR 1010 Engineering in the 21st Century	96.8	
	ENGR 4025 Integrated Engineering Design Lab I	93	
	ENGR 4085 Integrated Engineering Design Lab II	84.6	Student Learning Outcome Achieved
j.	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4030 Electronics	100	
	ENGR 4060 Manufacturing	85	Student Learning Outcome Achieved
k.	ENGR 1030 CAD	100	
	ENGR 2010 Statics	86.7	
	ENGR 4000 Mechatronics	100	Student Learning Outcome Achieved

For Table A-5, in the case of ENGR 3050 Fluid Mechanics, although the course student learning outcome score was 69, it was judged to be marginally low, so the course was placed on a watch list. The score improved the next year, so it was removed from the watch list. For ENGR 4010 Heat Transfer, the score was below 65, so immediate action was taken to redesign the syllabus. (1) The "General Instructions for Writing Reports" given to the students was drafted and commenced being distributed to the class at the beginning of the semester and discussed with the class, showing good and bad writing examples. (2) A new required course, "Writing for the Sciences" (ENGL 3120) was added to the IE curriculum in part because of the problem identified in this course. (3). A report grading rubric was distributed and explained to subsequent classes, along with a summary of technical writing rules and examples of correct and incorrect writing.

A similar chart is shown for the following year in Table A-6. Note that because not every course is assessed every year, some of the score entries in Table A-6 are repeats from the previous year. The one course on the watch list from the 2009-2010 year, ENGR 3050 Fluid Mechanics, attained a better score in 2010-2011 and so was dropped from the watch list. The ENGR 2030 Dynamics course got a very low score in 2010-2011 in part because of the specificity of the assessment criteria used in that course and in part because the teaching techniques used for the course needed revision. Besides changing the instructor, a more circumspect course assessment criterion was implemented.

Table A-6 Assessment of Student Learning Outcomes for 2010-2011 Academic Year

Outcome	Course	Percent Passing	Conclusion
a.	ENGR 2010 Statics	100	
	ENGR 2270 Electric Circuits	91.9	
	ENGR 3000 Thermodynamics	71.0	On watch list
			Student Learning Outcome Achieved
b.	ENGR 2145 Strength of Materials Lab	88.9	
	ENGR 3055 Fluid Mechanics Lab	86.0	
	ENGR 3015 Materials Science Lab	100	Student Learning Outcome Achieved

c.	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4005 Mechatronics Lab	100	
	ENGR 4030 Electronics	100	Student Learning Outcome Achieved
d.	ENGR 1010 Engineering in the 21st Century	85.5	
	ENGR 4025 Integrated Engineering Design Lab I	93	
	ENGR 4085 Integrated Engineering Design Lab II	100	Student Learning Outcome Achieved
e.	ENGR 2030 Dynamics	11.8	Changed instructors
	ENGR 3050 Fluid Mechanics	88	
	ENGR 4000 Mechatronics	100	Student Learning Outcome Achieved
f.	ENGR 3095 Engineering Design Lab II	100	
	ENGR 4050 Structural Analysis	100	
	ENGR 4070 Intro to Steel and Concrete Design	100	Student Learning Outcome Achieved
g.	ENGR 3010 Materials Science	100	
	ENGR 4010 Heat Transfer	100	
	ENGR 4085 Integrated Engineering Design Lab II	100	Student Learning Outcome Achieved
h.	ENGR 1010 Engineering in the 21st Century	85.5	
	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4085 Integrated Engineering Design Lab II	84.6	Student Learning Outcome Achieved
i.	ENGR 1010 Engineering in the 21st Century	85.5	
	ENGR 4025 Integrated Engineering Design Lab I	93	
	ENGR 4085 Integrated Engineering Design Lab II	100	Student Learning Outcome Achieved
j.	ENGR 3045 Engineering Design Lab I	100	
	ENGR 4030 Electronics	100	
	ENGR 4060 Manufacturing	100	Student Learning Outcome Achieved
k.	ENGR 1030 CAD	96.0	
	ENGR 2010 Statics	100	
	ENGR 4000 Mechatronics	100	Student Learning Outcome Achieved

APPENDIX VI – MATHEMATICS

Mission Statement

Not only does the Math Department serve future mathematicians, scientists, business strategists and engineers, but also future teachers of mathematics as well as those pursuing studies in the arts and humanities. Except for reading and writing, no other skill is so highly valued across the breadth of professional society as those that mathematics is responsible to teach. The Department of Mathematics is committed to offering a well-rounded academic program that will enhance the lives of those who take our courses. The demand for knowledge we offer is enormous in both industry and education. In secondary schools the two greatest shortages of qualified teachers across the nation are in mathematics and technology, and jobs outlooks rate mathematics as one of the highest needs of college graduates.

Student Learning Outcomes for Mathematics and Mathematics Education

Mathematics and Mathematics Education majors should be able to:

1. Use standard mathematical techniques to solve computational problems.
2. Demonstrate knowledge of fundamental mathematical concepts and results in the core content areas.
3. Use content knowledge to solve applied and real-world mathematical problems.
4. Communicate mathematics effectively using proper notation and terminology.
5. Use logical reasoning to construct clear and concise mathematical proofs.

SUU INSTITUTIONAL LEARNING OUTCOMES

The University has adopted broad Learning Outcomes based on the American Association of Colleges and Universities (listed below) that mesh with SLOs at the department level. The table below illustrates a mapping between the Math/Math Ed Student Learning Outcomes and SUU Learning Outcomes.

1. Knowledge of Human Cultures and the Physical and Natural World
2. Intellectual and Practical Skills, including
   - 2a. Inquiry and analysis
   - 2b. Critical and creative thinking
   - 2c. Written and oral communication
   - 2d. Quantitative literacy
   - 2e. Information literacy
   - 2f. Teamwork and problem solving
3. Personal and Social Responsibility, including
   - 3a. Civic knowledge and engagement—local and global
   - 3b. Intercultural knowledge and competence
   - 3c. Ethical reasoning and action
   - 3d. Foundations and skills for lifelong learning
4. Integrative and Applied Learning, including
   - 4a. Synthesis and advanced accomplishment across general and specialized studies

Table A-1: Math/Math Ed SLOs and How They Link to Institutional Counterparts

Student Learning Outcomes Math/Math Education majors should be able to:	Related SUU Learning Outcomes
Use standard mathematical techniques to solve computational problems.	2d. Quantitative literacy
Demonstrate knowledge of fundamental mathematical concepts and results in the core content areas.	2a. Inquiry and analysis 2d. Quantitative literacy
Use content knowledge to solve applied and real-world mathematical problems.	1. Knowledge of the Physical and Natural World 2a. Inquiry and analysis 2b. Critical and creative thinking 2f. Teamwork and problem solving
Communicate mathematics effectively using proper notation and terminology.	2c. Written and oral communication 2d. Quantitative literacy
Use logical reasoning to construct clear and concise mathematical proofs.	2b. Critical and creative thinking 2c. Written and oral communication 4a. Synthesis and advanced accomplishment across general and specialized studies

Table A-2: Math/Math Ed SLOs and How They Link to Institutional Counterparts

SUU LOs / Math SLOs	1	2a	2b	2c	2d	2e	2f	3a	3b	3c	3d	4a
1					x							
2		x			x							
3	x	x	x				x					
4				x	x							
5			x	x								x

Tables A-3: Department Profile information

Program Profile					
	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE generated	464.53	521.90	519.20	576.63	590.74
Annualized faculty FTE	15.98	16.09	16.67	15.40	16.67
Student/faculty ratio	29.1	32.4	31.1	37.4	35.4
Average annual undergraduate class size for lectures	29.2	29.0	28.9	32.9	33.5
Bachelor's degrees awarded based on first degree	10	8	9	12	18

Majors				
2006-7	2007-8	2008-9	2009-10	2010-11
72	73	90	94	79

Student Demographics						
		2007	2008	2009	2010	2011
Gender	Male	28	34	38	43	33
	Female	44	39	52	51	46
Race/Ethnicity	Caucasian	58	62	78	83	68
	Non-Caucasian	12	10	12	10	10

Appendix II - Math

Mathematics and Mathematics Education Program Resources

Facilities

- Faculty offices in Electronic Learning Center and Science Center

Software

- *Mathematica* (computer algebra system) site license for 15 concurrent users and corresponding home-use licenses for faculty
- *MatLab* (computer algebra system): Maintain five licenses for on-campus faculty usage
- *Maple* (computer algebra system): Have one license for Maple on Linux
- *Geometer's Sketchpad* (geometry software): Have purchased open-use license

Equipment

- Multiple calculator/projector combinations
- Several department laptops

Organizational resources

- SUU Library resources
- Multi-subject indices and databases available through Library
- Internet access for all students
- Numerous journals in Mathematics and Mathematics Education
- Computer/technology mediated classrooms

Appendix III - Math

Mathematics and Mathematics Education Curriculum Map

Table A-4: Mapping of SLOs to Courses

Student Learning Outcomes	MATH 1220	MATH 2210	MATH 2270	MATH 2280	MATH 3120	MATH 3130	MATH 3500	MATH 3700	MATH 3770	MATH 4220	MATH 4400	MATH 4410	MATH 4580	MATH 4900
1. Computation	2 4	3 4	3	3			1	1	3				3	
2. Fundamental Knowledge	2 4	3	3 4	3	1	2	3	3	3	1		2	1 4	2
3. Application	2	3		2 4			3 4	3 4	3					
4. Communication	2				2 4	3 4	3	1	3	1	1 4	2	1	3
5. Logical Reasoning					1 4	3				3 4	3	3	3	

(Key: 1 means "Introduced", 2 means "Reinforced", 3 means "Mastered" and 4 means "Assessed")

The Assessment process

The Program Review Committee member (Dr. Jana Lunt) is responsible for gathering and organizing the data to be used in assessing progress toward meeting Student Learning Outcomes. Math Department faculty review the data each semester and make recommendations for changes and their implementation. The department chair (Dr. Seth Armstrong) makes necessary assignments. The department chair and the course coordinators work with the relevant faculty to implement and monitor the changes.

Assessment Method for Courses

Assessment of Student Learning Outcomes is performed every semester. The framework for assessment is based on examination of Course Objectives that map to Student Learning Outcomes as shown in the above Table A-4. Raw assessment data consists of student responses to specific test questions that address the relevant Course Objectives. One or two questions will be given to students in the courses being assessed. Each student response or performance is assigned a "pass" or "fail" status based on objective standards.

Target for Assessing Course Objectives

Some of the course objectives are assessed using multiple choice questions. If 70% of students answer correctly, no action is needed. If 50-69% of students answer correctly, this is a marginal score. Action will be taken if a marginal score is maintained for 2 consecutive semesters. If 50% of students or lower answer the question correctly, then immediate action is needed. Actions taken include better topic coverage by curriculum adjustment and/or refinement of the assessment question(s).

Other course objectives are assessed with a short answer question. A rubric is used to determine the students' scores. If 70% of students get a 4 or better on the rubric for the course objectives in Math 3130 or a 3 or better in Math 3120 or Math 4220, no action is needed. If 50-69% of students receive those scores, then this is a marginal score. Action will be taken if a marginal score is maintained for 2 consecutive semesters. If 50% of students or lower score a 4 or better on the rubric for the course objectives in Math 3130 or a 3 or better in Math 3120 or Math 4220, then immediate action is needed.

Assessment Method and Target for Student Learning Outcomes

Provided at least one course objective mapping to the given Student Learning Outcome has met its target each semester, that student learning outcome is deemed to have been satisfactorily met.

Schedule

Data will be collected at the end of each semester (December 11th -13th and April 29th - May 2nd). The data will be analyzed by December 14th and May 15th of every calendar year.

Examples of Assessment Questions and Rubric

The following are examples of assessment questions. The first two questions are multiple choice and the third question is short answer, including the rubric that is used to assess the scores of the students.

Math 3500 Actuarial Mathematics

Learning Outcome 3: Students should be able to use content knowledge to solve applied and real-world mathematical problems.

Course Assessment Problem (*Correct Answer is d)*: 10-year 1000 face value bond, redeemable at par, earns interest at 5% convertible semiannually. Find the price to yield an investor 4.6% convertible semiannually.

a) 972.68
b) 1000.00
c) 1027.96
d) 1031.78
e) 1042.32

Math 2210 Calculus 3

Learning Outcome 1: Students should be able to use standard mathematical techniques to solve computational problems.

Course Assessment Problem (*Correct Answer is a)*: In xyz-space, an equation of the tangent plane to the surface $x^2y - z = 0$ at the point $(2, 1, 4)$ is

a. $4x + 4y - z = 8$
b. $x - 2y + z = 4$
c. $4x + 2y - z = 6$
d. $4x + y + z = 14$
e. $x + y + z = 7$

Math 3130 Foundations of Geometry

Learning Outcome 4: Students should be able to communicate mathematics effectively using proper notation and terminology.

Course Assessment Problem (*Correct Answer is found by starting with line and point not on line – can show that angles sum to the same as a "straight angle", or* $180°$*)*: Using the Euclidean axioms, explain why the measure of the three angles in a triangle sum to $180°$.

Rubric for Learning Outcome 4

0 Useless: Response involves incomprehensible statements and/or focuses on unrelated terms and notation.

1 Idea(s): Response demonstrates some content knowledge (involving a related term or related notation) but does not convey any meaning or understanding.

2 Beginning: Response involves several related terms with occasional use of proper terminology and notation. Writing may be difficult to follow and demonstrates minimal understanding.

3 Error: Overall, response uses correct terminology and notation but has some missing element. Writing displays a basic but incomplete understanding.

4 Almost: Response is almost entirely correct in terms of terminology and notation. Writing may be somewhat awkward and include some small typographical errors but indicates solid understanding.

5 Correct: Response is correct and complete, with proper use of all necessary terms and notation. Discussion is clear, concise, and mathematically correct.

Appendix IV – Math

Curriculum changes mandated by the University

The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. As new majors come to SUU, we encourage them to carry out undergraduate research with a Math faculty member to fulfill the EDGE requirements. These requirements are composed of three courses: Univ 1010, 3925 and 4925.

Curriculum changes made based on assessment of SLOs

The Department is too early in the process to have follow-up assessment results following curriculum changes. The Department has made some changes in the initial cycle and will continue to use assessment data to make curriculum changes as needed.

Table A-5: Recent changes made due to assessment of SLOs

Course ID	Course Learning Outcome	Assessment Method	Assessment Result	Action	Follow-Up
Spring 2012					
MATH 1220	Demonstrate knowledge of fundamental mathematical concepts and results in the core content areas. (Learning Outcome 2)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	(14/59) 24% got the question correct.	Question is too difficult. Combines too many concepts and therefore does not lend itself to multiple choice (finding intersection points with being able to integrate sine squared and graphing). Doesn't need to be as computational. Will create new question	Assessment problem was changed. Results improved in the next cycle (see Math 1220 Fall 2012 results).
Fall 2012					
MATH 1220	Demonstrate knowledge of fundamental mathematical concepts and results in the core content areas. (Learning Outcome 2)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	31/46 or 67% got the question right.	Score is marginal. It greatly improved from last semester after changing the question. Watch for next semester.	TBA, Spring 2013
Fall 2012					

MATH 1220	Use standard mathematical techniques to solve computational problems. (Learning Outcome 1)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	51% (30/59) got the problem correct.	This problem uses a difficult integral. A more straightforward problem that requires a simple substitution would be more appropriate (possibly an integration by parts problem; not multiple choice, but still graded right or wrong).	For Fall 2012 we changed the problem to separate integration by parts from improper integration. Scored 85%, Fall 2012.

Spring 2012

MATH 4220	Use logical reasoning to construct clear and concise mathematical proofs. (Learning Outcome 5)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	12/18 or 67% got a 3 or better on the rubric	This is a marginal score so it will be monitored for next semester. More direct action will be taken if a marginal score is received two semesters in a row. The problem needs to be given under a graded situation. It was not given on a test or quiz.	See MATH 4220 Fall 2012 assessment results.

Fall 2012

MATH 4220	Use logical reasoning to construct clear and concise mathematical proofs. (Learning Outcome 5)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	4/9 44% got a 3 or better on the rubric.	A committee met on 12/12/12. Several conclusions were reached. 1) The sample size was very small for this assessment. Only 5 of 9 students were passing with a C or better at the time of assessment. 2) Two students had already failed to get a C in 4220 the first time. We need to look more carefully at prerequisite completion. We will write a department policy for considering the Math future of students repeating classes several times.	The suggested policy was carried out. Results from the next assessment cycle will be carefully scrutinized

Spring 2012

MATH 4400	Communicate mathematics effectively using proper notation and terminology. (Learning Outcome 4)	To assess learning outcomes we will look directly at student work. One question will be given to students. See related document for question.	10 out of 25, 40%, got the question correct	The course coordinator and a committee of other faculty members met on 12/12/12. They decided that in order to effectively assess this communication outcome, students should be required to write a proof. This question is going to be changed to a short answer question instead of multiple choice. Also, the proof will be asked about a theorem that is more central to the course and covered by the book in more depth.	The new assessment problem was created. Results from the Fall 2013 assessment cycle will be weighed.

Changes made following suggestions by key stakeholders

Added Math 2250 (Linear Algebra & Differential Equations) as a four credit hour service course for Integrated Engineering students. This combines differential equations with linear algebra to reduce overall credit hours required by the Integrated Engineering program and is heavier in computational techniques than a theory and proof approach as their former requirements of Math 2270 (Linear Algebra) and Math 2280 (Differential Equations) that are each three credit hours and more theory-oriented.

List assessment results following any curriculum changes

We changed the Math 1220 assessment question for Learning Outcomes 1 and 2. Because of the Math 4220 assessment question we will look more carefully at prerequisite completion. We will write a department policy where students repeating several classes are given guidance on whether to continue in the program.

APPENDIX VII - NURSING

Department Vision Statement

The Southern Utah University (SUU) Department of Nursing will be a hallmark Baccalaureate Nursing Program, providing quality nursing education that efficiently and effectively meets the needs of students and the regional community.

Department Mission Statement

The Department of Nursing is made up of academic programs that prepare individuals for professional nursing practice. A Bachelor of Science in Nursing is recommended for students preparing for entry into nursing practice. We offer a learning-centered education that meets the requirements for a baccalaureate degree at SUU and ensures that graduates have the abilities to be successful professional nurses. The purpose of the Department of Nursing is to provide learning opportunities that engage students in a comprehensive program of classroom and experiential learning that emphasizes caring, critical thinking, problem solving, ethical decision making, and communication.

Program goals for the BSN degree are derived from established professional nursing standards which include the American Association of Colleges of Nursing (AACN) document, The Essentials of Baccalaureate Education for Professional Nursing Practice (2008). Student benchmarks for the program have been established by the faculty as practical measures of competency of graduates. These benchmarks include student success on first NCLEX-RN® attempt and resulting state licensure. The observable, measurable goals of the Department of Nursing and our objectives by which we will accomplish them are:

- To prepare graduates to successfully enter nursing practice by offering well-planned and pedagogically sound learning experiences in courses and in research projects that develop skills in analysis, critical thinking, problem solving, and ethical decision making.
- To develop technically proficient nurses by offering students hands-on experiences with state-of- the-art health care equipment and providing coursework and clinical practicum opportunities.
- To support faculty members as health care professionals who demonstrate excellence in teaching, scholarly endeavors, practice, and professional community service and who provide leadership in nursing practice by rewarding good teaching, encouraging participation in clinical practice and professional organizations, doctoral-prepared faculty, and scholarly engagement in current faculty.

Nursing provides graduating students with the following Student Learning Outcomes in accordance to Commission on Collegiate Nursing Education (CCNE) and the American Association of Colleges of Nursing (AACN) baccalaureate essentials.

A. Students will provide quality professional nursing care based on a synthesis of theoretical and empirical knowledge from nursing, physical and social sciences, arts and humanities, and life experiences.
B. Students will use evidence as the basis for clinically competent contemporary nursing care.
C. Students will communicate effectively using various means in a variety of roles and settings.
D. Students will optimize health care to diverse individuals, families, groups and communities through collaboration with interdisciplinary health care teams.

E. Students will demonstrate intellectual curiosity, critical thinking, and motivation toward life-long learning.
F. Students will influence the quality of nursing and health care using leadership skills, management concepts, and a knowledge of the political system.
G. Students will be legally and ethically accountable for clinical nursing practice.
H. Students will assume the role of generalist nurse and become a responsible member of the profession.

In addition, all students in the Nursing Department must be passing with a B- (GPA 2.70 on a 4.0 scale) or better each semester enrolled and achieves a minimum of a C (2.00) in each required nursing course. Nursing students must take a predictor examination in their senior year fourth level and pass with a 95% before taking the NCLEX-RN® exam. Students who do not pass must do remediation and retake this exam in order to take the NCLEX-RN® exam. If they do not pass a second time with a 95% they must take a one week NCLEX success course. We use Assessment Technologies Institute (ATI) testing to provide a nationally normed standardized test for our students.

SUU INSTITUTIONAL LEARNING OUTCOMES

The following SUU Learning Outcomes are based on the AAC&U (The Essential Learning Outcomes and USHE policy R470)

Undergraduate students graduating from SUU will demonstrate

1. Knowledge of Human Cultures and the Physical and Natural World
2. Intellectual and Practical Skills, including
   - 2a. Inquiry and analysis
   - 2b. Critical and creative thinking
   - 2c. Written and oral communication
   - 2d. Quantitative literacy
   - 2e. Information literacy
   - 2f. Teamwork and problem solving
3. Personal and Social Responsibility, including
   - 3a. Civic knowledge and engagement—local and global
   - 3b. Intercultural knowledge and competence
   - 3c. Ethical reasoning and action
   - 3d. Foundations and skills for lifelong learning
4. Integrative and Applied Learning, including
   - 4a. Synthesis and advanced accomplishment across general and specialized studies

Mapping between Nursing Student Learning Outcomes and SUU Learning Outcomes

The following table demonstrates the mapping between Biology Student Learning Objectives and SUU Learning Outcomes

Table A-1: Mapping between Nursing SLOs and SUU Institutional LOs

Nursing / SUU	A Provide quality professional nursing care …	B Use evidence as the basis for … care	C Communicate effectively…	D Optimize health care …	E …intellectual curiosity, critical thinking, and motivation toward life-long learning	F Influence the quality of nursing and health care …	G Be legally and ethically accountable …	H Assume the role of generalist nurse …
1	X		X	X		X		X
2a	X	X	X		X			
2b	X		X					
2c		X	X			X	X	
2d	X				X			
2e						X		
2f			X	X				X
3a		X	X	X				
3b	X	X	X	X		X		X
3c							X	
3d					X			
4a		X	X	X				X

Table A-2: Department of Nursing Profile Data

Program Profile					
	2006	2007	2008	2009	2010
Average annual undergraduate class size for lectures	30	30	20	20	20
Average annual undergraduate class size for labs (by state law ratios)	12.5	12.5	12.5	12.5	12.5
Bachelor's degrees awarded based on first degree	76	78	73	77	69

Table A-3: Student Applicant Data

Application Statistics

All Classes

Semester/Year Applied	Fall 2012	Spring 2012	Fall 2011	Spring 2011	Fall 2010	Spring 2010	Fall 2009	Spring 2009	Fall 2008	Spring 2008	Fall 2007	Spring 2007	Fall 2006	Spring 2006	Fall 2005	Spring 2005	Fall 2004
# of Applicants	78	49	63	45	43	38	56	29	95	49	35	40	35		115	43	34
Number Accepted	20	22	53	20	20	20	20	21	20	32	31	30	32	30	31	23	20
Number Alternates	8	6	20	7	7	5	15	2	10	2	5	0	0	0	15	7	6
# Physically Started	20	22	13	20	20	20	20	20	20	32	31	30	32	30	31	20	19
Average CUM GPA	3.62	3.68	20	3.6	3.71	3.51	3.57	3.38	3.61	3.52	3.40	3.42	3.42	3.35	3.53	3.60	3.43
Core GPA	3.65	3.69	3.68	3.7	3.72	3.51	3.61	3.31	3.70	3.40	3.40	3.46	3.45	3.35	3.56	3.50	3.52
# from outside SUU	5	7	3.73	4	5	3	12	1	11	12	17	15	8	9	14	4	0
Average Age	24	25.73	4	23	24	27	25	24	24	25	25	26	26	26	25	26	26
Male	5	4	26	4	4	4	4	2	5	2	10	9	7	8	10	3	7
Female	15	18	4	16	16	16	16	18	15	30	21	21	25	22	21	17	12
Ethnicity:			16														
Black Non-Hispanic:					0					0		0	0		0	0	0
Asian or Pacific Islander:					1			2	1	2	1	0	0	2	1	0	0
Hispanic:	1	1		1	1			1		1		1	1		2	0	0
White Non-Hispanic (Caucasian):	19	20	1	19	18	20	20	17	19	29	30	28	31	28	28	19	19
American Indian:			19		0					0		1	0		0	0	0
Other:		1			0					0			0		0	1	0

Table A-4: Pre-Licensure Attrition

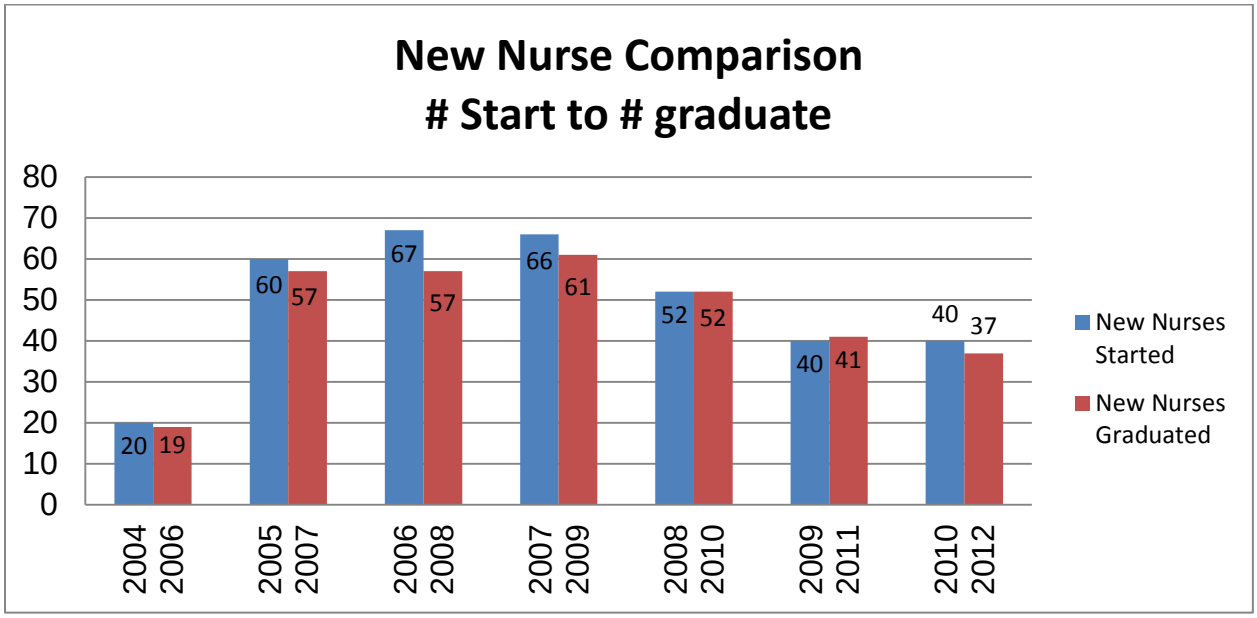


Table A-5: RN to BSN Attrition

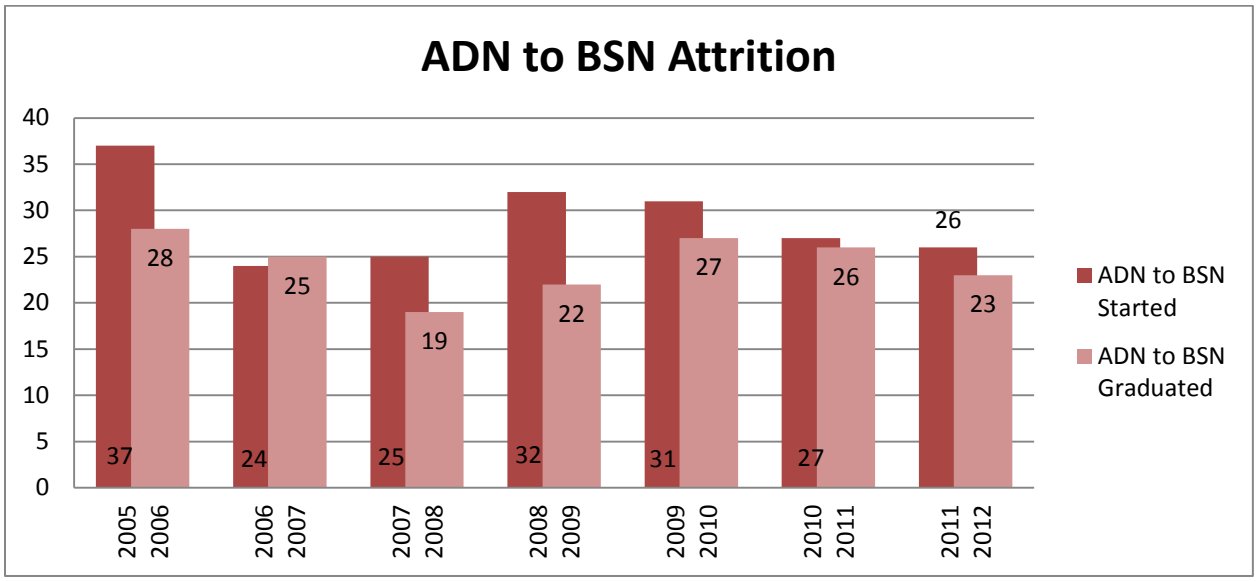
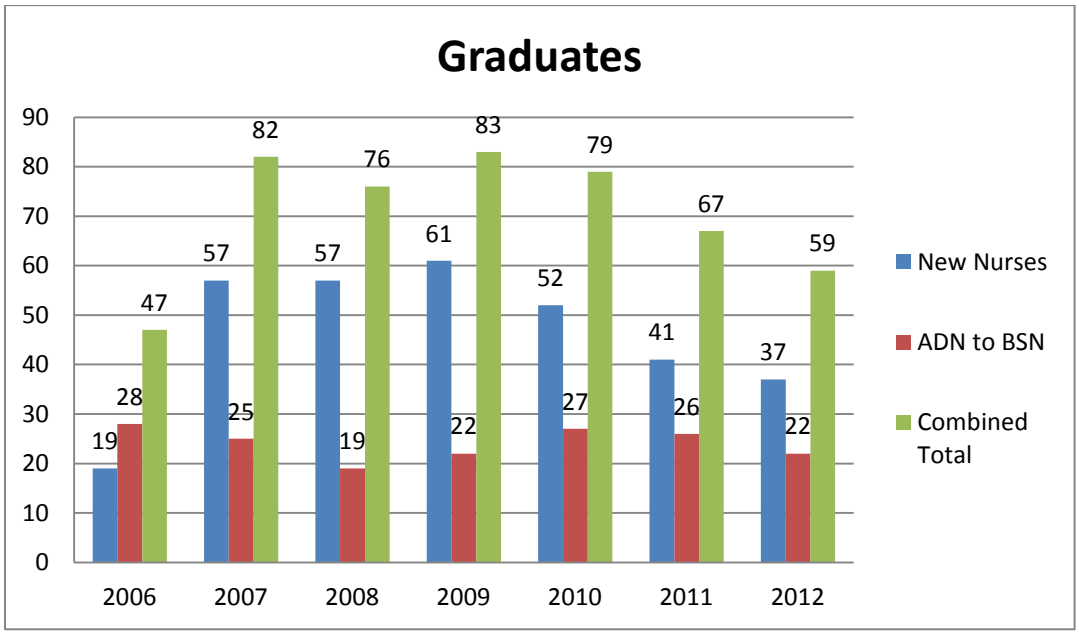


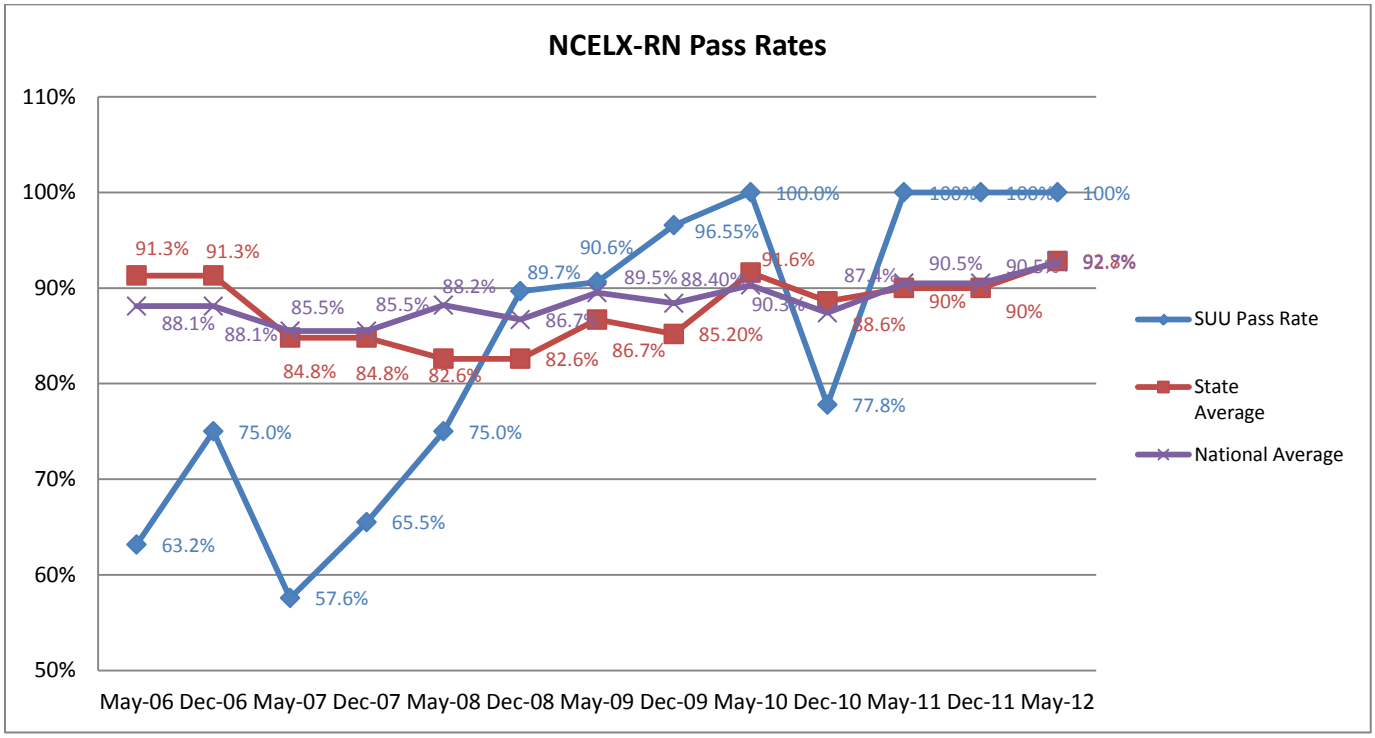
Table A-6: Number of Graduates



Tables A-7: NCLEX Test Data

Southern Utah University
NCLEX-RN® Pass Rates

Class of:	May-06	Dec-06	May-07	Dec-07	May-08	Dec-08	May-09	Dec-09	May-10	Dec-10	May-11	Dec-11	May-12
Goal	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
SUU Pass Rate	63.2%	75.0%	57.6%	65.5%	75.0%	89.7%	90.6%	96.55%	100.0%	77.8%	100%	100%	100%
State Average	91.3%	91.3%	84.8%	84.8%	82.6%	82.6%	86.7%	85.20%	91.6%	88.6%	90%	90%	92.8%
National Average	88.1%	88.1%	85.5%	85.5%	88.2%	86.7%	89.5%	88.40%	90.3%	87.4%	90.5%	90.5%	92.7%



NCLEX-RN® pass rates: Actual NCLEX-RN® pass rates for program graduates have increased since May 2007 with the most recent graduating class (May 2012) pass rate of 100%. This is the third consecutive class with a pass rate of 100%. It is also the fourth class out of the last 5 graduating classes to achieve 100% for first time NCLEX-RN® testing.

EBI Data: Educational Benchmarking Inc. (EBI) assessment data are used to measure the effectiveness of our programs from the graduating nursing students' perspective. The assessments from EBI are based on CCNE standards for accreditation and address student satisfaction and Student Learning Outcomes. The assessment provides feedback from students concerning their perception of the program's effectiveness and is utilized in comparison with six comparison institutions, SUU previous data, Carnegie Class institutions and all institutions using EBI. The data reveal how students near graduation perceive the program as meeting our expected outcomes and their educational needs. The EBI reports for the Department of Nursing are available in the department office for review.

Employer Satisfaction Survey: Informal feedback from Advisory Board Meetings (held at least annually) and interactions from key employers have been extremely positive concerning the performance of SUU graduates. Data from the employer surveys demonstrate employer satisfaction with SUU graduates. Advisory Board minutes are in the Department of Nursing office for review.

Employment Rates: Data about plans for employment or graduate school are collected from graduation surveys and the EBI survey completed by all pre-licensure students. According to current information those students who are not in graduate school have an employment rate above 90%.

Student Satisfaction: SUU has an online course evaluation process whereby students are given the option of evaluating each course/faculty member. Aggregate survey results are available on site. Each faculty member must evaluate and make comments on their specific survey results and student comments in their annual report. The majority of student responses agreed or strongly agreed that the program met the desired objectives.

The program conducts a post- graduation survey of students soliciting employment status, their plans for graduate school and how well they feel the program prepared them for practice. The majority of feedback from graduates is very positive with students indicating they were well prepared to enter practice.

Appendix II - Nursing

Program Resources

Facilities

- Nursing Faculty offices located in the Walter Maxwell Gibson Science Center (SCA) on the main level

Clinical Partner Facilities

- Valley View Medical Center (Cedar City, UT)
- Dixie Regional Medical Center (St. George, UT)
- Kolob Regional Long Term Care and Rehabilitation (Cedar City, UT)
- Iron County Home Health (Cedar City, UT)
- St. Marks Hospital (Salt Lake City, UT)
- Garfield Memorial Hospital (Panguitch, UT)
- Beaver Valley Hospital (Beaver, UT)
- Sevier Valley Medical Center (Richfield, UT)
- Gunnison Valley Hospital (Gunnison, UT)
- Fillmore Hospital (Fillmore, UT)
- Delta Hospital (Delta, UT)
- Central Valley Medical Center (Nephi, UT)
- Iron County School District (Cedar City, UT)
- Beaver County School District (Beaver, UT)
- Central Valley Hospital (Nephi, UT)

Labs

- Student Autotutorial (ATTL) Nursing Labs located in SCA rooms 103 and 104 on the main level

Equipment

The SUU Department of Nursing Maintains the following list of equipment

- FURNITURE
    - 10 Electric beds
        - 6 Hill-Rom 1000 series
        - 3 Hill-Rom TotalCare Bed System
        - 1 Joerns Healthcare, Hi-Lo
    - 1 Stretcher
        - Hill-Rom Transport, hydraulic
    - 1 infant bassinet
    - 2 Wheel chairs
    - 2 shower chairs: 1 fixed, adjustable height; 1 mobile with toileting bucket
    - 2 bedside commodes
    - 5 IV stands: 1 tabletop, 4 mobile
    - Overbed Tables
        - 3 Hill-Rom with multiple trays
        - 9 standard tables
    - 2 multi-drawer Medication Carts
    - 1 portable Tough computer cart (in SCA 104A, Noelle/Hal computer/17"monitors x2)
    - 1 custom-made light-colored wood, mobile cart, 3 drawers (EKGmonitor & simulators, VitalSim unit)
    - 10 Headwall Systems: Suction/vacuum, O2 flowmeter & medical air (compressed air), 2 plug 'live' power outlet
- MANIKINS
    - 3 Adult Male/Female Full size (Laerdal), multiple parts, wounds, extra arms and feet
    - 2 Adult (Laerdal –Kelly & Anne)) Vital Sim capable, with extra body parts, wounds, Postpartum belly
    - 1 Adult ALS (Laerdal) Vital Sim capable
    - 1 Adult 'Keri' (Nasco)
    - 1 Child (Mike/Michelle)
    - 1 Kid (Laerdal) Vital Sim capable
    - 1 infant Vital Sim capable
    - 1 female, 3 male infants
- SIMULATORS
    - 1 Adult female, Maternal Birthing Simulator (Gaumard) Noelle S575
    - 1 Neonatal, (Gaumard) Newborn Hal
    - 2 cardiac monitor simulators: 3-lead, 12Lead EKG (compatible with Nihon cardiac monitor)
- COMPUTERS
    - 1 Virtual IV, Laerdal
    - 1 cardiac monitor (Nihon) with invasive monitoring lines, BP, Pulse Ox;
    - 3 Vital Sim Units
    - (2 Wireless microphones)
    - 2 large volume IV Infusion pumps, (*Sigma, Alaris)*
    - 3 small volume IV medication pumps: 2 Hospira, 1 CADD
    - 1 enteral feeding tube pump (*Kangaroo)*

- MODELS
    - 2 anatomy plastic torsos; dissecting structures: 1 miniature, 1Tall on rotating base
    - 1 Incision care torso
    - 1 buttock wound care, multiple pressure sores
    - 1 ostomy care torso
    - 1 ostomy abdomen display case
    - 1 female urinary catheter
    - 1 tracheostomy care, head and upper chest
    - 1 plastic tracheostomy (see through trainer)
    - 1 Chester Chest with advanced arm, various central line care
    - 1 central line chest display case
    - 2 intubation head & lungs, infant & adult
    - 1 leopold maneuvers soft skin belly in duffle bag
    - 3 vinyl pelvic torsos with fetus, placenta & cord, and multiple 'fundus' for postpartum assess
    - 1 breast exam trainer
    - 1 testicular exam simulator
    - 4 belly/hip/thigh injection torsos
    - 1 intradermal injection forearm
    - 2 advanced venipuncture Task trainer
    - 2 advanced IV arms, 1 dark skin, 1 Caucasian skin
    - 1 Advanced IV hand, dark skin
    - 1 opthalmoscope head, various inner eye slides (SeeMore)
- DIAGNOSTIC EQUIPMENT
    - 13 Health Assessment Kits:
        - Otoscope/Opthalmoscope with Peds & Adult oto specula
        - Anaeroid BP cuff
        - Tympanic Thermometer, probecovers
        - Penlight
        - Wound measure guides
        - Goniometer
        - Reflex hammer
        - Skin Calipers
        - Tuning forks x2
        - Diabetic Monifilaments
        - Vision Charts
        - Tape measure
        - Tongue Blades, Q-tips, Alcohol swabs
        - 4 palm size, pulse oximeters
        - 1 large face anaeroid mobile BP cuff
        - 6 anaeroid BP cuffs in nylon case; med-adult, 2 latex free
        - 1 large adult anaeroid BP cuff
        - 1 child anaeroid BP cuff
        - 2 electronic portable vital sign machines, &1 mobile stand: BP cuff, pulse, pulse oximeter (Welch-Alynn)

        - 1 Wallmount Diagnostic station: Opthalmascope/Otoscope, Specula holder, Anaeroid BP cuff, clock
    - Thermometers:
        - 4 Temporal: 1 Professional, 3 Homestyle
        - 4 Geotherm Glass
        - 3 Tympanic (not in Health Assess kits)
        - 2 Digital
        - 15 dual-head adult stethoscopes, various colors & styles
        - 4 infant/peds dual-head stethoscopes
        - 1 doppler, OB & artery capable
        - 2 standard upright height/weight scales
        - 3 electronic vision screening boxes, metal case (see Alan Pearson)
        - Miscellaneous ATTL EQUIPMENT
        - 1 metal drawer cart (Armstrong) as 'Crash Cart' with defibrillator/cardiac monitor
        - 2 portable suction units, with canisters
        - 2 side rail pad cushions, (seizure precautions)
        - 1 portable oxygen unit, oxygen flowmeter, oxygen regulator
        - 1 ErgoNurse Lift, client positioning-in-bed (no-lift for health care provider)
- MISCELLANEOUS ATTL EQUIPMENT
        - 1 metal drawer cart (Armstrong) as 'Crash Cart' with defibrillator/cardiac monitor
        - 2 portable suction units, with canisters
        - 2 side rail pad cushions, (seizure precautions)
        - 1 portable oxygen unit, oxygen flowmeter, oxygen regulator
        - 1 ErgoNurse Lift, client positioning-in-bed (no-lift for health care provider)

Organizational Resources

- Computer labs (located across campus)
- SUU library resources (Campus and Online)
- Internet access for all students
- Peer Reviewed Journals
- Nursing Books including assessment testing resources
- Assessment Technologies Institute (ATI), Nursing Education and Assessment Testing
- HURST Review
- EBI Benchmarking

Appendix III - Nursing

Curriculum Matrix

The following tables outline how the Student Learning Outcomes are mapped to the courses in the Department Nursing program.

Tables A-8: Curriculum Maps

Mapping Nursing Student Learning Outcomes to Course Objectives and their coverage

	All courses with shading indicates courses to be assessed for specified Student Learning Outcomes based on CCNE's criteria for Nursing Program Accreditation								
	Student Learning Outcomes								*Objective*
	A	B	C	D	E	F	G	H	*Coverage*
Pre-Licensure Level I									
NURS 3120	X	X	X	X	X	X			6
NURS 3130	X	X	X	X	X	X			6
NURS 3135	X	X	X	X	X	X	X	X	8
NURS 3140		X	X	X	X	X	X	X	8
Course Coverage	3	4	4	4	4	4	2	2	

	A	B	C	D	E	F	G	H	*Coverage*
Pre-Licensure Level II									
NURS 3220	X	X	X		X				4
NURS 3230	X	X	X		X				4
NURS 3235	X	X	X	X	X				4
NURS 3240	X	X	X	X	X	X	X	X	8
NURS 4360	X	X	X	X	X	X	X	X	8
Course Coverage	5	5	5	2	5	2	2	2	

	A	B	C	D	E	F	G	H	*Coverage*
Pre-Licensure Level III									
NURS 3260	X	X	X	X	X	X		X	7
NURS 4330	X	X	X	X	X	X		X	7
NURS 4335	X	X	X	X	X	X	X	X	7
NURS 4340	X	X	X		X				4
NURS 4350	X	X	X	X	X				4
NURS 4355	X	X	X		X				4
Course Coverage	6	6	6	3	6	3	1	3	

	A	B	C	D	E	F	G	H	*Coverage*
Pre-Licensure Level IV									
NURS 4430	X	X	X	X	X	X	X	X	8
NURS 4435	X	X	X	X	X	X	X	X	8
NURS 4440	X	X	X	X	X	X	X	X	8
NURS 4550	X	X	X		X				4
NURS 4555	X	X	X			X		X	6
Course Coverage	5	5	5	3	4	4	3	4	

	A	B	C	D	E	F	G	H	*Coverage*
RN to BSN 1ST Semester									
NURS 3121	X	X	X	X	X	X			6
NURS 3141		X	X	X	X	X	X	X	7
NURS 3260	X	X	X	X	X	X		X	7
Course Coverage	2	3	3	3	3	3	1	2	

	A	B	C	D	E	F	G	H	*Coverage*
RN to BSN 2nd Semester									
NURS 4340	X	X	X		X				4
NURS 4351	X	X	X		X				4
NURS 4356	X	X	X	X	X				4
NURS 4361	X	X	X	X	X	X	X	X	8
Course Coverage	4	4	4	1	4	1	1	1	

	A	B	C	D	E	F	G	H	*Coverage*
RN to BSN 3rd Semester									
NURS 4431	X	X	X	X	X	X	X	X	8
NURS 4436	X	X	X	X	X	X	X	X	8
NURS 4440	X	X	X	X	X	X	X	X	8
NURS 4551	X	X	X		X				4
NURS 4556	X	X	X			X		X	6
Course Coverage	5	5	5	3	4	4	3	4	

The Assessment Process

Direct assessment of Course Objectives (and hence indirect assessment of associated Student Learning Outcomes) is performed at the end of each Fall and Spring semester. The framework for assessment is based on expectations from the CCNE nursing program accrediting body. The framework for each assessment is based on examination of course objectives for several courses that map to this Student Learning Outcomes, as listed above. The raw assessment data consist of student responses to specific

homework, clinical performance, or test questions. Each student response or performance is assigned a "pass" (performance or test at or above 74%) or "fail" status based on rubrics or other objective standards outlined in each syllabus. The Nursing department performs an assessment at both the course and program level every other year based on following rules below.

Assessment of Course Objectives

If the mean percentage of "pass" scores for the given Course Objective is below 74 percent or the student fails the course, immediate action will commence (in the form of evaluation of the course in which the student was below the 74 percent or failed and possible curriculum adjustment may take place). If the mean percentage of "pass" scores is between 74-79 percent, immediate action will commence,(in the form of curriculum review for adjustment or possible curriculum adjustment). If the mean percentage of "pass" scores is 80 percent or above, no action is required.

Assessment of Student Learning Outcomes

Recall that Student Learning Outcomes are tied to individual courses and their objectives as illustrated in the tables above. If three courses for a given Student Learning Outcome require no action (*i.e.* the mean percentage of "pass" scores is at or above 80 percent), the Department of Nursing has declared that this Outcome has been achieved for the particular academic year. In the case that *no* course that maps to the given SLO has "pass" scoring mean of 80 percent or better, immediate action will commence (in the form of curriculum adjustment).

Table A-9

Student Learning Outcomes *(The Percent of Students Passing values is the frequency distribution of pass / fail for each performance indicator)*		
80-100%	74-79%	0>74%
No action needed	Marginal	Immediate Action

Role of Key Stakeholders

The following groups and individuals, identified as internal or external stakeholders, have an interest in the mission, goals and expected outcomes of the Department and the program's effectiveness in achieving them. Internal stakeholders include current nursing students, department faculty, staff and administrators and the SUU community. External stakeholders include prospective students, alumni, community members served by alumni, contracted health care agencies, employers of alumni, Utah State Board of Nursing, Commission of Collegiate Nursing Education (CCNE), and the DON Advisory Board.

The Department of Nursing Advisory Board members are provided opportunity during advisory meetings to indicate the need for change in program mission, goals and outcomes. Advisory Board minutes reflect input and resulting action to make the program comply more with community of interest needs. A specific example is instituting the opportunity for PN licensure after successful completion of the second semester of the program. The Advisory Board has been instrumental in program development since inception.

APPENDIX VII – PHYSICAL SCIENCE – CHEMISTRY & GEOLOGY

Appendix I

(Chemistry)

Mission

The mission of the chemistry program is to afford all students the opportunity to understand the discipline of chemistry and its relevance through quality teaching, scholarly activities, and service. In a world that is becoming increasingly more technical and complex, providing chemical instruction with the depth, breadth, and rigor required to meet this need is of primary importance.

Chemistry faculty will strive to provide students with quality, current, comprehensive, courses of study, which serve the following needs including:

1. Preparation of students who choose to pursue graduate degrees in chemistry.
2. Preparation of students who choose to pursue degrees in the health sciences (medicine, dentistry, pharmacy, etc.)
3. Preparation of students who choose to gain employment in a science related field with an undergraduate degree.
4. Preparation of students who choose to become chemical educators.
5. Education of students to think critically and independently.
6. Helping students improve communicative, creative, analytic, and information gathering skills.

To accomplish these goals, the chemistry faculty will provide the following:

1. Honest evaluations of student abilities and potential.
2. An environment of mutual respect and trust among faculty, staff, and students.
3. The application and involvement of basic scientific principles and methodologies.
4. Competitive opportunities for mentorship through undergraduate research, employment, and other hands-on educational means.

Chemistry Program Student Learning Outcomes

1. Problem Solving. Students should be able to define problems clearly, develop testable hypotheses, design and execute experiments, analyze data using appropriate statistical methods, and draw appropriate conclusions.
2. Chemical Literature Skills. Students should be able to use the peer-reviewed scientific literature effectively and evaluate technical articles critically. Computer applications and resources will be emphasized as a method to navigate the literature.
3. Laboratory Skills. Students should understand responsible disposal techniques, understand and comply with safety regulations, understand and use material safety data sheets (MSDS), recognize and minimize potential chemical and physical hazards in the laboratory, and know how to handle laboratory emergencies effectively.
4. Communication Skills. Students should be able to present information in a clear and organized

manner, write well-organized and concise reports in a scientifically appropriate style, and use technology such as poster preparation software, word-processing, chemical structure drawing programs, and computerized presentations in their communication.

SUU INSTITUTIONAL LEARNING OUTCOMES

The following SUU Learning outcomes are based on the AAC&U (The Essential Learning Outcomes and USHE Policy R470).

Undergraduate students graduating from SUU will demonstrate

9. Knowledge of human cultures and the physical and natural worlds.
10. Intellectual and practical skills, including
    a. Inquiry and analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
11. Personal and social responsibility, including
    a. Civic knowledge and engagement – local and global
    b. Intercultural knowledge and competence
    c. Ethical reasoning and action
    d. Foundations and skills for lifelong learning
12. Integrative and applied learning, including
    a. Synthesis and advanced accomplishment across general and specialized studies

The following table demonstrates the mapping between Chemistry Student Learning Outcomes and SUU Learning Outcomes

Table A-1: Mapping Chemistry SLOs to SUU LOs

Chemistry / SUU	1. Problem Solving	2. Chemical Literature Skills	3. Laboratory Skills	4. Communication Skills
1	X	X	X	X
2a	X	X	X	
2b	X	X	X	X
2c		X	X	X
2d	X	X	X	X
2e		X		X
2f			X	X
3a		X		X
3b		X		X
3c		X		X
3d	X	X	X	X
4a	X	X	X	X

(Geology)

Mission

The geology faculty strives to provide students at Southern Utah University with excellence in earth science education. Our integrated efforts are directed toward those methods we feel produce the best possible educational experience. The primary goal of the geology faculty is to ensure academic excellence while demanding integrity and building self-esteem in our students. Specifically, our mission is to foster a positive learning environment which serves a variety of needs including:

1. Preparation of students who choose to pursue graduate studies in geology;
2. Preparation of students to directly enter the work force;
3. Preparation of students who choose to pursue careers in areas other than science (i.e. business or law), but need a broadly based background in geology as a foundation for those pursuits;
4. Preparation of students who choose a career in earth science education; and
5. Preparation of students choosing physical science general education courses to be more knowledgeable citizens by providing a quality educational experience. The geology area carries out its role through application of, and involvement with, the basic principles of science and by instilling understanding and appreciation of scientific methodologies.

Geology Student Learning Outcomes

The Geology Bachelor degree is designed to provide graduating students with the following learning outcomes:

A. Knowledge of the physical and natural world
B. Integrative learning through teamwork, problem solving, inquiry, and analysis
C. Introduction and development of geological field and/or lab skills
D. Written and oral scientific communication

In addition, all courses to be counted in the Geology major must be passed with a "C" or better. Geology courses older than 10 years may not be counted toward degree requirements.

SUU INSTITUTIONAL LEARNING OUTCOMES

The following SUU Learning Outcomes are based on the AAC&U (the Essential Learning Outcomes and USHE Policy R470).

Undergraduate students graduating from SUU will demonstrate:

1. Knowledge of Human Cultures and the Physical and Natural World
2. Intellectual and Practical Skills, including
    a. Inquiry and Analysis
    b. Critical and creative thinking
    c. Written and oral communication
    d. Quantitative literacy
    e. Information literacy
    f. Teamwork and problem solving
3. Personal and Social Responsibility, including
    a. Civic knowledge and engagement - local and global
    b. Intercultural knowledge and competence
    c. Ethical Reasoning and action
    d. Foundations and skills for lifelong learning
4. Integrative and Applied Learning, including

a. Synthesis and advanced accomplishment across general and specialized studies

The following table demonstrates the mapping between Geology Student Learning Outcomes and SUU Learning Outcomes

Table A-2: Mapping Geology SLOs to SUU LOs

Geology / SUU	A Geology Knowledge	B Integrative Learning	C Field and Lab Skills	D Communication Skills
1	X			
2a		X		
2b				X

2c			X	
2d	X			
2e		X		
2f		X	X	
3a				
3b				
3c				
3d	X			
4a	X		X	X

(Physical Science Teacher Education)

Mission

The mission and role of the Physical Science Teacher Education degree is to provide an environment that fosters academic breadth in the disciplines of chemistry, geography, geology, physics and education in order to obtain the competencies necessary for a physical science teacher in a secondary school.

Physical Science Teacher Education Student Learning Outcomes

A: Scientific Knowledge: Students should demonstrate knowledge of the major facts, theories, and models in the physical sciences.

B: Problem Solving Skills: Students should be able to define problems clearly, develop testable hypotheses, design and execute experiments, analyze data using appropriate statistical methods, and draw appropriate conclusions.

C: Field and Laboratory Skills: Students should understand responsible disposal techniques, understand and comply with safety regulations, understand and use material safety data sheets (MSDS), recognize and minimize potential chemical and physical hazards in the laboratory, and know how to handle laboratory emergencies effectively.

D: Communication Skills: Students should be able to present information in a clear and organized manner, write well-organized and concise reports in a scientifically appropriate style, and use technology such as poster preparation software, word-processing, chemical structure drawing programs, and computerized presentations in their communication.

The following table demonstrates the mapping between Physical Science Teacher Education Student

Learning Outcomes and SUU Learning Outcomes

Table A-3: Mapping Physical Science Ed SLOs to SUU LOs

Teacher Ed. / SUU	A Scientific Knowledge	B Problem Solving Skills	C Field and Lab Skills	D Communication Skills
1	X			
2a		X		
2b				X
2c			X	
2d	X			
2e		X		
2f		X	X	
3a				
3b				
3c				
3d	X			
4a	X		X	X

Tables A-4: Department of Physical Science Profile Data

Program Profile					
	2006-7	2007-8	2008-9	2009-10	2010-11
Annualized FTE generated	351.15	365.83	373.80	419.22	452.39
Annualized faculty FTE	17.66	17.99	20.47	18.20	19.54
Student/faculty ratio	19.9	20.3	18.3	23.0	23.1
Average annual undergraduate class size for lectures	25.18	24.8	23.6	28.6	30.1
Average annual undergraduate class size for labs	16	16.2	17.2	18.5	18.9
Bachelor's degrees awarded	17	16	20	11	9

Majors				
2006-7	2007-8	2008-9	2009-10	2010-11
131	158	160	182	229

Student Demographics						
		2007	2008	2009	2010	2011
Gender	Male	87	99	99	114	147
	Female	44	59	61	68	82
Race/Ethnicity	Caucasian	121	137	137	155	193
	Non-Caucasian	7	17	19	21	34

Table A-5: Survey of Department of Physical Science graduates

Graduate Placement: Physical Science							
Year	Number of Graduates	Number of Responses	Employed in Field	Employed Out of Field	Percent Employed	Post-BS Studies	Percent Post-BS
2007-2008	16	16	6	0	37.5	10	62.5
2008-2009	20	17	2	7	53	8	47
2009-2010	11	10	1	0	11	9	90
2010-2011	9	7	1	2	43	4	57
2011-2012	20	17	2	3	29	12	71

Appendix II – Physical Science

(Chemistry)

Program Resources

Facilities

- Faculty offices located in the Science Center Building
- Classrooms located in the Science Center and Science Center Addition Buildings
- Chemical Stockrooms located in the Science Center and Science Center Addition Buildings

Labs

- Environmental Water Wet Laboratory
- Environmental Micro Laboratory
- Nuclear Magnetic Resonance Laboratory
- Graphite Furnace, Ion Chromatography Laboratory
- Organic Chemistry Laboratory
- General Chemistry Laboratory
- Quantitative Analysis Laboratory
- Physics Laboratory
- Edward and Shirley Stokes Open Laboratory and
- Edward and Shirley Stokes Teaching Laboratory

To support classes, laboratories and undergraduate research, the program has acquired the following equipment:

- Dionex DX 120 Ion Chromatograph
- Perkin Elmer 5100 Graphite Furnace
- Perkin Elmer 5100 Atomic Absorption Spectrophotometer
- Agilent 7700 ICP-MS
- Agilent 5975 GC-MS
- Varian Gemini 200 MHz Nuclear Magnetic Resonance
- Anton Paar Monowave 300 Microwave Synthesis Reactor
- Bruker Smart Breeze Single Crystal Diffractometer
- Melles Griot 43 Series Ion Laser
- Perkin Elmer Auto System and Hewlett Packard 5890 Gas Chromatographs (3)
- Agilent 8453 and Cecil CE 2030 UV/Visible Spectrophotometers (2)
- Perkin Elmer Spectrum 100 and 1600 FTIR FTIR Spectrophotometer (2)
- Photon Technology International custom built emission/excitation Fluorimeter
- Anton Paar MCP 200 Polarimeter
- Akta Prime FPLC
- Selection of Potentiometric Titrators and pH meters

- Analytical to Semi-Preparative gradient HPLC
- Johnson Matthey MSB Mk1 magnetic susceptibility balance
- Gel box and power supply
- Nikon Eclipse Ti Light/Fluorescence Microscope
- Welch 2027 vacuum pump (6)
- CHI 630D Potentiostat
- Miele Glassware Cleaner
- Refrigerators, Freezer, Ice Machines, Heratherm Ovens, Buchi Rotovaps, and Labconco Glove Boxes

(Geology)

Program Resources

Facilities

- Faculty offices located in the Science Center Building
- Classrooms located in the Science Center

Labs

- Complete thin-section lab
- XRD lab
- Mineralogy lab
- Sedimentology lab

To support classes, laboratories and undergraduate research, the program has acquired the following equipment:

- Rock saws
- 18" diamond saw
- 10" inch trim saw
- Thin sectioning equipment
- Low-speed precision saw
- Polishing laps
- X-ray diffractometer
- Student petrographic microscopes
- 2 research-grade petrographic microscopes, one with digital camera
- Bruton compasses
- Jacob staffs

Organizational resources

- SUU library resources
- Multi-subject indexes for articles
- Internet access for all students
- Physical science journals

Appendix III Physical Science

(Chemistry)

Curriculum matrix

The following table shows how Student Learning Outcomes are mapped to the courses in the Chemistry program (shaded boxes indicate courses in which outcomes are regularly assessed).

Table A-6: Curriculum Map for Chemistry

Required Courses	Chemistry Program Student Learning Outcomes			
	1. Problem Solving	2. Chemical Literature	3. Laboratory Skills	4. Communication Skills
Chem 1210	X			
Chem 1215	X		X	
Chem 1220	X			
Chem 1225	X		X	
Chem 2010			X	X
Chem 2310	X	X		X
Chem 2315	X	X	X	X
Chem 2320	X	X		X
Chem 2325	X		X	X
Chem 2990	X	X	X	X
Chem 3000	X			
Chem 3005	X		X	X
Chem 3160	X			
Chem 3610	X			
Chem 3615	X	X	X	X
Chem 3620	X			
Chem 3625	X	X	X	X
Chem 3700	X			X
Chem 3990	X	X	X	X
Chem 4110	X			
Chem 4120	X	X		
Chem 4160	X	X		
Chem 4165	X	X	X	X
Chem 4230	X	X	X	X
Chem 4240	X	X	X	X
Chem 4250	X	X	X	X
Chem 4540	X	X		
Chem 4890				
Chem 4990	X	X		X
Core Coverage	27	15	14	16

Assessment of Student Learning Outcomes

Assessment of Student Learning Outcomes is performed every year. The assessment is based on the Course Objectives for at least three Chemistry courses for every SLO as illustrated in Table 6 above. Student responses to specific test questions or homework assignments are assigned a "pass" or "fail" status based on objective standards. The student response data are then compiled to determine the percent of students that achieved passing scores for each Course Objective.

(Chemistry, continued)

Assessment of Course Objectives:

There are three possible results of Course Objectives Evaluation. If the percentage of "pass" scores is sufficiently high (typically 60% or greater), no action is needed. If the percentage of "pass" scores falls into an intermediate regime (typically 50-59%) for *two* consecutive semesters, action will be taken. If the percentage of "pass" scores falls into a low regime (typically less than 50%) immediate action will be taken in the form of a curriculum adjustment.

Table A-7

Evaluation of Student Performance for Chemistry Learning Outcomes *Percent of Students Passing Assessment and Corresponding Action*		
Meet passing requirement (≥60% by class)	Intermediate (50%-59% by class)	Less than passing requirement (<50% by class)
No action needed	Action taken after two consecutive semesters	Immediate action taken

Assessment of Student Learning Outcomes:

If some course associated to a given Student Learning Outcome needs no action (the mean percentage of "pass" scores is at or above 60% for that course), the Chemistry program declares that our students have achieved this SLO. If no course meets the "pass" requirement for any given Learning Outcome, immediate action will commence in the form of curriculum adjustment.

The Role of Key Stakeholders

Feedback from the American Chemical Society, the WMG COSE advisory board, graduates, colleagues at other USHE institutions, as well as feedback from graduate programs accepting SUU graduates in Chemistry have provided impetus for changes to program curriculum (as noted in Appendix IV).

(Geology)

Curriculum Matrix

The following table outlines how the Student Learning Outcomes are mapped to the courses in the Geology degree program. The shaded boxes indicate courses in which the outcomes are assessed.

Table A-8: Curriculum Map for Chemistry

Shaded represent indicator courses for Student Learning Outcome assessment				
Geology	Student Learning Outcomes			
Required Courses	A Geology Knowledge	B Integrative Learning	C Field and Lab Skills	D Communication Skills
GEO 1110	X			
GEO 1115	X	X	X	
GEO 1220	X			
GEO 1225	X	X	X	
GEO 3010	X			X
GEO 3015	X	X	X	X
GEO 3110	X			X
GEO 3115	X	X	X	X
GEO 3120	X	X		X
GEO 3210	X			X
GEO 3215	X	X	X	X
GEO 3330	X			X
GEO 3335	X	X	X	
GEO 3410	X			X
GEO 3415	X	X	X	X
GEO 3510	X		X	X
GEO 3515	X	X	X	X
GEO 4000	X	X	X	X
GEO 4800	X	X	X	X
GEO 4960	X	X	X	X
GEO 4990	X			X
Core Coverage	21	12	12	16

Assessment of Student Learning Outcomes

Assessment of Student Learning Outcomes is performed every year. The assessment is based on the Course Objectives for two Geology courses for every SLO as illustrated in the shadings of Table A-8 above. Student responses to specific test questions, field exercises, or projects are assigned a "pass" or "fail" status based on objective standards. The student response data are then compiled to determine the percent of students that achieved passing scores for each Course Objective.

(Geology, continued)

Course Objectives Evaluation:

If the percentage of "pass" scores is sufficiently high (75% or greater), no action is needed. If the percentage of "pass" scores is less than 75% for two consecutive semesters, action will be taken in the form of a curriculum adjustment.

Table A-9

Evaluation of Student Performance for Geology Learning Outcomes *Percent of Students Passing Assessment and Corresponding Action*		
Meet passing requirement (≥75% by class)	Intermediate (65%-75% by class)	Less than passing requirement (<65% by class)
No action needed	Action taken after two consecutive semesters	Immediate action taken

Student Learning Outcome Evaluation:

If at least one course for a given Student Learning Outcome needs no action (the mean percentage of "pass" scores is at or above 75% for at least one course), the Geology program declares that our students have achieved this SLO. If no course meets the "pass" requirement for any given SLO, immediate action will commence in the form of curriculum adjustment.

The Role of Key Stakeholders

Feedback from graduates and colleagues at other USHE institutions as well as feedback from graduate programs accepting SUU graduates in Geology are highly valued and influence program curriculum.

Physical Science Teacher Education

Curriculum matrix

The following table outlines how the Student Learning Outcomes are mapped to the courses in the Physical Science Teacher Education degree program. The shaded boxes indicate courses in which the outcomes are assessed.

Table A-10: Curriculum Map for Physical Science Ed

Shaded represent indicator courses for Student Learning Outcome assessment				
Teacher Education	Student Learning Outcomes			
Required Courses	A Geology Knowledge	B Integrative Learning	C Field and Lab Skills	D Communication Skills
CHEM 1220	X	X		
CHEM 1225	X	X	X	X
CHEM 2010	X	X	X	X
CHEM 2310	X	X		
CHEM 2315	X	X	X	X
CHEM 2320	X	X		
CHEM 2325	X	X	X	X
CHEM 3000	X	X	X	
CHEM 3005	X	X	X	
CHEM 3700	X	X	X	
GEOG 3220	X	X		
GEOG 3225	X	X	X	
GEO 1110	X			
GEO 1115	X	X	X	
GEO 1220	X			
GEO 1225	X	X	X	
GEO 3210	X			X
GEO 3215	X	X	X	X
PHYS 1040	X	X		
PHYS 1045	X	X	X	X
PHYS 2210	X	X		
PHYS 2215		X	X	X
PHYS 2220	X	X		

PHYS 2225		X	X	X
PHYS 3310	X	X		
PSCI 4900	X	X		X
PSCI 4980	X	X		X
GEO 3010	X			X
GEO 3015	X	X	X	X
Shaded represent indicator courses for Student Learning Outcome assessment				
Teacher Education	Student Learning Outcomes			
Required Courses	A Geology Knowledge	B Integrative Learning	C Field and Lab Skills	D Communication Skills
GEO 3170	X			X
GEO 3175	X	X	X	X
GEO 3410	X			X
GEO 3415	X	X	X	X
GEO 3510	X		X	X
GEO 3515	X	X	X	X
GEO 4000	X	X	X	X
GEO 4070	X	X	X	X
Core Coverage	37	31	22	23

The Assessment Procedure

Currently all of the course assessment for the Physical Science Teacher Education occurs via course assessment under the Chemistry and Geology programs as well as in other support courses (i.e. Physics). Refer to those programs for more information about individual course assessment. For each of the Student Learning Outcomes, it is considered satisfactory if at least one course per Student Learning Outcome per academic year (2 regular semesters + summer semester if applicable) passes assessment.

Assessment of Course Objectives

This is done within the programs that support this degree.

Assessment of Student Learning Outcomes

This is done in the same manner as Chemistry and Geology.

The Role of Key Stakeholders

Feedback from graduates and colleagues at other USHE institutions as well as feedback from graduate programs accepting SUU graduates in Physical Science Education have provided impetus for changes to program curriculum (as noted in Appendix IV).

Appendix IV Physical Science

(Chemistry)

Curriculum changes mandated by the university

The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. These requirements are composed of three courses: Univ 1010, 3925 and 4925. All chemistry majors are encouraged to carry out undergraduate research and disseminate their results. Undergraduate research is a major component of an experiential education.

Curriculum changes made based on assessment of SLOs

Each faculty member routinely makes content changes based on oral and or written assessment results. The Department is too early in the process to have formal assessment results from curriculum changes (but we will have results for several classes by the end of spring 2013).

Changes made because of input from key stakeholders

Added CHEM 4110 to ACS certified degrees in response to ACS on-site audit
Added CHEM 3005 to ACS certified degrees in response to advisory board and input from peer institutions
Added more biological chemistry examples to CHEM 2310 and 2320 in response input from ACS.
Extensive upgrade of CHEM 3610 in response to graduates, peer institutions, faculty and new hires.
Complete overhaul of CHEM 3615 in response to graduates, peer institutions, faculty and new hires.
Extensive upgrade of CHEM 3620 in response to graduates, peer institutions, faculty and new hires.
Complete overhaul of CHEM 3625 in response to graduates, peer institutions, faculty and new hires.

List assessment results following any curriculum changes

Overall scores from ACS and ETS exam results have seen gradual improvement in the past three years.

The Department is too early in the formal process to have assessment results from curriculum changes (but will have results for several classes by the end of spring 2013)

(Geology)

Curriculum changes mandated by the university

The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. These requirements are composed of three courses: Univ 1010, 3925 and 4925. All Geology majors are engaged in undergraduate research and the dissemination their results. Undergraduate research is a major component of an experiential education.

Curriculum changes made based on assessment of SLOs

Each faculty member routinely makes content changes based on oral and or written assessment results.

The Department is too early in the formal process to have assessment results from curriculum changes as assessed Geology courses are offered only once a year or every other year. To ensure progress toward assessing SLOs, the Department will add a pre- and post-test for the outcomes in GEO 1220 for the spring 2013 semester.

Changes made because of input from key stakeholders

The Geology program is experimenting with the implementation of an exit exam to track the progress of students toward our SLOs.

Assessment results following any curriculum changes

The Department is too early in the formal process to have assessment results from curriculum changes (but will have results for several classes by the end of spring 2013). No deficiencies were found from the first assessment period.

(Physical Science Teacher Education)

Curriculum changes mandated by the university

The Experiential Education (EDGE) requirements were recently added as GE requirements for all SUU students. These requirements are composed of three courses: Univ 1010, 3925 and 4925. All Physical Science Teacher Education majors are encouraged to carry out undergraduate research and disseminate their results. Undergraduate research is a major component of an experiential education.

Curriculum changes

Inasmuch as the Physical Science Teacher Education degree is created entirely from other programs (i.e. Chemistry, Geology, etc.), all changes made to this program will be listed under those programs, as will be any follow-up reporting.

Appendix IV

Closing the Assessment Loop

The Department of Nursing made significant changes in our pedagogy based upon assessment data (specifically NCLEX-RN pass rates). Our pass rates were (as noted above) in the 50 and 60% when the

first classes graduated and tested. In an effort to improve performance on the NCLEX (our summative evaluation of student learning) the following changes were made in the student learning experiences:

- We started using ATI (Assessment Technology Institute) for testing student knowledge and test performance for each content area as well as at the end of the program (the comprehensive predictor). Progression is tied to acceptable performance on the ATI. We began working with ATI fall of 2006, the semester after our first group tested (NCLEX-RN). We did not immediately see the success we had hoped from this implementation.
  As we met with the ATI representative on November 15, 2007, and explained the way we have implemented ATI in the program as well as our concern about the continued poor pass rate, he labeled our implementation 'aggressive'. He recommended that information from ATI psychometric specialists, suggests that perhaps we have been too aggressive in our use of the testing in demanding student performance which has possibly resulted in an inappropriate focus on the testing rather than NCLEX. Therefore, we decided that beginning spring 2008 ATI will be incorporated into the class grade to provide a more balanced perspective on ATI testing performance while helping to identify student needs.
- SUU Nursing faculty built in more basic content facts, delineate clear performance criteria, and incorporate testing into classroom activities and grading procedures.
- We believe the most significant and needed change in our program was requiring individual accountability for learning. All current faculty members are committed to teaching and basing grades on individual student performance in multiple ways including substantial testing.
- We also changed to a competitive admission beginning fall 2008. Several studies suggest that performances in prerequisite courses as well as GPAs' are strong indicators of NCLEX success.

In summary we made the following changes to improve NCLEX pass rates: More basic content in classes, clear delineation of expectations, use of ATI (which we established best practice for our program), grading based on individual performance including testing, individual accountability for learning, and competitive admission standards.
Because of the changes instituted above the NCLEX-RN pass rate is now at 100% for four of the last five graduating classes. We are pleased with the outcomes of these changes to our program.

Curriculum Changes due to Faculty and Student Input

Curriculum Changes made over the last 5 years include:

- Moving Theory and Research to Level 2 (second semester) and Health Promotion and Patient Teaching to Level 3 (third semester). This change did provide a better opportunity for students to become involved in and complete and undergraduate research project.
- Moving RN to BSN Research to Summer Semester to decrease student load fall semester and allow greater focus on research.

Changes Made in Response to External Stake Holders

Initially students in the SUU Nursing Program could not take the NCLEX-PN examination. Because of requests from an advisory board member we made the necessary adjustments and policies to allow students the opportunity to take the NCLEX-PN if desired. An average of 12 students per year takes the NCLEX-PN allowing them to work as a PN as they complete their BSN education.