

Life Science: Health Science 2015 Program Review

Section 1: Overview of the Program

The current Health Sciences program includes courses in Anatomy (Ant 31, Ant 32, AP34A, AP34B), Microbiology, and Physiology which are core subject areas for the all the major health care fields. While these courses clearly meet the needs of our diverse student community, it also provides a comprehensive lower division curriculum for science majors seeking to transfer to a four-year university. Further, they also permit the student to pursue and acquire a degree in General Science, Biology, Kinesiology, Medical Laboratory Technician, Pre-Dentistry, Pre-Medicine, Pre-Nursing, Pre-Optometry, or Pre-Pharmacy.

We currently have an excellent and well-qualified faculty that are more than competent to teach our Health Sciences program. They maintain rigorous academic standards whilst providing additional academic support for students in the form of tutoring, and open-labs. In addition, the life science classrooms are equipped with internet access either at multiple sites throughout the classroom or via the faculty access port. Additional upgrades include a series of new lap tops for NATS 123 together with new BioPacs and their software.

Both the faculty and students of the Health Sciences program are involved in a wide array of campus activities such as Science clubs, STEM activities, and the Onizuka Space Science Day which reaches out to the surrounding community and feeder schools. These extra-curricular activities foster a positive campus climate.

The first mission of the program is to meet the educational needs of our diverse community with direct transfers to four-year universities, AA or AS degrees, and an opportunity to master basic skills and provide a cultural enrichment. With a solid educational foundation are students will be able to develop a pattern of life-long learning which will enhance their career opportunities, and economic status.

Another mission of the program is to provide the student with a positive experience and ensure student success where possible. This is done by offering a comprehensive set of educational opportunities whilst maintaining optimal academic standards and ensuring the availability of academic or student support services. Additional support is afforded by providing the appropriated technological infrastructure combined with the fostering of external business, hospital and community partnerships.

Concurrent with this would be to promote prudent fiscal policies at the college level as well as provide additional opportunities for professional staff development. Clearly, to continue with these objectives we need to maintain, replace and expand the current facilities and staffing as is outlined in the appropriate sections of this review.

Offered degrees/certificates

As has already been stated in the overview, our program permits the student to earn an A.S. degree in General Science, Biology, Medical Laboratory Technician, Pre-Dentistry, Pre-Medicine, Pre-Nursing, Pre-Optometry, or Pre-Pharmacy. Further, the majority of our students depend heavily on our core program courses to obtain a degree in Nursing, Radiologic Technology, Physical Therapy, or Respiratory Care.

State of recommendations from the prior Program Review

Over the past four years we have been able to meet the following recommendations for the Health Professions Program.

1. The obtaining of an additional cadaver:
In the fall of 2014 a male cadaver was obtained to complement the current female cadaver that we currently acquired back in February 2001. As before, this cadaver was obtained from the UCI Willard Body Program.
2. Hire a full-time Microbiology instructor:
In the spring of 2014, we were fortunate enough to have successfully hired an excellent, highly qualified microbiology instructor. This was to replace faculty member Less Scharlin.
3. Development of student learning outcomes and assessment instruments for the allied health program:
There are three SLOs for each of the five courses offered in the health sciences program and three program SLO's. According to the four-year assessment plan, one SLO per course per year will be assessed. The assessment will be conducted via lab exercises, quizzes, or exams.
4. Give priority to lab expenditures, like equipment, technology, and consumables so as to maximize student hands-on experiences:
Our block grant funding list has been prioritized for the necessary additional replacement units, new equipment, new technologies, and consumables.
5. More library purchases of science books and journal subscriptions:
In this situation, we are fortunate to have support from STEM grants which have contributed funds necessary for these additional acquisitions.

Over the past four years, we have been able to partially meet the following recommendations for the Health Professions Program.

1. Increase the number of sections, faculty, and classrooms for the health science courses:
It is no longer possible to add additional sections because the lack of additional facilities, classrooms, and equipment make such a move impossible at the present time. This prevents any further increase in course offerings.
2. Provide additional monetary funds for tutoring and open labs:
Tutoring funds for both anatomy and physiology are provided through the learning resource center or through the instructor funds which would normally be used for graders or student lab aides. These funds are usually used to fund Open Labs.
These funds are extremely limited and fail to adequately fund the open labs. In addition, these limited funds make it very difficult to acquire qualified tutors.
3. Block grant applications for equipment and software:
Each year the department is permitted a percentage of the block grant funds which may be used to help upgrade, replace or acquire needed equipment or software. Through these grants, we have managed to update our old lab tops together with upgraded BioPac machines and their new software. Further, we have replaced the microscopes in the two Anatomy classrooms. At present, no new grants have been established or applied for.
4. Set up regular meetings with the nursing faculty:
Our attempt to meet regularly with the Nursing faculty has not met with much success. Unfortunately scheduling has made such meetings difficult if not impossible.

Over the past four years many of our additional recommendations have not met. This can be attributed to lack of district approval and lack of funds.

1. Construction of additional laboratory classrooms including the conversion of the basement level of the Natural Science building into additional labs and classrooms:
As already stated, our division has reached maximum capacity in terms of physical space, thereby making any increase in course offerings extremely difficult, if not impossible. Any additional growth will require the provision of additional classrooms, staff, and equipment.
2. Facility improvements, especially in terms of better ventilation, temperature control, functioning clocks, and so forth:
The Life Science building lacks adequate ventilation with potentially toxic fumes following each dissection lab.
3. Hire additional classified staff for weekend sections:
As already stated, we have no additional space for new sections except on the weekends. In order to achieve this, additional funding would have to be provided by the district. Unfortunately, current budget restrictions preclude this possibility.
4. Equip the labs so that virtual dissections may either augment or possibly replace the use of preserved specimens:
Providing an adequate number of computer stations in each classroom is not currently feasible due to funding limitations. In a similar way, the tight budget has forced the utilization of used dissection specimen which helps to a limited degree. We are also very fortunate in that we have managed to acquire and additional cadaver (a male) which may eventually help change the focus of lab dissections.
5. Computer tutorial open labs and tutorial software:
Clearly the use of computer labs to help tutor the students would help improve student comprehension and better prepare them for tests, physical dissections, and eventually a career in the working world. Again additional software and staffing would be needed but are unavailable without additional funding.

Section 2: Analysis of Institutional Research Data

a) Course grade distribution; success and retention rates

Course grade distribution: Retention Rates for School Years 2010-11 to 2013-14

| Course | 2010 | 2011 | 2012 | 2013 | Overall / course |
|------------------|-------|-------|-------|-------|------------------|
| Anatomy 30 | 57.2% | 47.1% | 56.7% | 58.9% | 55% |
| Anatomy 32 | 57.8% | 56.7% | 63% | 66.1% | 61% |
| Anatomy 34A | 60.8% | 76.1% | 78.2% | 72.1% | 72% |
| Anatomy 34B | 83.9% | 96.3% | 94.7% | 89.2% | 91% |
| Microbiology 33 | 74.6% | 79.9% | 69.2% | 79.3% | 76% |
| Physiology 31 | 65.4% | 72.4% | 76.6% | 82.3% | 74% |
| Overall / Year : | 67% | 72% | 73% | 75% | |

The overall average retention rates (see table above) in the Health Science classes encompassing the school years Fall 2010 to Spring 2013 are as follows: Anatomy 30 = 55%, Anatomy 32 = 61%, Anatomy 34A = 72, Anatomy 34B = 91%, Microbiology 33 = 76% and Physiology 31 = 74%. Relatively low retention rates in Anatomy 30 and 32 again reflect the fact that many of the students are often under-prepared for the rigorous nature of these classes while students in microbiology and physiology reflect a much higher retention rate due to their successful completion of the required prerequisites.

1. Given the data, what trends are observed?

Retention rates in the Health Sciences program as a whole showed a steady increase over the four year period (see table above), from retention rates of 67% in Fall, 2010 to 75% in Fall, 2013. These rates although reflecting a significant increase were still consistently less than the retention rates of the college as a whole. There are several possible reasons starting with the technical and mathematical nature of science courses which make them comparatively more difficult to master. Another reason could be the absence of Credit/No Credit courses in the Health Sciences program and the Natural Science Division, compared to the multitude of such courses in other programs of the college. If retention rates for the college do not include credit/no credit courses, the retention rates for the Health Sciences Program would be more comparable.

Course grade distribution: Success Rates for School Years 2010-11 to 2013-14

| Course | 2010 | 2011 | 2012 | 2013 | Overall / Course |
|-----------------|------|------|------|------|------------------|
| Anatomy 30 | 46.9 | 37.3 | 51.4 | 45.6 | 45.3% |
| Anatomy 32 | 46.1 | 45.1 | 56.9 | 50.3 | 50% |
| Anatomy 34A | 52.7 | 59.3 | 54.6 | 53.8 | 55% |
| Anatomy 34B | 77.4 | 92.6 | 84.2 | 69.2 | 81% |
| Microbiology 33 | 69.9 | 76.0 | 61.5 | 72.4 | 70% |
| Physiology 31 | 53.1 | 56.9 | 65.2 | 73 | 62% |
| Overall / Year | 58% | 61% | 62% | 61% | |

The overall average success rates (see table above) in the Health Science classes encompassing the school years 2010-11 to 2013-14 are as follows: Anatomy 30 = 45.3%, Anatomy 32 = 50%, Anatomy 34A = 55%, Anatomy 34B = 81%, Microbiology 33 = 70% and Physiology 31 = 62%. Relatively low success rates in Anatomy 30 and 32 reflect the fact that these courses are entry level courses with few, if any pre-requisites. The students are often underprepared for the rigorous nature of the classes. Better student preparation via completion of prerequisites leads to higher success rates as reflected in the Anatomy 34B, Physiology and Microbiology classes.

1. Given the data, what trends are observed?

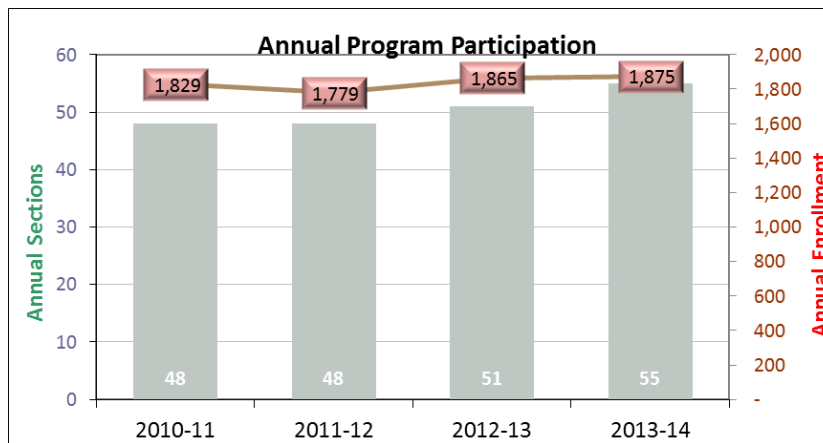
Success rates in the Health Science program as a whole showed a slight increase over the four year school period (see table above), from success rates of 58% in 2010 to 61% in 2013. These rates although reflecting an increase were still less than the success rates of the college as a whole. There are several possible reasons starting with the technical and mathematical nature of science courses which make them comparatively more difficult to master. Another reason could be the absence of Credit/No Credit courses in the Health Sciences program and the Natural Science division, compared to the multitude of such courses in other programs of the College. If retention rates for the college do not include credit/no credit courses, the retention rates for the Health Sciences Program would compare better.

b) Enrollment statistics with section and seat counts and fill rates

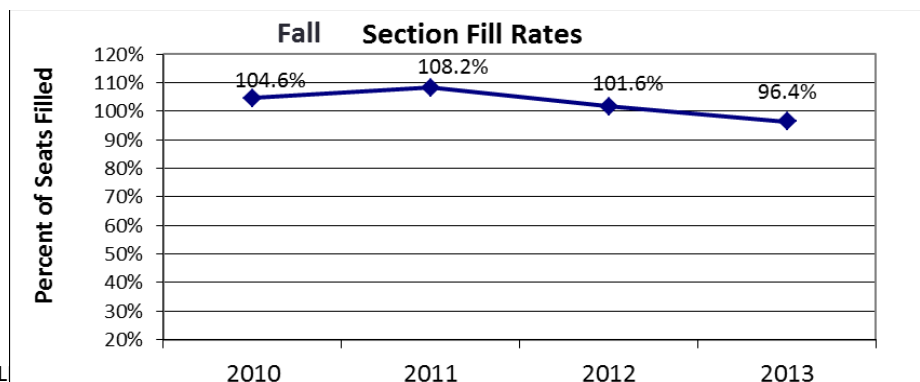
Enrollment statistics: section and seat counts and fill rates for school years 2010-11 to 2013-2014

| | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 4 Yr Average |
|-------------------|---------|---------|---------|---------|--------------|
| Sections | 48 | 48 | 51 | 55 | 50.5 |
| Annual Seat Count | 1829 | 1779 | 1865 | 1875 | 1837 |

The annual seat count for the Life Science program was 1,829 in 2010-11 school year to 1,875 in 2013-14 school year, with a 4 year average of 1,837 (see table above). The course section fill rates have consistently been over 100%. Despite high fill rates the program is not in growth mode (see chart below).



The annual fill rate for the Health Science courses was consistently over 100% until the 2013-14 school year (see chart below). The fill rate of over 100% was an adjustment made by the faculty to minimize student inconvenience. To address high student demand with restricted number of course sections offered instructors allow more students to enroll than the maximum number of seats. This, in turn, is a reflection of the number of students that desire these courses combined with the lack of sections that were offered from 2010 to 2012. Sections were added once the economy improved but because the overall enrollment rate has dropped there were fewer students per class section in the 2013-14 school year.



2. What adjustments are indicated?

Prior to the 2013-14 school year the consistent fill rate of over 100% for the Health Science courses, Anatomy, Physiology, and Microbiology, was an adjustment made by the faculty to minimize student inconvenience caused by high student demand versus the restricted number of course sections offered. More sections were added for the 2013-14 school year that helped to address this issue and now there are 55 sections with an average of 34 students per sections.

c) Scheduling of courses (day vs night, days offered, and sequence):

Instructions: Complete the chart below. Indicate the time when sections of courses in the program are currently scheduled to start. Analyze the data provided by Institutional Research on student satisfaction with scheduling in the program and answer the questions

Enrollment by Time of Day

| Fall Term | 2010 | 2011 | 2012 | 2013 |
|-----------------|-------|-------|-------|-------|
| Day | 75.9% | 75.7% | 73.6% | 71.3% |
| Night | 21.3% | 21.1% | 23.4% | 26.9% |
| Weekend/Unknown | 2.8% | 3.2% | 3.1% | 1.8% |

1. What (if anything) is indicated by the student satisfaction with scheduling?
 - All sections were filled over capacity therefore students seem to be satisfied with the scheduling of classes.
2. Are there time periods of high student demand which are not being addressed? X Yes No
How could such demands be addressed?
 - Microbiology 33, and Physiology 31 could be offered in the afternoon and early evening.
3. Should a recommendation be written addressing this area? X Yes No (If yes, list.)
 - Additional classified staff should be hired to provide support services to the additional sections that need to be added in the afternoon and evenings.

Provide and analyze the additional data compiled by Institutional Research:

At the request of the Life Science faculty several studies were performed by Institutional Research comparing the success rates for Life Sciences students* by feeder high schools as follows:

| High School | Success Rates |
|-----------------------|---------------|
| El Segundo | 70.6% |
| Gardena | 18.8% |
| Hawthorne | 52.0% |
| Lawndale | 27.3% |
| Leuzinger | 42.9% |
| Mira Costa | 53.6% |
| Narbonne | 54.1% |
| North | 44.4% |
| Palos Verde Peninsula | 42.1% |
| Redondo | 58.1% |
| South | 73.3% |
| Torrance | 65.4% |
| West | 68.7% |

*Students who took the following courses between Fall 2010 -Spring 2014:

Human Anatomy 32
Human Physiology 31
Microbiology 33
Human Anatomy & Physiology 34A
Human Anatomy & Physiology 34B

The table above illustrates the outcome disparity of students successfully passing the Life Science courses depending upon the feeder high school attended. For instance, the success rate of students who attended El Segundo had a passing rate of 70% compared to students coming from Gardena with a passing rate of only 18.8%. This difference could possibly be addressed by reaching out to students coming from high schools that reflect low success rates. Interventions could include offering workshops in the life sciences for underprepared students prior to course enrollment in the life sciences.

Recommendation for future implementation:

Currently we have a part-time faculty member who teaches full-time at West high school. Currently she teaches Biology 10. We can collaborate with her to recruit students for dual enrollment in Anatomy 30 or 32.

Alternatively, we can look at the high school with the highest success rate and set up a collaboration with their science department to see if students can enroll in Anatomy 30 while still in high school to meet a dual enrollment.

To analyze data:

Currently there is no data on dual enrollment available to analyze. We can stipulate to institutional research to collect data on dual enrollment if there is any. However, it will not be completed before the program review write up is due.

Section 3: Curriculum

- a) Provide the curriculum course review timeline to ensure all courses are reviewed at least once every 6 years.
- This semester (Spring 2015), the Allied Health Program consists of 6 courses with a total of 26 sections: Anatomy 30 (3sections), Anatomy 32 (9 sections), Anatomy and Physiology 34A (3 sections), Anatomy and Physiology 34B (2 sections), Physiology 31 (5 sections), and Microbiology 33 (4 sections).

Concerning the scheduling of Course Review:

| Course | Last Review | Next Review |
|-----------------|-------------|-------------|
| Anatomy 30 | Fall 2014 | Fall 2020 |
| Anatomy 32 | Fall 2009 | Fall 2015 |
| Anatomy 34A | Fall 2012 | Fall 2018 |
| Anatomy 34B | Fall 2012 | Fall 2018 |
| Physiology 31 | Fall 2012 | Fall 2018 |
| Microbiology 33 | Fall 2014 | Fall 2020 |

- b) Explain any course additions to the current course offerings.
- Since the last program review, no new course has been developed. In addition to the first cadaver receive in 2012, a second cadaver has been obtained in the Spring 2015.
- c) Explain any course deletions from the current course offerings.
- As of 2015, no course deletions have been made. For each semester, every section of the total 26 of the 6 Allied Health Courses has been full and large numbers of students have been turned way in many cases.

- d) Have all courses that are required for your program's degrees and certificates been offered during the last two years? If not, has the program established a course offering cycle?
- All of the courses required for Degrees and Certificates have been offered each semester for the last 2 years. They will continue to be offered each semester in the future semesters.
- e) Discuss any concerns regarding department/program's courses and their articulation.
- Concerning articulation, there have been no problems with any of the course offerings. In fact, students transferring to profession schools have been extremely well prepared. Pre-Nursing students have also transferred to many different programs across the U.S. and have not encountered any problems with course preparation. Pre-Radiology Technology and Pre-Respiratory Care students have no problems transitioning into their appropriate programs.
- f) Discuss the degrees, certificates, and licensure exams (when applicable). If few students receive degrees or certificates or if few students pass the licensure exam, should the program's criteria or courses be re-examined?
- Currently, there are no individual degrees or certificates offered for just the Health Science Program specifically, but the program personnel are continuing to discuss future offering and awarding the "Pre-Health" A.S. Degree.
- g) List related recommendations (when applicable).
- The department is still considering and recommending one possible new course in the future. However, a proposed timeline is not in place and will be created when the budget situation improves and funding can be available to pay for the faculty teaching the course and compensation outside the classroom for instructors dissecting the cadaver.

A 1 unit Laboratory course for Anatomy and Physiology to enhance the basic skills while studying Anatomy for students enrolled in the formal Anatomy and Physiology courses. This course will enhance and vastly improve the students' motivation and interest to lead to a greater success, retention, and efficacy in the formal Anatomy and Physiology course offerings.

Section 4: Student Learning Outcomes for the Allied Health Program, Life Science Department

I. Program and Course Level SLOs

A. Anatomy 30

1. Students will be able to use language appropriate to anatomy & physiology and the health sciences.
2. Students will be able to identify higher vertebrate body structures, and explain functions of all body systems.
3. Students will demonstrate the use of instruments for dissection, histology, and to gather data.

B. Anatomy 32

1. Students will be able to use language appropriate to anatomy and the health sciences.
2. Students will be able to identify higher vertebrate body structures of all body systems.
3. Students will demonstrate the use of instruments for dissection, histology, and to gather data.

C. Anatomy & Physiology 34A

1. Students will be able to use language appropriate to anatomy & physiology, & the health sciences.
2. Students will be able to identify structures of the integumentary, skeletal, muscular, and nervous systems, in addition to explaining the functions of the systems.
3. Students will demonstrate the use of instruments for dissection, histology, and to gather data.

D. Anatomy & Physiology 34B

1. Students will be able to use language appropriate to anatomy and physiology, and the health sciences.
2. Students will be able to identify structures of the nervous, endocrine, circulatory, respiratory, digestive, urinary, and reproductive systems, in addition to explaining the functions of the systems.
3. Students will demonstrate the use of instruments for dissection, histology, and to gather data.

E. Physiology 31

1. Students will be able to use language appropriate to physiological functions and the health sciences.
2. Students will be able to describe mechanisms and explain physiological processes that occur in the human body on cellular, organ, systemic, and organismal levels.
3. Students will demonstrate the use of instruments to gather physiological data.

F. Microbiology

1. Students will be able to use language appropriate to microbiological studies and the health sciences.
2. Students will demonstrate the use of instruments to gather data.
3. Student will be able to identify microbes and explain their roles in health and disease.

G. Allied Health Program

1. Students will be able to use language appropriate to the health sciences.
2. Students will demonstrate the use of instruments for dissection, histology, and to gather data.
3. Students will be able to apply concepts learned to healthy and pathological outcomes.

II. SLO and Assessment Timeline: Four-Year Cycle

SLO and Assessment Timeline: Four-Year Cycle

| | |
|--------------|-------------------------------------|
| Program Name | Allied Health Program, Life Science |
|--------------|-------------------------------------|

SLO Assessment Timeline: Create Your 4-Year Assessment Plan

Directions: Starting in academic year 2016-2019, SLOs will be assessed over a four-year cycle at ECC. Because program review will start occurring in calendar years (i.e. Spring to Fall semester), the grid below is organized by calendar year rather than academic year. Plan out your program's assessments so that all SLOs (both course- and program-level) are assessed at least once every four years.

| Calendar Year | Semester | Course-Level SLOs Assessed | Program-Level SLOs Assessed |
|---|------------------|--|--|
| Year 1 of 4-Year SLO Cycle (3 years before Program Review) | Spring Year 1 | Health science language SLO (All sections) 2016 | Health science language SLO (All sections) 2016 |
| | Fall Year 1 | | |
| Year 2 of 4-Year SLO Cycle (2 years before Program Review) | Spring Year 2 | Use of Scientific Instruments SLO (All sections) 2017 | Use of Scientific Instruments SLO (All sections) 2017 |
| | Fall Year 2 | | |
| Year 3 of 4-Year SLO Cycle (1 year before Program Review) | Spring Year 3 | Anatomical structures and physiology explanations SLO (All sections) 2018 | Anatomical structures and physiology explanations SLO (All sections) 2018 |
| | Fall Year 3 | | |
| Year 4 of 4-Year SLO Cycle (Year of Program Review) | Spring Year 4 | Program Review 2019 | |
| | Fall Year 4 | | |

**Note: Indicate which SLOs will be assessed in the timeline by indicating the number or title of the SLO.*

III. Assessment Results and Recommended/Implemented Changes

A. Assessment Results for Health Science Language SLO

1. The Health Science Language SLO was assessed in spring 2012 by all Allied Health Science sections by the incorporation of questions related to the topic into exam questions.
2. Success was determined by the number of students who answered the questions correctly. For this student population, if 75% or more students answer the question correctly, that indicates that this topic was conveyed in an understandable manner. If between 65%-75% of students answered the question correctly, some modification might be necessary in the presentation of the material or the wording of the question. If less than 65% answered the question correctly, the question might be poorly worded or the topic wasn't presented adequately.
3. Assessment results: Analysis of the data revealed the following. Question #1, which was a definition question about cytology, had the highest percentage of correct answers, with all range of scores from 72.3% for Anatomy 30 students to 88% for Microbiology 33 students. Question #2, which asked for the best description of cell death, had the lowest overall percentage of correct answers, with a range of 41.3% for Anatomy 32 students to 73% for Microbiology 33 students. Question #3, about osmosis, was in the intermediate range in terms of the percentage of correct answers, with a range of 64% for Anatomy 32 students to 78.5% for Microbiology 33 students. The relatively high scores in Microbiology 33 and Anatomy & Physiology 34A and 34B may reflect the fact that these are higher level courses in which students are required to pass prerequisites, such as Chemistry, before enrolling in the classes. However, the somewhat lower scores in Physiology 31 are a bit puzzling because it also requires prerequisites of Anatomy and Chemistry to enroll. The Anatomy 30 and Anatomy 32 courses do not require prerequisites for enrollment.

B. Assessment Results for Use of Scientific Instruments SLO

1. Use of scientific instruments was assessed in spring 2013 by all Allied Health courses by having students demonstrate their abilities to view and identify objects on slides with compound microscopes.
2. Students were assessed via a rubric that rated their abilities to use the microscope on a scale of 1-4, with 1 being an inability to use the microscope, to 4 which indicated proficient microscope use.
3. Assessment Results: Analysis of the data revealed that the majority of students in the Allied Health classes scored level 4 in microscope proficiency. Physiology 31 students had the greatest proficiency in microscope use (97%), followed by the students in Anatomy 32 (77.2%) and Anatomy & Physiology 34B (74.2%) and 34A (65.4%), Microbiology 33 (50.4%), and Anatomy 30 (36%), respectively. Anatomy 30 had fewer students who achieved 4s in microscope use, but their combined percentage of 3s and 4s was 72%. A couple of reasons could explain the lower scores in the Anatomy 30 classes. First, the Anatomy 30 course is an entry level course with no prerequisites, therefore the students are less prepared for the rigorous nature of a science course. Second, although the microscopes were standardized in room LS-113, the microscopes in LS-109 were still a hodge-podge of several different microscope types, which makes instruction about how to properly use a microscope more difficult.

C. Assessment Results for Anatomical Structures and Physiology Explanations SLO

1. The Anatomical Structures and Physiology Explanations SLO was assessed by all Allied Health courses in spring 2014 via the incorporation of questions related to these topics into exams.
2. Students were assessed via a rubric that rated their understanding of the questions on a scale of 1-3, with 1 indicating a minimum level of understanding & 3 indicating proficiency in the topics.
3. Assessment results: Analysis of the data revealed that the average percent of students in the Allied Health Program who answered two or more questions correctly was about 64%, which did not quite meet the rubric target of 65% of students. However, some courses in the Program met or exceeded the target, whereas other courses fell short of the target. Courses that met or exceeded the target included Anatomy 32, with 89.7% of students meeting the target, Physiology 31, with 71.1% of students who met the target, and Microbiology 33, with 72.5% of students on target. Courses that did not meet the target included Anatomy 30, with 42.9% of student who met the target, followed by Anatomy & Physiology 34B, with 45.7% of students on target, and Anatomy and Physiology 34A, with 62.3% of students meeting the target. One reason that Anatomy 30 had the lowest percentage of students who met the target may be due to the fact that Anatomy 30 is an entry level course that has no prerequisites to enter the course, and thus receives students who are not adequately prepared for the amount of study required to succeed in such a rigorous course. However, Anatomy 32, which is a higher level entry course than Anatomy 30, had the greatest percentage of students who achieved the target level. An examination of the methods whereby the questions' topics are taught in Anatomy 32 compared to those used in Anatomy 30 could help to improve the scores in Anatomy 30. Anatomy & Physiology 34A, which is another entry level course, does have a Chemistry prerequisite, which is also a rigorous science course, which could be one reason that the students in the course were closer to meeting the target level of 65%. The question topics are part of the curriculum material in the Anatomy & Physiology 34A course, but are peripherally related to Anatomy & Physiology 34B course material. The fact that some students do not take the 34B course immediately after taking the 34A course might could be one reason for the relatively low percentage of students who met the target level in the 34B course. The data indicates that some of the 34B students do not seem to be able to recall and apply the information they learned in 34A to the 34B subject matter. The students in Physiology 31 exceeded the target level, which is possibly because Anatomy 32 is a prerequisite to Physiology 31. Microbiology students also exceeded the target level, which could be partly due to the fact that the students in the course have already been exposed to the subject matter in the prerequisite courses of Anatomy 32 or Anatomy & Physiology 34A.

D. Recommended/Implemented Changes

1. Based on the SLO data, we modified the assessments to more clearly identify student misconceptions and reduce possibly confusing wording. In addition, the SLO assessment data shows that students could improve on their understanding of health science concepts such as necrosis, and that additional tutoring would improve outcomes. We would like the college to provide more qualified tutors to help improve student outcomes. Discussion among faculty members resulted in the decision that in the 2016 assessment cycle for the Health Science Language SLO, the wording of question #2, regarding the best term to describe cell death, will be changed so that it is less ambiguous. Because the percentage of correct answers to question #3 (terminology related to the movement of water across cell membranes) were on the border of an acceptable understanding of the term osmosis, some modification may also be necessary to ensure that students understand the topic.
2. The recommended change to improve the Use of Instruments SLO by upgrading the microscopes was partially implemented initially due to lack of funds to purchase more microscopes. However, new microscopes have now been purchased for the Anatomy and Physiology classes in rooms LS-109 and LS-113, and are now in use. These new microscopes have allowed the faculty to standardize instruction about how to use the microscope. These microscopes also included the 4x scanning objective lens that was requested, which allows students to find objects on slides more easily, and to see a greater overview of the object on the slide, which is beneficial to their learning how to use a microscope. New microscopes are still needed in room NATS-123.

3. The following changes were recommended by faculty members to improve the Anatomical Structures and Physiology Explanation SLOs. It was decided that we would reword the answers to questions 1 and 2. For question 1, letter B, we will add the word “shrink” in parentheses after crenate, because some of our courses don’t use the word crenate. For question 2, we are going to change the letter C answer from “peroxisomes” to “ribosomes.” Because both peroxisomes and lysosomes are degradative organelles, this change should minimize confusion about the correct answer. For question 3, no change was deemed necessary. Our faculty also shared techniques about how these topics are taught to determine more effective ways of helping students to learn and retain the material. One instructor, whose classes had a relatively high percentage of correct answers, said that she reviewed the question concepts with her students the day before she quizzed them on the information. Although most, if not all, of our faculty provide study guides to their students prior to exams, apparently an in-class review is also helpful.

IV. Allied Health Program’s level of SLO/assessment implementation: Awareness; Development; Proficiency; or Sustainable Continuous Quality Improvement

A. Awareness

1. Allied Health Program faculty members continue to discuss methods of assessing and implementing student learning outcomes.
2. The Program Level Outcomes and Student Learning Outcomes alignment grid is as follows:

NATURAL SCIENCES

Institutional (ILO), Program (PLO), and Course (SLO) Alignment

Program: **Life Science: Allied Health**

Number of Courses:
6

Date Updated:
09.10.2014

Submitted by:
T. Jim Noyes, ext. 3356

| ILOs | 1. Critical Thinking | 2. Communication | 3. Community and Personal Development | 4. Information Literacy |
|------|---|--|--|--|
| | <i>Students apply critical, creative and analytical skills to identify and solve problems, analyze information, synthesize and evaluate ideas, and transform existing ideas into new forms.</i> | <i>Students effectively communicate with and respond to varied audiences in written, spoken or signed, and artistic forms.</i> | <i>Students are productive and engaged members of society, demonstrating personal responsibility, and community and social awareness through their engagement in campus programs and services.</i> | <i>Students determine an information need and use various media and formats to develop a research strategy and locate, evaluate, document, and use information to accomplish a specific purpose. Students demonstrate an understanding of the legal, social, and ethical aspects related to information use.</i> |

SLO-PLO-ILO ALIGNMENT NOTES:

Mark boxes with an 'X' if: SLO/PLO is a major focus or an important part of the course/program; direct instruction or some direct instruction is provided; students are evaluated multiple times (and possibly in various ways) throughout the course or are evaluated on the concepts once or twice within the course.

DO NOT mark with an 'X' if: SLO/PLO is a minor focus of the course/program and some instruction is given in the area but students are not formally evaluated on the concepts; or if the SLO/PLO is minimally or not at all part of the course/program.

| PLOs | PLO to ILO Alignment (Mark with an X) | | | |
|---|--|---|---|---|
| | 1 | 2 | 3 | 4 |
| PLO #1 Language Students will be able to use language appropriate to anatomy and physiology and the health sciences. | | X | | |
| PLO #2 Instruments Students will demonstrate the use of instruments for dissection, histology, and to gather data. | X | | | |
| PLO #3 Structures Students will be able to identify higher vertebrate body structures, and explain the functions of body systems. | X | | | |

| SLOs | SLO to PLO Alignment (Mark with an X) | | | COURSE to ILO Alignment (Mark with an X) | | | |
|---|--|----|----|---|---|---|---|
| | P1 | P2 | P3 | 1 | 2 | 3 | 4 |
| ANAT 30 Essentials of Anatomy and Physiology: SLO #1 Language Students will be able to use language appropriate to anatomy and physiology and the health sciences. | X | | | X | X | | |
| ANAT 30 Essentials of Anatomy and Physiology: SLO #2 Instruments Students will demonstrate the use of instruments for dissection, histology, and to gather data. | | X | | | | | |
| ANAT 30 Essentials of Anatomy and Physiology: SLO #3 Structures Students will be able to identify higher vertebrate body structures, and explain the functions of body systems. | | | X | | | | |
| ANAT 32 General Human Anatomy: SLO #1 Language Students will be able to use language appropriate to anatomy and the health sciences. | X | | | X | X | | |
| ANAT 32 General Human Anatomy: SLO #2 Instruments Students will demonstrate the use of instruments for dissection, histology, and to gather data. | | X | | | | | |
| ANAT 32 General Human Anatomy: SLO #3 Structures Students will be able to identify higher vertebrate body structures of all body systems. | | | X | | | | |
| APHY 34A Anatomy and Physiology I: SLO #1 Language Students will be able to use language appropriate to anatomy and physiology, and the health sciences. | X | | | X | X | | |
| APHY 34A Anatomy and Physiology I: SLO #2 Instruments Students will demonstrate the use of instruments for dissection, histology, and to gather data. | | X | | | | | |
| APHY 34A Anatomy and Physiology I: SLO #3 Structures Students will be able to identify structures of the integumentary, skeletal, muscular, and nervous systems, in addition to explaining the functions of the systems. | | | X | | | | |
| APHY 34B Anatomy and Physiology II: SLO #1 Language Students will be able to use language appropriate to anatomy and physiology, and the health sciences. | X | | | X | X | | |
| APHY 34B Anatomy and Physiology II: SLO #2 Instruments Students will demonstrate the use of instruments for dissection, histology, and to gather data. | | X | | | | | |
| APHY 34B Anatomy and Physiology II: SLO #3 Structures Students will be able to identify structures of the nervous, endocrine, circulatory, respiratory, digestive, urinary, and reproductive systems, in addition to explaining the functions of the systems. | | | X | | | | |
| MICR 33 General Microbiology: SLO #1 Language Students will be able to use language appropriate to microbiological studies and the health sciences. | X | | | X | X | | |
| MICR 33 General Microbiology: SLO #2 Instruments Students will demonstrate the use of instruments to gather data. | | X | | | | | |
| MICR 33 General Microbiology: SLO #3 Microbes Student will be able to identify microbes and explain their roles in health and disease. | | | X | | | | |

| SLOs | SLO to PLO Alignment (Mark with an X) | | | COURSE to ILO Alignment (Mark with an X) | | | |
|--|--|----|----|---|---|---|---|
| | P1 | P2 | P3 | 1 | 2 | 3 | 4 |
| PHYO 31 Human Physiology: SLO #1 Language Students will be able to use language appropriate to physiological functions and the health | X | | | X | X | | |
| PHYO 31 Human Physiology: SLO #2 Instruments Students will demonstrate the use of instruments to gather physiological data. | | X | | | | | |
| PHYO 31 Human Physiology: SLO #3 Mechanisms Students will be able to describe mechanisms and explain physiological processes that occur in the human body on cellular, organ, systemic, and organismal levels. | | | X | | | | |

B. Development

1. Allied Health Program faculty members have established a time line for the implementation of student learning outcomes.
2. The appointment of a Natural Sciences Division SLO coordinator has been helpful in developing SLOs and establishing the time line for their implementation.

C. Proficiency

1. Student learning outcome assessment methods are in place for the Anatomy, Physiology, and Microbiology courses, as well as the Allied Health Program. From 2012-2014 we assessed 100% of our Course Level and Program Level Student Learning Outcomes.
2. Faculty members meet to discuss the results of SLO assessments, and changes suggested by those results are used to improve student learning.
3. Assessment results are being used for the improvement of pedagogy in the courses, and alignment with institution-wide practices.
4. Comprehensive SLO reports have been submitted and are being completed on a regular basis.
5. Course level and Program level SLOs are aligned with degree SLOs.
6. Students are made aware of the goals and purposes of the courses and Allied Health Program by the inclusion of these goals in course syllabi and discourse with instructors and counselors.

D. Sustainable Improvement

1. Student learning outcomes and assessment are ongoing, systematic, and used for continuous quality improvement.
2. Dialogue about student learning is ongoing, pervasive and robust.
3. Organizational structures to support student learning have been, and continue to be improved.
4. Student learning improvement is a top priority in this program.

V. Related Recommendations

Additional tutors for the Allied Health Science courses are needed in both the Learning Resources Center, as well as for open anatomy labs. The faculty have observed that student learning of the required material is improved when the students who are struggling attend tutoring sessions as well as open anatomy labs. Unfortunately, open anatomy labs were not available in the spring 2015 or the fall 2015 semesters due to the inability to find qualified work study students to facilitate the open labs. Additional efforts will be made to find qualified students. Further, although the Learning Resources Center does an admirable job recruiting qualified tutors for the Allied Health Science courses, the tutors' hours are often limited to the point that some students who wish to avail themselves of tutors are not able to do so due to the time limitations. It would be helpful if the Learning Resources Center, as well as the Natural Sciences Division could receive additional funding to hire more tutors.

Section 5: Analysis of Student Feedback

During the 2015 spring semester there were a total of 692 students enrolled in the Life Science Department. Of that number 119 students took an electronic department survey. This voluntary survey was delivered via ECC email. Students were alerted to it via emails and class announcements by instructors. Students answered questions based on how much they agreed with the statement using the following scale: **Strongly Agree = 5, Agree = 4, Neither Agree nor Disagree = 3, Disagree = 2, Strongly Disagree = 1.** Thus, a mean closest to 5 is the strongest value. This is the first year such type of survey has been assessed for our department.

Results

Student Support

The survey presented 6 questions for the student support section which evaluated instructors' performance. The mean range was 4.30 to 3.87. According to the results, students feel the strongest regarding program instructors' providing opportunities to actively participate (Mean 4.3) followed by being helpful when approached with academic concerns (Mean 4.23). The third and fourth areas of strength for instructors in our department are in helping students achieve academic goals (Mean 4.06) and valuing student contributions (Mean 4.02). With regard to office hours, students feel the hours offered are more adequate (Mean 3.90) than the instructor's availability during office hours (Mean 3.87). The lowest scoring section is in students feeling a sense of community in this program (Mean 3.80).

Curriculum

The survey presented 8 questions that focused on aspects of curriculum. The mean range was 4.20 to 3.27. According to the results, students feel the strongest regarding the program courses helping them meet academic goals (Mean 4.20). This is followed by finding resources in the library that help them succeed in the courses (Mean 3.98).

Our program offers many sections for each subject and that is reflected in the survey result, as students agree that they are able to register for the classes they need (Mean 3.91). We did not expect this question to rank as high since many students are turned away at the start of the semester. It is

worth noting that the total number of students enrolled in our program is much greater than 119 and those who were turned away (not enrolled) did not have an opportunity to participate in the survey.

The next area of strength is in the range of courses that our program offers (Mean 3.80) followed by adequate tutoring resources (3.77). This result was a surprise as during the 2015 spring semester open lab was not offered and students had to heavily rely on the Library's Learning Resource Center which was heavily impacted. The area that was assessed to be the weakest was the variety of extracurricular activities relating to this program. We do not have an Allied Resources club and the program promoted the most is a hospital volunteer opportunity through the Clinical Care Extender Program.

Facilities, Equipment & Technology

The survey presented 4 questions regarding facilities, equipment, and technology. The mean range was 4.28 to 2.54. According to the results, students feel the strongest regarding the condition of the classrooms used (Mean 4.28). The next area of strength is the classroom equipment available (Mean 3.89) followed by the computers used in the program (Mean 3.71). The lowest scoring area was the WiFi connectivity available in classrooms and labs (Mean 2.54).

Program Objectives

The survey asked only one question regarding course outcomes. Of the 119 students who took the survey 104 provided a positive answer. 39 students agreed and 65 students strongly agreed that they were aware of the course outcomes and what skills and knowledge they should acquire upon completion of the course. The mean for this question was 4.39

Implications

The strongest area of our program is its instructors. Our program is led by instructors who provide an education that includes active participation, values student contribution, and properly addresses students' academic concerns. Students in our program feel they are able to reach their goals because they receive appropriate academic preparation.

Students are able to find resources for academic support in the library and from professors. They are satisfied with the range of courses offered, the facilities in which they are held, the equipment used, and to some extent the technology offered. Overall students feel informed about the skill and knowledge they should gain at the end of the course. Our program has strong areas and some of its weak areas can be improved with better support from other departments such as Information Technology.

Recommendations

Instructors can implement techniques to increase the sense of community in our department. Our students work in lab groups of approximately 4 students. However, it seems that having lab groups is not enough to effectively provide a sense of community.

Our program needs to look into offering more extracurricular activities. The school offers a pre-med club, a science club, and a nursing club; yet students identified this as a weakness in the curriculum of our program.

With regard to Facilities, Equipment & Technology, there is a great need to improve the WiFi connectivity, as this area scored the lowest in the entire survey. The issues with connectivity interfere with instruction, labs, and other online resources needed in class.

Section 6: Facilities and Equipment

Describe and assess the existing program facilities and equipment.

The existing program facilities and equipment are currently adequate for the health sciences program but, as should be expected, we desire them to be exceptional. In addition, due to limited classroom availability, any growth in the program through the addition of sections may have limitations. Current facilities include 4 classrooms. Three of these rooms are dedicated to anatomy and/or physiology courses (LS 109, LS 113, and NATS 123) and one of these rooms is dedicated to microbiology (LS 130). These current rooms have adequate functionality; however storage space for models and equipment is at a premium. Consequently, NATS 123 could use additional cabinetry to aid with storage. Furthermore, the scheduling of additional sections of anatomy and/or physiology has become difficult with the current lab rooms that are available. This might temporarily be alleviated by moving any lectures out of the rooms and designating them strictly for labs, but eventually even this measure would fail to solve our course expansion problems. Thus, it would be apt to find, or create, appropriate classroom space that could be used for additional section in the future. Alternatively, LS 130, which is currently used specifically for microbiology, is highly functional and has time available for additional sections.

Within the last year we were fortunate enough to be able to update several models for the anatomy and/or physiology sections. This included the acquisition of 1 Somso Medical Torso, 12 Molecule Model Sets, 9 Disarticulated Skeletons (with carrying case), 4 DNA Models, 1 Skin Burn Model, 4 Liver and Gall Bladder Models, 1 Ovary Model, 3 Pancreas Models, 2 Villi Models, 3 Single Kidney Models, 6 Altay Deluxe Kidney Models, 3 Female Pelvis Models, 3 Male Pelvis Models, 3 Knee Models, 3 DG Brain Model, 1 Somso Arm Muscle, 2 Somso Half Pelvis Models, 3 DG Heart of America Models, and 1 Cell to Embryo Activity Model. Additionally, microbiology was also able to replace several microscope slide sets. These new items were added to the myriad of other equipment that is currently in use for these courses (see tables below).

Despite the addition of these new items, the normal wear that occurs with constant use of models, microscopes, slides and other equipment for all of these classrooms is tremendous, requiring constant replacement as the items fail from semester to semester.

Anatomy Model Inventory List

Muscular System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-----------------|-------|-------|---------|------------------------|
| Tiny Tim | 5 | 5 | 2 | 1N |
| Head & Shoulder | 2.5 | 2 | 1 | 1R 2N |
| Arm | 3 | 3 | 2 | 1N (<u>Acquired</u>) |
| Leg | 3 | 4 | 2 | 1N (<u>Acquired</u>) |

Integumentary System

| Model | LS109 | LS113 | NATS123 | Deficit |
|------------------|-------|-------|---------|------------------------|
| Skin Model | 3 | 3 | 3 | |
| Skin Burn | 1 | 1 | 0 | 1N (<u>Acquired</u>) |
| Older Skin Model | 2 | 0 | 1 | |

Cellular Models & Molecular Kits

N= new R=replacement

| Model | LS109 | LS113 | NATS123 | Deficit |
|--------------------|-----------------------------|-----------|---------|-------------------------|
| Molecular Kits | 8 kits to be shared between | | 18 | 12N (<u>Acquired</u>) |
| Cell Model- animal | 2 | 2 | 1 | 1N |
| Cell Model- Plant | 1 | 1 | 0 | |
| Paramecium | 1 | 1 | 0 | |
| Euglena | 1 | 1 | 0 | |
| DNA Model | 0 | 0 | 2 | 4N (<u>Acquired</u>) |
| Tissues Set | 1 | 1 | 1 | |
| Mitosis Animal | 1 | 1 (somso) | 0 | 1N |
| Mitosis- Plant | 1 | 1 | | |
| Meiosis Plaque | 1 | 1 | 1 | |
| Muscle Fiber | 1 | 1 | 1 | |
| RBC | 1 | 1 | 0 | 1N |
| WBC | 1 | 0 | 0 | 2N |

Skeletal System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-------------------------------|--------------|--------------|---------|------------------------|
| Bone Histology | 1 | 2 | 1 | |
| Disarticulated Skeleton | 18 | 18 | 0 | 9N (<u>Acquired</u>) |
| Articulated Skull- Real | 9 | 11 | 0 | |
| Articulated Skull- Plastic | 8 | 12 | 0 | |
| Disarticulated Skull | 7 | 12 | 0 | |
| Somso Beauchene Skull | 1 | 1 | 0 | 1N |
| Fetal Skull | 1 | 1 | 1 | |
| Demo Cart | 1 | 1 | 0.5 | |
| Sectioned Bone Box | 1 | 1 | 0 | 1N |
| 3-Vertebrae Stand | 1 | 1 | 0 | 1N |
| Knee Joint | 4 | 4 (1 broken) | 1 | 3N (<u>Acquired</u>) |
| Section Knee Joint | 2 | 2 | 0 | |
| Section Hip Joint | 2 | 2 | 0 | |
| Female Pelvis | 1 | 2 | 1 | 3N (<u>Acquired</u>) |
| Male Pelvis | 2 | 1 | 1 | 3N (<u>Acquired</u>) |
| Artic. Skele- no muscle marks | 1 (no skull) | 1 | 3 | 2R |
| Artic. Skele w muscle marks | 1 | 1 (broken) | 0 | 1 N 1R |
| Articulated Upper Limb | 2 | 0 | 1 | |
| Articulated Lower Limb | 2 | 0 | 1 | |
| Whale Vertebrae | 1 | 1 | 0 | |

Circulatory System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-----------------|---------------|---------------|--------------|------------------------|
| Small Heart- DG | 5 (+2 broken) | 4 (+3 broken) | 3(+2 broken) | |
| Large Heart | 1 | 2 | 2 | |
| CV Flat Man | 2 | 3 | 2 | 2N (<u>Acquired</u>) |
| Vascular Arm | 1 | 1 | 0 | 1N |

Broken hearts are in NATS stockroom waiting for Perfecto to fix them.

Nervous System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-----------------------------|---------------|--------------|---------|------------------------|
| Synapse | 1 | 1 | 1 | 3N |
| Neuron | 2 | 2 | 1 | 1N 2R |
| Ventricles | 3 (+1 broken) | 4(+1 broken) | 3 | |
| Baldwin Brain (in head) | 2 | 3 | 1 | 1N (<u>Acquired</u>) |
| Functional Brain (colorful) | 3 | 3 | 1 | |
| Brain (older) | 3 | 3 | 2 | |
| Cervical Spinal Cord | 3 | 3 | 1 | |
| DG Spinal Cord (wood) | 3 | 2 | 1 | |
| Spinal Cord (plastic) | 3 | 2 | 1 | |
| Sacrum on Stand | 1 | 1 | 0 | |
| Flat Nerve Guy | 2 | 3 | 1 | |
| Ear(DG- attached) | | 5 | 2 | |
| Ear (blue- detaches) | | 1 | 2 | |
| Cochlea | 1 | 2 | 1 | 1N |
| Large Eye | 3 | 3 | 2 | 1N |
| Small Eye | 3 | 3 | 2 | 1N |
| Purple Eye | 4 | 3 | 3 | |

Respiratory System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-----------------------------|-------|-------|--------------|---------|
| Flat Nose Model | 1 | 2 | 1 | |
| Lung (3B-white back) | 1 | 2 | 2 | |
| Lung (Clay Adams) | 1 | 1 | 0 | |
| Lung (AM100-no back) | 2 | 2 | 2 | |
| Large Larynx | 2 | 2 | 1(+1-broken) | 1R |
| Small Larynx | 3 | 3 | 3 | |
| ½ Head Model (sagittal cut) | 1 | 1 | 1 | |
| Glass Lung model | 1 | 1 | 1 | |

Urinary System

| Model | LS109 | LS113 | NATS123 | Deficit |
|--------------------------|-------|-------|---------|------------------------|
| Single Standing Kidney | 2 | 1 | 1(old) | 3N (<u>Acquired</u>) |
| Urinary Apparatus/system | 3 | 3 | 2 | |
| 3 part Kidney | 4 | 4 | 4 | |
| Nephron | 2 | 1 | 1 | 2N |

Digestive System

| Model | LS109 | LS113 | NATS123 | Deficit |
|-------------------------|--------------|------------|---------|------------------------|
| Large Tooth | 1 | 2 | 1 | |
| Jaw- DG no glands | 0 | 1 | 0 | |
| Jaw- DG w glands | 1 | 1 | 1 | 3N |
| Villi | 2 | 1 + mucosa | 1 | 2N (<u>Acquired</u>) |
| Liver (on plastic base) | 3 (all diff) | 2 | 1 | 4N (<u>Acquired</u>) |
| Liver (on wood stand) | 1 | 0 | 0 | |
| Pancreas | 2 | 2 | 2 | 3N (<u>Acquired</u>) |

Reproductive System

| Model | LS109 | LS113 | NATS123 | Deficit |
|---------------------|---------------------|-------|---------|------------------------|
| Ovary | 1 | 1 | 0 | 1N (<u>Acquired</u>) |
| Female Repro- Somso | 0 (missing) | 1 | 0 | 2N (<u>Acquired</u>) |
| Female Repro- 3B | 4 | 4 | 4 | |
| Male Repro- Somso | 4 (1 parts missing) | 4 | 2 | |
| Male Repro- 3B | 2 | 1 | 1 | |
| Embryo Development | 1 | 1 | 0 | 1N (<u>Acquired</u>) |
| 2 upright female | | 2 | | |

Torsos

| Model | LS109 | LS113 | NATS123 | Deficit |
|--------------------|-------|-------|---------|------------------------|
| DG- Torso (w skin) | 2 | 3 | 2 | |
| Nostrom 100 (dark) | | 2 | 0 | |
| Nostrom 200 (dark) | 2 | 1 | 1 | |
| Somso Medical | 0 | 1 | 0 | 1N (<u>Acquired</u>) |

One-of-a-Kind

| Model | Location | Purchase |
|--|----------|----------|
| 2- ½ old brains | NATS 123 | |
| Silicone Heart Replicas (2) | LS113 | |
| Medical Heart Models (2) | LS109 | |
| Medical Bladder (sectioned bladder on stand) | LS113 | 2N |
| Hepatic Disease | LS109 | 2N |
| Fetal Pig Display | LS109 | |
| Pregnancy/Fetal Development Series | NATS 123 | 2N |

Explain the immediate (1-2 years) needs related to the facilities and equipment. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

- 1.- The acquisition of alarm systems for the refrigerators containing the preserved specimens
 - a) Total Cost Estimate: \$10,000
 - b) Justification: As we have just had a major loss of two human cadavers because of refrigeration failures it is essential to prevent any further such losses in the future. It took us years to acquire the cadavers and they are an essential component of the Human Anatomy program. Without this security step, the quality of the entire program is at risk.
- 2.- Cabinetry for additional storage in NATS 123.
 - a) Total Cost Estimate: \$16,229
 - b) Justification: Storage space for models and equipment has become nonexistent in this room forcing models to be stored on countertops or on carts in the associated prep room. Addition of the cabinetry would allow us to recoup counter and teaching space in NATS 123.
- 3.- 6 x Ohaus Scout Pro Portable electric balances.
 - a) Total Cost Estimate: \$3,111
 - b) Justification: Needed to replace balances that have failed or are failing due to wear and tear. Needed for the proper measuring of chemicals and materials required for media and other preparations.
- 4.- 24 x Otoscope Sets; 4 Otoscope Set Disposable Spectulas 00 Pack of 200; 12 Ophthalmoscope Sets; 100 Percussion Hammers; 50 Two-Point Aesthesiometers; 3 Physician Scale with Height Rods; 30 High Intensity Penlights.
 - a) Total Cost Estimate: \$17,393
 - b) Justification: Needed to replace equipment that has failed due to wear and tear or to make available modern equipment that is required for teaching. Required to properly train students in the use, application, and interpretation of data obtained from the equipment.

- 5.- 3 x VWR Guard Rail carts, stainless steel.
 - a) Total Cost Estimate: \$6,434.
 - b) Justification: Needed to replace equipment that has failed due to wear and tear or to allow for the additional presentation of models and lab associated items. Used to move models, supplies, and materials to the various classrooms that involved in allied health.
- 6.- 1 x Somso Animal Mitosis Model Set; 3 Atlay Animal Meiosis Model Set.
 - a) Total Cost Estimate: \$2,585
 - b) Justification: Needed to replace equipment that has failed due to wear and tear. Required to properly teach students cell replication processes.
- 7.- 2 x VWR Mobile Demo Cart, resin top, wooden legs, (for audiometers); 4 Cart, Tuffy, 34"Lx24"Wx18"H, plastic resin (for ECG units).
 - a) Total Cost Estimate: \$2,926
 - b) Justification: Required to hold and move audiometers and ECG/EKG units.
- 8.- 6 x Bionet Cardio-7 ECG & SPM-300 Spirometer Combo Unit.
 - a) Total Cost Estimate: \$16,252
 - b) Justification: Needed to replace equipment that has failed due to wear and tear or to make available modern equipment that is required for teaching. Required to properly train students in the use, application, and interpretation of data obtained from the equipment.
- 9.- 3 x 2-Basket Glassware Carts
 - a) Total Cost Estimate: \$2,055
 - b) Justification: Needed to replace equipment that has failed due to wear and tear. Required to demonstrate dissected cats and for transporting student dissection cats.
- 10.- 3 x Lakeside 444 – Stainless Steel Utility Carts
 - a) Total Cost Estimate: \$1,224
 - b) Justification: Needed to replace equipment that has failed due to wear and tear. Needed as bone demonstration cart as well as transporting A&P materials for LS 109 and LS 113.
- 11.- 3 x Perimeter Vision Field Tester
 - a) Total Cost Estimate: \$10,000.00
 - b) Justification: Needed to replace equipment that has failed due to wear and tear or to make available modern equipment that is required for teaching. Required to properly train students in the use, application, and interpretation of data obtained from the equipment.

12.-80 x TFK4096 – United Scientific Tuning Fork 4096 Hz

- a) Total Cost Estimate: \$250.00
- b) Justification: Needed to replace equipment that has failed due to wear and tear or to make available modern equipment that is required for teaching. Required to properly train students in the use, application, and interpretation of data obtained from the equipment.

13.-6 x M3702CB-4 – Swift binocular compound microscope with 4xd, 10xd, 40xrd, 100xrd

- a) Total Cost Estimate: \$4,100.00
- b) Justification: Needed to replace equipment that has failed due to wear and tear or to make available modern equipment that is required for teaching. Required to properly train students in the use, application, and interpretation of data obtained from the equipment.

14.-1 x 55" Solid Door Reach-In Refrigerator

- a) Total Cost Estimate: \$6200
- b) Justification: Heavily used equipment is beginning to malfunction and needs to be replaced. The refrigerator is used to store instructor microbial cultures and student work.

15.-2 x General Purpose Water Baths

- a) Total Cost Estimate: \$3,224
- b) Justification: Heavily used equipment is beginning to malfunction and needs to be replaced. The water baths are used by the students to carry-out their laboratory work with microbes.

16.-10 x Hot Plates

- a) Total Cost Estimate: \$3,720
- b) Justification: Heavily used equipment is beginning to malfunction and needs to be replaced. Hot plates are used by the students to carry-out their laboratory work with microbes.

Total Cost Estimate (all items listed): \$103,703

The dollar amounts provided are based on current equipment and material pricing.

Explain the long-range (2-4+ years) needs related to the facilities and equipment. Provide a Total Cost Estimate for each need and explain how it will help the program better meet its goals.

- a) Additional Lab Space Usable for Anatomy and/or Physiology Courses. This would require 2 rooms minimum approximately 700 sqft each (20x35).
- b) Total Cost Estimate: \$ Unknown
- c) Justification: Needed to add additional sections of anatomy and/or physiology courses so that the student demand level for these courses can be met in the future. Program expansion will not be possible without additional space for these courses.

Section 7: Technology and Software

Describe and assess the adequacy and currency of technology and software used by the program.

The technology and software used in the health sciences classrooms is currently limited to the desktop computers and projectors that are used for presentation purposes. The desktop computers and their monitors have been recently updated and are sufficient for their current use. The software on the desktop computers is maintained and updated by the Information Technology Services department of the school. We currently do not require any unique software for any of the rooms that the programs classes are held in. Any special software or online program access is handled as part of the course materials on a class by class basis. These do not require any continuing licenses and have no cost to the school as they are provided by the publisher.

Explain the immediate (1-2 years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

We currently have no immediate technology and software needs for the Health Sciences, however we may want to begin to investigate if tutoring software exists that could cover the entire Health Sciences. Currently, finding tutors for some of the classes, such as microbiology, has been all but impossible.

All the current software we use on our classroom desktop computers is maintained and updated by the Information Technology Services department of the school. I believe this cost burden and the licensing is not covered by the Health Sciences program in the Natural Sciences department.

Explain the long-range (2-4+ years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

With the rate that technology is changing it may be useful in 2-4+ years to investigate the cost of integrating the classroom systems through the use of tablets. This technology, and any related software, could allow students to follow the projected materials on the tablet, react and respond to questions made by the instructor, have access to the instructor's class site materials, and have access to the internet for research and information purposes. Giving the students this capacity at their desks could greatly enhance lecture and lab activities, as well as helping with student engagement and information retention. Currently, equipping all the classrooms used by the health sciences courses would be cost prohibitive. However, technology costs can drop dramatically in 2-4 years, so this concept may be worth revisiting in the next program review.

Section 8: Staffing (Health Sciences)

2012 FTEF (full-time equivalent faculty): 7.683
2012 FTES (full-time equivalent student): 175.74
2012 FT/PT Ratio (full-time/part-time ratio): 4.25:1
 (21 sections: Full time faculty 80.95% / Adjunct faculty 19.05%)

2013 FTEF (full-time equivalent faculty): 9.950
2013 FTES (full-time equivalent student): 216.9
2013 FT/PT Ratio (full-time/part-time ratio): 3.40:1
 (22 sections: Full time faculty 77.27% / Adjunct faculty 22.72%)

2014 FTEF (full-time equivalent faculty): 10.37
2014 FTES (full-time equivalent student): 222.3
2014 FT/PT Ratio (full-time/part-time ratio): 4.75:1
 (23 sections: Full time faculty 82.6% / Adjunct faculty 17.4%)

a.) Describe the program's current staffing, including faculty, administration, and classified staff.

- The current Allied Health Science program's staffing needs appears to be sufficient. The classified staff includes three laboratory technicians, Christie Killduff, Linda Ohara, and Cynthia Hoover, which duties include preparation of all Anatomy, Physiology and Microbiology laboratory sections.
- In the fall 2012 semester, the FTEF (full-time equivalent faculty) was 7.683 which was lower than the fall 2013 semester 9.950. Most recently, the FTEF for the fall of 2014 had increased to 10.37, which is acceptable. The data for the FTEF indicates that with each consecutive year, one additional class section was offered to the students and taught by a full-time faculty.
- The full-time faculty to part-time faculty load ratios (FT/PT load ratios) was also sufficient, since the fall 2012 was 4.25:1, fall 2013 was 3.40:1 and fall 2014 was 4.75:1. The substantial increase of the FT/PT ratio demonstrated for fall 2014. This increase was due primarily to the hiring of a new full-time Microbiology instructor, Todd White, who replaced the retired Lester Scharlin.

- The Data for the FTES(full-time equivalent student), which was the highest for fall 2014, suggests that the demand for classes is increasing and additional class room space maybe needed. An informal survey was taken between faculty to determine the number of students that were turned away and not able to add, due to full enrollment of classes. The results indicate that a substantial number of anatomy students were turned away, indicating additional sections could be added in the future.

Faculty Status

| <u>Name</u> | <u>Reassigned time</u> <u>(how much in %)</u> | <u>Currently on</u> <u>leave</u> | <u>Retired in last</u> <u>3 years</u> | <u>FT hired last</u> <u>3 years</u> | <u>Anticipated to retire in</u> <u>next 3 years</u> |
|--------------------|--|-------------------------------------|--|--|--|
| Thuy Bui | | | | | |
| Jessica Padilla | | | | | |
| Lester Scharlin | | | X | | |
| Margaret Steinberg | | | | | |
| Michael Stupy | | | | | |
| SimonTrench | | | | | X |
| Ann Valle | | | | | |
| Todd White | | | | X | |

b) Explain and justify the program's staffing needs in the immediate (1-2 years) and long-term (2-4+ years).

Provide cost estimates and explain how the position will help the program better meet its goals.

- The faculty status data shown in the above table indicates that the loss of the full-time faculty microbiology position previously occupied by Lester Scharlin, has been filled with a new full-time faculty member, Todd White. This has helped maintain a high FT/PT faculty ratio and have a positive impact on the department.

- The data also indicates that Simon Trench, who teaches anatomy and physiology, will probably retire within the next three years. In the future, the hiring of a new anatomy and physiology full-time faculty member will be required to replace his full-time position to help maintain a high FT/PT ratio. The salary cost estimates would range between \$55,000 and \$70,000, depending on the academic degree of the applicants. There are no full-time positions open as of now, so little planning is being done.
- It is important to maintain a high FT/PT ratio in Life Sciences Allied Health Program, since it will significantly benefit the program and students. In past semesters, fall 2008 and fall 2009, low ratios of full-time to part-time faculty occurred. Extra part-time faculty were immediately required to replace the sudden loss of two full-time faculty positions. However during the last three years, the higher FT/PT ratio observed has had a positive impact to the program and greater benefit to our students. Full-time faculty are able to maintain regular office hours, interact more often with students and are more accessible to students needs on campus. Also, full-time faculty are more involved in department, division and campus wide responsibilities and activities, compared to part-time faculty.
- The data does not reflect in the possibility that within five years there may be at least two additional full-time faculty retirements. The program could again experience a low FT/PT ratio.

c) List any related recommendations.

The FTES data implies that adding additional sections, especially anatomy and physiology classes, would be a positive step to accommodate increased student demand.

- Finding additional classroom space would be a problem, since all of our rooms in both the Natural Science and Life Science buildings are utilized 100% for the maximum number of sections to be offered. One option to gain extra classroom space for additional anatomy and physiology sections, would be to utilize the lecture rooms located in the new STEM Center building. Sharing lecture rooms with the STEM Center would assist the Natural Science Department to expand and offer additional sections.
- The hiring of one additional full-time faculty member would be required to instruct the added sections of anatomy and physiology. An alternative would be to hire part-time instructors to teach the new sections.
- The hiring of an additional laboratory technician maybe required to cover the additional sections of anatomy and physiology. This may not be required, since the laboratory portion would be taught in the Natural Science building.
- Also, another possibility to increase classroom space would be to remodel the entire Life Science Building and add a second story. This would double the number of classes offered and double our teaching capacity. However, this option may not be possible due to budget constraints.
- It is also very important to continue and maintain a high FT/PT faculty load ratio, to benefit the students. As full-time faculty retire in the future, their positions should be immediately filled with new full-time faculty. Replacing retirement positions with full-time faculty and not part-time faculty, will help prevent a low FT/PT faculty load ratio from occurring.

Section 9: Direction and Vision

a) Describe relevant changes within the academic field/industry. How will these changes impact the program in the next four years?

- Our health science faculty is well aware of the need for the student to experience hands-on training and experience in the life/health sciences. Indeed, progress being made in presenting and utilizing technology as a tool to better illustrate or develop an academic concept or lab skill. Despite these gains, there are always new and better animations, computer programs, and lab equipment that will help the student successfully master to topics required. Unfortunately, we are also aware of the current budgetary constraints that prevent us for better fulfilling these needs. It is clear that having our labs developed around the actual equipment and testing procedures that the student would actually experience in the field would be ideal for both the student's understanding of the subject as well as their success and proficiency in their future careers in the health science field.
- Every semester, the faculty has to turn away students simply because there are not enough sections due to limited facilities and equipment. Since our classrooms are generally utilized to the maximum, one can only expect continued growth if we acquire additional facilities. The Life Science building facilities often fail resulting in frequent ventilation shutdowns, sewage back-ups and so forth. Even to maintain the current programs, we face a constant need to replace or update the equipment together with all the associated costs yet we continue to be limited by the current budget constraints. This problem continues to prevent the development and implementation of new courses in such areas as Pathophysiology and Forensic Pathology. Whilst there is a clear rationale for these types of courses to meet the ever-evolving student needs in the work force, the funds and facilities are simply not there. Our current inability to obtain these facilities will ultimately result in the need for an expedited catch-up program after the next four years.

b) Explain the direction and vision of the program and how you plan to achieve it?

- As always, the vision and direction of the program is to prepare students academically in order to successfully enter into life/health science fields such as PA programs, nursing, radiology technology, respiratory technology, kinesiology, and so forth. Rigorous courses are taught that emphasize the structure and function of the human body together with the causes of physiology dysfunction, disease, and the role of microorganisms in developing these pathologies. With the addition of a second cadaver, we are better able to illustrate and teach human morphology and the pathologies that frequently arise.
- To successfully achieve these goals, we strongly recommend better preparation before taking the life science courses. For Anatomy, the student should already have a mastery of English and previous experience in the biological sciences. More advanced courses would also require a background in Chemistry and Math. Indeed, Chemistry, Anatomy 32, and English are already prerequisites for Physiology. We have found that students who are weak in these prerequisite fields struggle greatly in the major Life Sciences courses leading to low retention rates. With these prerequisites, the retention rate and success rate are much higher as is student satisfaction and future career success.
- Should additional facilities and the corresponding necessary equipment become available, then additional staff would also become necessary so as to provide a more uniform quality to the courses.

c) List any related recommendations

- It is clear that even in a down economy, the medical fields are going to continue to expand. This will inevitably lead to increased student demand for addition sections to be opened up. Since the lack of additional facilities is the major impediment to achieving this, our primary recommendation would be for the college to provide alternate sites for the division's expansion.

Section 10: Prioritized Recommendations

a) Provide a single prioritized list of recommendations and needs for your program/department

| Recommendations | Cost Estimate | Strategic Initiatives |
|--|----------------------------|-----------------------|
| 1. Acquire and alarm system to indicate if and when the Cadaver refrigerator shuts down. <ul style="list-style-type: none"> This fall we had an extremely unfortunate disaster when we discovered that the Cadaver refrigerator failed and had been off for a number of weeks resulting in the desiccation and denaturing of our two cadavers because of long term exposure to extreme heat (above 140 °F). Without the cadaver program a major component of the Anatomy program will be lost thereby limiting the development essential visual recognition and dissection skills | \$5,000 To \$10,000 | A, B, & F |
| 2. Facility improvements, such as better ventilation in the LS lab rooms. <ul style="list-style-type: none"> When dissections are preformed, especially now that we have cadavers preserved with carcinogens such as formaldehyde, proper ventilation is essential. Fume hoods would be a start to providing adequate ventilation. | \$36,000 to \$50,000 | A, B & F |
| 3. Purchase enough microscopes to be able to standardize the types of microscopes being used in each classroom. <ul style="list-style-type: none"> This will increase the student's understanding and the proficient use of a microscope. | \$50,000 | A, B, E, F |

| | | |
|--|----------------------------|------------|
| <p>4. Purchase more models and equipment for the Anatomy & Physiology courses.</p> <ul style="list-style-type: none"> Since we do not have enough space for all the Anatomy classes, we have been forced to utilize other classrooms which now need to be supplied with additional models and equipment. | \$50,000 To \$80,000 | A, B, & F |
| <p>5. Provide faculty compensation for cadaver dissection.</p> <ul style="list-style-type: none"> Since we only have two cadavers to be used for several years by many sections per semester, faculty will dissect the cadaver to maintain its integrity. This would be at the special assignment compensation of approximately \$60.00 per hour. | \$12,000 To \$15,000 | B, C & E |
| <p>6. Construction of additional laboratory classrooms.</p> <ul style="list-style-type: none"> Now that we are offering Ant 34A and 34B, additional lab space is greatly needed. Since the bottom floor of NATS building is now the new MESA center and home to a STEM center, we need to find an alternate location to meet our need for additional classrooms. | N/A | B, E & F |
| <p>7. A lot more money to be available for tutoring and supervision</p> <ul style="list-style-type: none"> We need tutors for evening and day students. Also there is a need for a qualified person to supervise open labs other than asking full-time instructors to repeatedly volunteer their time without compensation. The average student pay ranges from \$8.50 to \$10.50. | \$2,500 To \$3,000 | A, B, C, E |
| <p>8. Do the necessary research needed to establish an English prerequisite for targeted courses.</p> <ul style="list-style-type: none"> Currently, a large percentage of the incoming students are unable to read at a college level. This problem is compounded by the complexity and enhanced vocabulary of scientific textbooks. Unfortunately the basic vocabulary and concepts cannot be diluted without comprising the integrity of the course. <p>Requiring English as a prerequisite would greatly help improve student success.</p> | N/A | B, C, D, E |
| <p>9. Schedule combined meetings with the Nursing and Allied Health Faculty</p> <ul style="list-style-type: none"> This would help better match to goals and requirements of each division in terms of what the students need to succeed. | N/A | A, B, D, E |

b) Explain why the list is prioritized in this way

- The manner in which the items are prioritized is one of necessity before enhancements. It is clear that unless we have the physical space and the materials then all that would be expected to follow is not possible. There is little point in purchasing additional materials or changing features of our current courses if we do not even have the classroom. Similarly, if we are to have a class, we would then need the necessary equipment before we can consider additional aids and improvements to the learning environment. The primary reason for placing items 2 and 3 appear before the need for additional classroom space is simply because these priorities are necessary to support the already existing courses and the respective classes.