Program Description of Biology for the Health Sciences Program

Biology for the Health Sciences Instructional Program: The Biology for Health Sciences Program at Ohlone College is focused on a series of courses designed to prepare students to successfully apply to and complete professional programs in nursing , dental hygiene, physical therapy, respiratory therapy, pharmacy and other medically related professions. As such this program is designed to meet the pre-requisites for these professional degree programs and to provide the students with a sufficiently in-depth knowledge of normal human biology, anatomy and medical microbiology to complete these professional programs successfully.

How the Biology for Health Sciences program addresses the needs of students and the community: A shortage of health science professionals presently exists locally and nationwide, and this shortage is expected to grow over the next ten years. Nurses, in particular, will be in short supply as many of the present nurses are approaching retirement age just as the baby boom generation is aging. The Biology Health Science program will provide for the community students who are sufficiently trained to enter and successfully complete the professional programs that will provide the community with nurses and other health care professionals. This need in the community has motivated a steep rise in the numbers of students wishing to enter the courses required to apply for these professonal programs. In addition, two of Ohlone's programs, Respiratory Therapy and Physical Therapy Assistant, have changed their pre-requisite courses to require the one year anatomy and physiology courses and the five unit, lab based microbiology courses that were already highly impacted.

The quality of the pre-requisite courses needed by students as they enter these professional programs is a strong predictor of their success within these programs. Students require a high quality of pre-requisite courses that give them an adequate foundation in the normal biology of these systems and in the theoretical basis of medical microbiology.

How the Biology for Health Sciences Applies Current Technologies: The courses in this program are extremely information intensive courses that require a student to develop disciplined study skills and critical and analytical thinking. In order to aid in developing these skills and this knowledge base, the courses in this program use intensive hands- on laboratory exercises. These include computer based, real time physiological recordings, dissections of cadavers and animals, models, analytical unknown investigations and case study reports. Students aid each other in learning the material through group projects designed to focus on specific aspects of the laboratory. Oral presentations by groups of students are designed to review and test their fellow students on the material prior to the practical based exams.

Lectures include interactive multimedia presentations and case studies. Testing of the lecture material requires students to reach the synthesis level of learning through the use of essay and short answer based examinations that require students to integrate different facts and explain mechanisms.

The use of WebCT and email has expanded the availability of instructors. Students can now obtain course materials and interact with the faculty outside of regular classroom sessions.

The impact the Biology for Health Sciences has on the college and associated college programs: The programs most directly impacted by the Biology for Health Sciences are the nursing, respiratory therapy and physical therapy programs at Ohlone college since our courses are designed to meet their pre-requisites. In the next year both the respiratory and physical therapy programs will no longer accept the one semester Anatomy and Physiology 104 or the lecture only Microbiology for Health (107) courses. All three programs will require the year long sequence courses (103A and 103B and 106) that have been very impacted for several years.

The consistently high enrollment in all of these courses has contributed FTES to the college as a whole. The number of sections of these classes has more than doubled in the past few years to meet student demand.

Relationship of this program to College Goals

Goal: To provide life long learning opportunities for students, college personnel and the community: Many of the students in these courses are presently in the medical professions and are seeking to advance in their chosen profession by obtaining a higher degree. Others are seeking to change their professions as they become aware of the growing opportunity for jobs in the health science fields. Successful completion of the courses within this program will provide them the knowledge and skills to obtain more advanced professional degrees.

Goal: to provide open access to underserved minority populations: A high proportion of students presently in these courses are from minority populations. In many cases, these students are immigrants who have received training in the health sciences in their home countries and wish to complete their training and be eligible to practice their professions in their new country.

Student Learning Objectives of Allied Health Sciences Program Review:

1. **Inquiry based laboratory skills:** Students will demonstrate competence in the use of standard laboratory equipment and in standard laboratory techniques. Students will be able to describe how to safely conduct themselves in the laboratory. Students will be able to identify key features of data, analyze that data and draw conclusions from that data.

2. **Critical thinking skills:** Students will be able to compare and contrast information from diverse sources. Students will demonstrate the ability to organize information into different formats using table and graph interpretation skills. The

students will demonstrate their understanding through essays that integrate facts and paraphrase concepts.

3. **Comprehensive Knowledge:** Students will be able to relate new concepts to previously learned information. Students will investigate their own learning styles and apply those to the comprehension of new facts and concepts.

4. **Cooperative Learning:** Students will work both in groups and individually to investigate information and present that information to their fellow students. The presentations will require students to illustrate both their knowledge of the topic and their ability to review and present that information to their fellow students. Assignments will require group work.

5. **Practical Application of Information:** Students will be able to relate information learned to the appropriate situation in a health sciences setting. Case studies will be assigned that integrates information from several levels of the year long sequence of the courses that require integration of diverse information and the application of that information to a particular situation.

Assessment of Success in Reaching Program Outcomes

Feedback from the professional programs at Ohlone and other local colleges will be used to determine if the Biology for Health sciences has met its goal of providing well-prepared students to their programs. Antidotal evidence from the Dean of Health Science has indicated that our program's students are well prepared. Students entering the nursing program who have earned a B or above in our Health Science courses successfully complete the nursing degree at as high or higher rate than other local colleges. A more formal survey will be preformed in the future that should document what best aids student success in these professional programs and should be instructive on any changes needed within the present program.

Surveys of students completing this program were done for the previous program review. In that survey 78% of the students rated these courses as excellent to good, while none rated the courses as poor or inadequate. Future surveys could follow graduates from these courses into their respective professional programs. In these programs the strengths and weaknesses of our program will be more evident to those surveyed.

Enrollment has substantially grown during the past five years without an increase in full time faculty. In response to student demand, the number of sections of all of these courses has been increased from four per year in 103A , three per year in 103B, and two per year in 106 to ten 103A sections, six 103B sections and five 106 sections per year. This growth has aided in the high WSCH/FTES of the biology department (at 630.98 it is the second highest in the division) and the high FTES (168) of this department. In order to cover this increased number of sections many part time faculty have been hired. A

new position to teach anatomy and physiology has been requested in order to maintain consistency and quality within these courses.

Assessment of Program through Review of Teaching/learning

Student learning outcomes will be assessed separately using techniques of testing and teaching within the course and through assessment of student success in subsequent programs that they enter.

Inquiry based Laboratory Skills: The competent use of standard laboratory equipment will be accomplished by assignments that require students to extensively use this equipment. Practical examination and student presentations have been used to demonstrate student ability to properly use laboratory equipment and to demonstrate an understanding of the data obtained from such studies. Safe handling of biohazardous materials is an integral part of working in the health sciences and students will be intensively instructed on safe laboratory procedures and then will be required to demonstrate such procedures in the context of the laboratory. Inquiry based laboratories require students to analyze data from normal and pathological laboratory samples. Students also determine the identity of an unknown pathogen through the use of logical deduction techniques based on dichotomous keys and standard clinical laboratory testing.

Critical Thinking Skills: Testing within these courses includes written questions that require students to demonstrate analytical thinking and to integrate diverse information. In this information intensive course students are required to move from the recall level of learning to be able to apply what they have learned through testing that requires them to relate diverse information in table, essays and short answer questions. Case studies are required as written assignments by students to enable them to apply the information learned to a relevant context and to demonstrate the ability to integrate diverse data.

Three unknown identifications of pathogens are preformed within the microbiology courses at three different levels. These levels enable students to progressively analyze data they have collected from organisms they have grown and then apply this analysis to different contexts that mimic diagnostic procedures used in the health sciences.

Comprehensive Knowledge: The integration of facts and data are incorporated into the assignments and the tests completed by students. Case studies at the end of the second semester anatomy and physiology courses require students to apply knowledge learned through out the entire one year sequence and relate information from different body systems to a set of symptoms presented by hypothetical patients. Similarly in microbiology the final unknown demands that the student employ all levels of analysis learned during the semester to separate and identify microbes and to present this analysis in a logical and concise manner.

Cooperative Learning: Students aid each other in learning the information necessary for this course through the use of group projects and presentations. These

presentations demand that each student orally review information just prior to the practical examinations where this material will be tested. Students work together to design presentations and to prepare laboratory material to review the information needed for the upcoming practical examination.

In the laboratory portion of these courses students work in groups in order to complete their assignments. The assignments are very extensive so that cooperation is necessary for the success of any one student. Oral presentations require planning and cooperation.

Practical Application of Learned Material: Case studies are used throughout the year long sequence of these courses. In the laboratory data is collected that mimics clinical testing and knowledge of normal and pathological results from such clinical tests is required. Within the lecture portion of the course clinical examples are used to provide relevance to the material learned and to introduce pathophysiology. In microbiology case studies are employed to challenge the students ability to apply the knowledge learned to the analysis of symptoms and clinical data collected. Several unknown identifications are designed to mimic diagnoses of specific diseases.