I. Department Overview and Assessment

1. Authored by Mark Rosati, M.S., Biosciences Department Chair

   - Provide a brief description of your department.
   - Include an overview of changes that have occurred since your most recent program review process.
   - Faculty Activities.

1.a. Biosciences Department Description:

   The Biosciences Department serves the diverse student population at Phoenix College by offering courses that satisfy degree requirements, university transfer, and occupational program requirements. We offer several different modes of course delivery: entirely online, hybrid (online lecture and in class lab) and entirely face-to-face class meetings. We support student success with innovative curriculum, course-specific tutoring and supplemental instruction. We also offer student career path opportunities including off-site and on-site student training for research and internship projects. In the past several years, we have increased our on-site student intern capacity to serve seven students per year. These student interns are local high school dual enrollment students and Phoenix College students.

   The number of students that transfer from MCCCD colleges to Arizona public universities declaring Biosciences as their undergraduate major has increased from fourth to third most declared major since the 2004-2005 academic year. Since 2000, Biosciences enrollment has grown at a rate that outpaces the Phoenix College campus. We serve over 4,500 students per year, about 1/4 enrolled in evening, and 1/4 enrolled online. More than half of our students have the intention of entering a health care program of study. Many of our students require a significant level of instructional support as they lack the skills required to be successful in the lab sciences. Our Department has responded to these student challenges through creating and implementing in-class and department-wide tutoring and supplemental instruction as well as online student support tools for students to use more conveniently.
Biosciences Department Changes:

Our classroom approach is progressive and responsive to student needs, and our faculty and staff have current training in up to date classroom delivery technologies and teaching techniques for better student engagement and assessment. Robin Cotter and Patricia Finkenstadt have successfully completed Master Teacher training, and all of our full time faculty participate in Professional Learning Communities. To further advance department initiatives for student-centered approaches to teaching and learning, we have and continue to successfully garner grants for student support efforts. Our faculty commitment to student success and science teaching is further evidenced by the fact that four full time faculty (Mickie Bond, Philip Pepe, Robin Cotter, and Patricia Finkenstadt) have been awarded Distinguished Teaching Awards. Every year one or more of our full time and adjunct faculty are nominated for this award. This year, Dr. Elena Ortiz was a finalist for this award.

We have advanced the departmental goal of attracting and retaining highly qualified faculty. We have updated the MCCCDD minimum hiring qualifications for faculty in the biological sciences requiring 24 hours of advanced lab science coursework to demonstrate actual working knowledge of the scientific process in the practice of science. We also proposed an equal pay for lab classroom teaching to remediate the fact that lab science faculty are not paid for 20% of the actual lab classroom time. This proposal was denied by the MCCCDD Administration for cost reasons. We will re-submit this proposal before the next review as attracting and retaining scientists to community college teaching is a paramount endeavor in pursuing our goals and mission.
Another departmental goal is to better prepare our students for greater success and retention in our courses. Community college students are frequently unprepared for college-level lab science courses and have a decreased level of retention and success in these courses. In order to help better prepare our students, we have instated basic college reading assessments as prerequisites for our majors and health-care biology courses. We have continued the work of increasing student support with tutoring and class-specific supplemental instruction. Support for students is an ongoing priority for our department members. We have developed and instituted student support programs that include direct biology student tutoring offered in our lab classrooms and department offices. We also offer student supplemental instruction after face to face lectures to help students bolster key concepts and skills.

The Biosciences provides multiple student scholarships. The Gerald Traut Environmental Biology Scholarship awards $500 per year to a student enrolled in a Biosciences Department course who is identified as interested in environmental issues, maintains a high grade point average, and receives good recommendations from a Biosciences Department faculty member. The Margaret Groh Biology for Majors Scholarship, in the memory of our colleague Margaret Groh, supports students enrolled in the Biosciences Department’s introductory biology for majors course, and pays for the following semester. Our third and longest active student scholarship is the Human Anatomy and Physiology Scholarship. This scholarship is awarded to a student enrolled in the first semester anatomy and physiology class based on merit, and pays for tuition for the second required anatomy and physiology course.

Our most significant and continuing challenge to student success and enrollment, however, is the staffing of full time faculty positions. The reliance on part time faculty is problematic for several reasons: a high rate of turnover, lack of classroom technology ability and knowledge, and far less responsiveness to students. We have had to continue to offer many of our courses to part time faculty as a result of maintaining annual full time faculty understaffing rates ranging from 30% to 50%. A further exacerbation of our understaffing problem began in Summer 2011. MCCCD District Employee Services enforced the policy limiting the work load of part time faculty requiring us to hire 30% more part time faculty in a short period of time to cover existing courses that were fully enrolled. This increased need to attract and retain 30% more qualified part time faculty to maintain enrollment trends is very difficult given the competition with nine other Biology Departments in MCCCD.
Biosciences Activity Summaries Submitted by Faculty and Staff:

1) A list of Professional Growth activities that you have been awarded such as Faculty Professional growth, MCLI, e-learning grants or Title V.
2) Direct student support activities to increase student success and retention such as SASS mentor, tutoring or student development activities through a grant such as Title V, creation and implementation of new teaching tools or student activities to increase your students success.
3) Advisory groups or Boards or mentors relating to teaching and student success at Phoenix College, a biology-related function, or science teaching and learning function.

Amanda Chapman, M.P.H. Residential Faculty

1) Title V PLC Project: Provided PLC leadership training to other faculty members and served as the Faculty Lead for three of our Title V Funded campus Professional Learning Communities (A&P, Biology, BIO156 and Online Learning). This project included meeting with interested faculty in Chemistry, Mathematics and Biosciences and facilitating the development and implementation of specific goals for course activities, projects or improvements that have positive, measurable student outcomes. This project was designed to support the principles of the Learning College such as “Inquiry and Accountability,” “Learning outcomes and Assessment,” and “Student Engagement.”

- NSF S-STEM Grant Application – Grant was submitted to NSF and has been recommended for funding by the review committee. We are waiting for the final approval.
- 21st Century Maricopa Dual Enrollment District Committee – A committee tasked with reviewing and recommending changes in our current district DE processes. ILAC committee – Serves on the Information Literacy Assessment Committee.
- NBCT - Completed and earned the National Board Certification for Teaching in Adolescent and Young Adulthood Science – Biology. This included four portfolio assessments, two of which included classroom video, describing and justifying teaching practice and a written content knowledge examination.

Hiring Committees

- Title V IT – Served on the hiring committee for the Title V grant funded Instructional Technologist position.
- Title V Math and Science Specialist – Served on the hiring committee for the Title V grant funded Instructional Technologist position.

Blackboard Mentor – Currently working with the Phoenix College Center for Teaching and Learning Technologies to pilot a Bb mentoring program for our new adjunct and DE faculty that could replace the online training in appropriate instances.
Curriculum Development and Implementation

- BIO160 Online Course – Received an e-learning grant to rewrite the online course for BIO160 to better align with our face-to-face (FTF) curriculum and include interactive activities, updated lectures, laboratories similar to the FTF course and four lab practical assessments.

- BIO160 FTF – Made additions to the lab curriculum to increase engagement and interactivity using best teaching practices and to bolster physiology content. I also moved the laboratory course to a CISIP inspired notebooking/rubric model to bolster students writing and critical thinking skills and added online support for the anatomy portion of the laboratory course.

- BIO100 FTF – Collaborated with the lead instructor to implement the notebooking/rubric model in the laboratory component course as well. In addition I added a new laboratory where Genetically Modified Organisms were identified using PCR and gel electrophoresis that is now part of the regular curriculum. I plan to pilot another new laboratory on biofuels that utilizes spectrophotometers for data collection this spring.

2) High School Student Internships – Mentored 10 Bioscience High School interns, who serve on our PC campus, for the full year through their senior capstone projects.

- Phoenix College Preparatory Academy Strategic Planning and Advisory Committee – This committee to assist Teacher Prep High School. We assisted in developing its new vision, mission and strategic plan/goals and the NCA accreditation process.

- SciTech Festival – Helped to prepare our robotics presentation for this festival. Science Project Judge – Served as a judge evaluating capstone projects for students at Bioscience High School.

- BHS Robotics – Served as assistant coach for Bioscience High School Robotics team who were awarded a Silver Medal as Finalists in the 2010 Arizona Regional.

- Science Foundation Arizona’s STEM Advisory Council – Participated in the Advisory Council for two years.

- MECHA Conference - Presented activities to high school students visiting PC regarding science, college readiness and accessibility (in collaboration with other Biosciences Faculty). I have agreed to present again this year.

- PC Bioscience Dual Enrollment – Evaluate new applicants and existing DE instructors. Mentoring these instructors by answering questions, providing course materials and loaning out appropriate and necessary laboratory equipment.
Robin Cotter, Ph.D. Residential Faculty

1) In the fall of 2008, Dr. Robin Cotter along with biosciences faculty, Dr. Patricia Finkenstadt, and nursing faculty, Matilda Chavez and Salina Gonzales, received an MCLI Teaching and Learning with Technology grant to create a digitally-recorded simulated patient case study to help pre-nursing and nursing students develop better clinical reasoning skills. In April of 2009, they presented this work at the American Association of Community Colleges (AACC) meeting in Phoenix.

2) In the spring of 2009, Dr. Cotter was awarded the Distinguished Teaching Award (DTA).

3) In the spring of 2009, Dr. Cotter received an eLearning grant to fund the development of an online Microbiology (BIO 205) course. This online course has now been offered for 4 semesters.

4) From 2008-2010, Robin received Title V STEM (Science, Technology, Engineering, and Mathematics at Hispanic-Serving Institutions) Grant funding to create a series of online tutorials entitled, “Biology Boot Camp.” Working in collaboration with colleagues in counseling, the library and the Student Success Center, the goal of this project was to create online learning modules to help biology students develop information literacy, scientific writing, and critical thinking skills.

   a) Biology Boot Camp: Interactive & Online Information Literacy Tutorial for Students of the Biological Sciences. (grant renewed 4 times)
   b) Biology Boot Camp: Scientific Writing Tutorial for Students of the Biological Sciences.
   c) Biology Boot Camp: Critical Thinking and Case-Based Learning for Students of the Biological Sciences.

5) In the spring of 2010, Dr. Cotter along with Biosciences Department faculty members, Patricia Finkenstadt, James Sinner and Amanda Chapman, received Title V STEM funding for a grant entitled, “Teaching Biology in Second Life.” This group is currently piloting the interactive microscope lab simulation in the Bio 181 and 205 courses.

6) In the spring of 2012, Dr. Cotter co-authored and received funding for a $17,000 BRC Capital Funds Grant Request entitled, “Technology Upgrade for the Biosciences Laboratories,” which will equip four bioscience laboratories with interactive whiteboard technology and instructional cameras.

7) In the spring of 2012, Dr. Cotter received the National Institute for Staff and Organizational Development (NISOD) Excellence Award from the University of Texas at Austin, Community College Leadership Program for her contribution to teaching, leadership, and learning.
2) From 2008 to 2012, Dr. Cotter has served as the Women’s Soccer Team faculty advisor for the Student Athlete Scholastic Success (SASS) program.

- Dr. Cotter has also served as an honors project advisor for students in Bio 181 and Bio 205.
- Dr. Cotter has coordinated and supervised open lab tutoring for students in Bio 100, 156, 181, 182 and 205 for the past several years within the department.
- In the spring of 2012, Dr. Cotter participated in a pilot project sponsored by the Success Center to study the impact of Supplemental Instruction project on student retention and success in Bio 181.
- Developed series of interactive online Lessonbuilder tutorials to enable students in Bio 181 and 205 to review and self assess their comprehension of key lecture concepts and laboratory techniques.
- From 2007-2012, Dr. Cotter attended several district-wide MCLI and nationally sponsored conferences that focused on improving student retention and success.

  - In the fall of 2010, Robin attended the National Case Study Conference in Buffalo, New York where she learned how to write and implement case studies into her Bio 181 and Bio 205 course curriculum.
  - In the spring of 2011, Robin attended several workshops to help enhance her knowledge of current biological topics and online technologies, including the iPlant DNA Workshop hosted by the Dolan DNA Learning Center at Cold Spring Harbor Laboratory, where she learned how to incorporate gene sequencing and analysis in the Bio 181 course she teaches.

- In the spring of 2012, Dr. Cotter hosted a workshop for educators and community members on the use of the virtual reality program Second Life in teaching biology labs online as part of the Arizona SciTech Festival Celebrating Science, Technology, Engineering and Math (STEM).

- Working together with Bioscience Department faculty members, Patty Finkenstadt, James Sinner and Amanda Chapman, Robin has also presented workshops at the MEChA Student Leadership Conference hosted by Phoenix College to encourage Hispanic students to pursue degrees and careers in the biosciences.

- In addition, Dr. Cotter also served as a volunteer for the Phoenix College ACE (Achieving a College Education) Program.

3) Dr. Cotter is an active member of several campus, district, community-based and national committees and organizations related to student success and the biological sciences including:

- Critical Thinking Assessment Committee (2007-2009)
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- Phoenix College Distinguished Teaching Award (DTA) Committee (2009-2012)
- PC Learning College Committee, Tri-Chair (2009-2010)
- Learning Commons Initiative Committee (2011-2012)
- Student Success Initiative Committee (2010 – present)
- MCLI-sponsored Arizona Master Teacher Seminar facilitator (2010-2012)
- Member of the American Society for Microbiology (ASM)

- In addition to her work for these committees and organizations, Dr. Cotter has also served as an external reviewer on TGen’s Institutional Biosafety Committee.
- In collaboration with Dr. Patricia Finkenstadt from the PC Biosciences Department and Cyndie Carroll, the Professional Development specialist for Maricopa County, Dr. Cotter has also helped conduct Professional Development workshops for biology teachers within Maricopa County. The purpose of these workshops was to teach current biology techniques to grade school and high school biology teachers in an effort to enhance their instruction in the biological sciences.
- In collaboration with Melinda Braham, Teri Graham and Darra Kresge, Dr. Cotter presented a workshop entitled, “Best Practices in Student Engagement” at the Spring 2012 Adjunct Faculty Learning Conference hosted by Scottsdale Community College.

Patricia Finkenstadt, Ph.D. Residential Faculty

1) Dr. Patricia Finkenstadt has developed, participated and presented a variety of projects that are focused on student success.

- Simulated Case Studies: Dr. Finkenstadt aided in the development of a collaborative project (Biosciences and Nursing Departments) that presented digitized patient case studies to students. These case studies challenged them to apply critical thinking skills in order to solve disease-related problems. The innovative nature of these case studies was highlighted at a presentation at the American Association of Community Colleges Annual Meeting. Furthermore, the development of these case studies was recognized by MCLI and awarded a Teaching with Technology grant.
- American Physiological Society Weekend Workshop: This meeting of educators from all levels of higher education (2-year colleges to primary research institutions) addressed the changing needs of physiology students and resulted in a publication in Advances in Physiology Education (2007).
- Participation at Phoenix College and Maricopa Day of Learning Workshops and Seminars: Dr. Finkenstadt attended several workshops, including but not limited to MCLI’s Native Americans Dialogue Day that focused on the unique challenges of Native American students who are planning on entering the health care fields, several Web 2.0 workshops (Jing, YouTube, SoftChalk LessonBuilder, Blackboard, Respondus, Canvas), An Introduction to
Formative Classroom Assessment, and Dr. Rita Smilkstein’s BornToLearn Workshop.

- Let’s Get Engaged: Dr. Finkenstadt co-presented three sessions of Let’s Get Engaged, a workshop aimed at providing instructors with the tools to introduce active learning strategies into their classroom.

- MCLI-sponsored Teaching and Learning with Technology Conference: Dr. Finkenstadt demonstrated the incorporation of Student Response System (clicker) technology into the current A&P curricula at Phoenix College at two District-wide technology workshops.

- Human Anatomy and Physiology Annual Conference: Dr. Finkenstadt attended the annual HAPS conference multiple times. Several ideas for presentation and review of content have been incorporated into her course (ex. Learning Portfolios, student capstone projects, gallery walks, pair-and-share).

- Arizona Master Teacher Seminar: Dr. Finkenstadt participated in the MCLI-sponsored 4-day workshop focused on non-content specific pedagogical techniques, which enabled her to gain new ideas related to teaching a variety of content areas.

- American Association of University Professors Summer Institute and One Day Workshop: Dr. Finkenstadt currently serves as the Faculty Senate President at Phoenix College. As such, she attended multiple workshops on grievance administration and resolution, as well as several discussions related to academic freedom and shared governance.

- Developing Arizona’s Human Capital: A two-day conference focused on the unique challenges of educating and employing Arizona’s population.

- Leadership/Chair Academy: Dr. Finkenstadt gained experience in leadership styles and strategic planning at this week-long District sponsored leadership training.

- Biosciences Mini-Modules: Working with adjuncts and full time faculty from the Biosciences, Mathematics and Chemistry Departments, Dr. Finkenstadt facilitated the development of materials for underprepared students interested in STEM careers. This series of learning modules are aimed at alleviating the deficiencies of students enrolled in the pre-Allied Health courses.

- Second Life Virtual Lab: Working with a variety of colleagues, she aided the development of a fully online laboratory environment in a virtual world called SecondLife. This environment allows students to interact with instructors and other students as “avatars” in a simulated lab and perform simulated lab experiments.

2)

- Cluster facilitator for Leadershape, a nationally recognized District sponsored student leadership conference.

- Participant in Professional Learning Community for Anatomy and Physiology to update and modernize curriculum.

- Development of standardized Bioscience Adjunct Orientation and Training to increase faculty and student success in the classroom.
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- Pre-Pharmacy Club Faculty Advisor: Facilitated the formation of the Pre-Pharmacy Club at PC.
- SASS Mentor for Women’s Soccer: Worked with students and coaches to increase success and retention of student athletes.
- Sexually Transmitted Diseases Seminars: Presented seminars on STDs to students and community members.
- Arizona Science Center Science Institute for Teaching Educator Workshops: Instructed elementary, middle, high and home school teachers in anatomy and physiology curriculum.
- Development of ancillary and career resources for allied health students. These include a variety of materials for use in on-line and in-person courses.
- Co-facilitation of a Science Professional Development Day at Mohave Middle School.
- Co-facilitation of Science in the City for the 2010 Chicana/Chicano Student Leadership Conference sponsored by M.E.Ch.A.
- Incorporation of instructional technologies in Anatomy and Physiology curriculum, including LessonBuilder, Student Response Systems, Jing, Wikis, Panapto, Podcasting, Blackboard, Smartboard.
- Development of a BIO201 hybrid course using Canvas learning management system.
- Panel member for Civic Engagement discussion in conjunction with PC Student Life.
- Participation in PC Honors Program and development of Honors projects for BIO201 and 202.

3) Honors Advisory Council
   Pre-Pharmacy Club Advisor
   District Faculty Executive Committee
   Faculty Senate
   Phoenix College Leadership Council
   Learning Commons Initiative Task Force
   Variety of department and college hiring committees
   Active member in the Human Anatomy and Physiology Society and the Maricopa Community College District Faculty Association.

Anna Marti-Subirana, Ph.D. Residential Faculty

1) Professional growth activities:
   - Sabbatical Leave – Academic Year 2007-2008
   - NSF S-STEM Grant – Co-PI (Principal Investigator: Amanda Chapman) Grant proposal funded (April 2012).
   - Leadership Academy 2011-2012 – Participated in all of the three sessions of the 2011-2012 Leadership Academy. Graduated in May 2012
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- Canvas Early Adaptor – Currently working with the Phoenix College Center for Teaching and Learning Technologies and Title V Office to pioneer delivery of BIO 181 online using Canvas.
- Curriculum Development and Implementation
- BIO181 Online Course – Received a Teaching and Learning grant to design and implement the course for BIO181. Phoenix College Bioscience department is the only MCC department that offers BIO 181 online.
- BIO181 Online and FTF – Received Teaching and Learning and e-grants to make additions to the lecture curriculum directed to target and bolster students critical thinking and information literacy skills (Genetics Case Studies)
- BIO 181 labs – Dr. Marti-Subirana moved the laboratory course to a notebooking/rubric model to strengthen students writing and critical thinking skills. She added new laboratories (Bacterial Transformation and Identificacion of Alu sequence that use molecular biology techniques such as transformation, PCR, and gel electrophoresis.
- Dr. Marti-Subirana hosted a student tutor (Trisha House) in one of her BIO 181 lab section for student support. Dr. Marti-Subirana is planning on having Trisha and a bilingual student as Supplemental Instruction tutors in several of her BIO 181 lecture and lab sections.

2) Direct student support activities:

- Biosciences Student Internships – Dr. Marti-Subirana mentored 7 Biology Majors for summer and semester long internships in local research laboratories (The Biodesign Institute at ASU, TGen, University of Arizona Medical School).
- Numeracy and English as a Second Language (ESL) Assessment Committees Member – These committees assist and execute the design and implementation of numeracy and ESL college assessment tools and programs.
- Enrollment Management Committee Member – This committee assists and executes the design, evaluation, and implementation of assessment tools, criteria, and programs aligned with the college Student Retention and Completion Agenda.
- Phoenix College Faculty Senate Member – Zone 4 elected Senator since May 2010.
- Faculty Senate Professional Rights and Responsibilities Committee Member – This committee provides guidelines and recommended best practices for faculty and students according to the Maricopa Community Colleges Administrative Regulations, Residential Faculty Policies, and Student Handbook Common Pages. Member since May 2010.
- Meet and Confer Attract & Retain Task Force Member – This task force addresses faculty satisfaction and faculty salary inequity issues and policies (i.e. salary inversion, lab loading) and makes suggestions for Meet and Confer negotiations. Member since August 2011.
James Neuenfeldt, M.A.M.B., M.Ed., M.B.A. Interim Faculty

Jim Neuenfeldt came to the Biosciences Department with a Master’s degree in Applied Molecular Biology and a strong background in academic research and lab management. From 2004 through 2010, Jim was the Biosciences Lab Coordinator responsible for all aspects of laboratory support including but not limited to: property control, the department’s health and safety plan, collaboration with faculty on the development of student lab activities, department ordering and financial reporting, and the supervision of lab and office staff. In 2007, Jim received a Master’s degree in Education, and in 2009 he received a Master’s degree in Business Administration.

From 2008 through 2010, Jim was elected to serve as the District-wide President of the Management, Administration, and Technology (MAT) Association. In addition to his responsibilities in the Biosciences Department, Jim provided leadership and representation for 800+ District-wide MAT employees in such areas as professional growth, policy development, and benefit/salary negotiations, and he chaired and served on numerous District-wide committees. In 2009, Jim also began teaching as a part-time instructor for the Biosciences.

In 2010, Jim was selected by the Phoenix College Administration to participate in the District’s pilot of its Leadership Advancement Program. Later that same year, he was given a reassignment opportunity to work as the Phoenix College Coordinator of Fiscal Services, where he was responsible for the oversight of the college’s purchasing duties, travel authorization, and procurement card use, as well as recommending and implementing college fiscal policies and educating college employees on those policies.

For Academic Year (AY) 2011-2012, Jim began his first year as a One-Year-Only Residential Faculty in a temporary reassignment from his MAT position as Lab Coordinator for the Biosciences Department. In addition to his teaching load, he has been involved in multiple projects and PC committee assignments with a focus on increased student access and success.

As Jim’s primary academic focus is distance education for the Biosciences, he is a member of PC’s eLearning Committee which has been responsible for the development of a comprehensive set of eLearning tutorials to help students successfully navigate PC’s Learning Management System (LMS). Jim had also attended the 27th Annual Conference on Distance Teaching and Learning prior to the start of AY11-12. This experience provided a wealth of strategies to improve online instruction that Jim has implemented and will continue to implement in his courses. Jim plans on attending the Teaching Professors Conference during the Summer of 2012 as well as beginning the Distance Education Certificate Program offered through the University of Wisconsin.

Jim has been continually revising both BIO100 (Biology Concepts, a one-semester introductory course covering basic principles and concepts of biology) and BIO156 online. By implementing tutorials for easier navigation, standardizing content sections and assessment types/frequencies, incorporating specific and clear grading rubrics, and reducing
the number of clicks that students use to navigate the learning space in his courses, Jim aims
to decrease some of the frustration of online learning and improve overall success in both
courses.

To expand the department's online offerings, Jim has developed curriculum and built
a Blackboard course for online delivery of BIO108 Plants and Society (an introductory, non-
majors course covering a global study of plants in relation to humans), and he will begin
offering the course during the Summer 2012 semester. By utilizing the current best practices
for online content delivery and collaborating with the Center for Teaching, Learning, and
Technologies (CTLT), the design of this course will provide students the best chance at being
successful taking it. As this course was designed to closely mirror the learning objectives
of the face-to-face (F2F) BIO108 course, it will allow BIO108 to be offered in three formats:
F2F, hybrid, and online. Additionally, the introduction of BIO108 on online will both
increase scheduling flexibility and access for our students.

Jim has collaborated with Mark Rosati as part of a BIO156 Professional Learning
Community (PLC) to align the online and in-person learning objectives, activities, and
assessments in BIO156 (an introductory biology course for allied health majors with an
emphasis on humans). Additionally, this PLC will be proposing an update to the MCCC
 course competencies to better align BIO156 with BIO201 and BIO205, the courses for which
BIO156 is a prerequisite. This will allow for an easier transition for students into these
courses as well as bolster their chances for success.

Jim has collaborated with Amanda Chapman to develop an appropriate evaluation
tool for online biosciences courses which will aid online instructors to recognize potential
weaknesses in course design and/or content delivery. The new tool has been reviewed by the
Office of Planning, Research, and Institutional Effectiveness and was implemented for use
during Spring 2012. This evaluation tool will aid online instructors with continual quality
course improvement.

For AY 11-12, Jim has also been a Student Athlete Scholastic Success (SASS)
Mentor for the men's football team. As a SASS Mentor, Jim met with student athletes who
were struggling academically and worked with them, in conjunction with their instructors, to
develop and implement a Plan for Performance Improvement.

Elena Ortiz, Ph.D. Residential Faculty

1) Professional growth activities:

Online Environmental Biology Summer Project - 2008:
The purpose of Elena Ortiz’s summer project was to research alternative course
delivery schedules for a non-majors course, Environmental Biology BIO 105 for K-
12 teachers. The research had two main components. First, researching practices in
online environmental education; and, second, surveying K-12 teachers to determine
their course schedule preferences.
Online Professional Learning Community – Title V - 2010-2011
Elena Ortiz participated in a Professional Learning Community with other online science instructors as part of the Title V Grant, to research and discuss best practices. They also developed a student survey for online science courses.

2) Direct student support activities:

Science Alliance 2006-2009
Elena Ortiz participated in a district-wide professional learning community of environmental educators The Science Alliance, which also included members from ASU, Audubon Arizona, AZ Game and Fish, AZ DEQ, Bureau of Land Management, and others. The group had 4 main desired outcomes. 1) Create curriculum that serves both Maricopa’s students and the community at large. 2) Determine environmental monitoring needs of community partners (natural resource management agencies and conservation organizations) that could be met by student research activities done as part of Maricopa biology courses. 3) Create teaching materials based on recommendations by community partners. 4) Provide students authentic, applicable research experiences in natural resources management and environmental monitoring

Elena Ortiz is faculty advisor for the Phoenix College Garden Club - 2010-present. Club participation is known to increase student retention and success.

3) Advisory groups or Board or mentors for student support:

K-12 Partnerships – 2006 –present
Elena Ortiz currently mentors two K-12 teachers in their efforts to bring environmental research to their classrooms (Theresa Johnson and Susan Pendelton). She also created a service learning project with a third teacher in which his 5th graders used to join the Bio 105 Environmental Biology students 4 times during the semester for outdoor labs at the Rio Salado Habitat Restoration site. This service learning partnership lasted from 2006-2010.

ACE advisory Board 2009 – present
Elena Ortiz participates in a district-wide ACE (Achieving a College Education) advisory committee. The ACE program provides at risk high school students the opportunity to earn college credits during high school and provides academic and social support for achieving a college degree.

ENRS Certificate 2009 - present
Elena Ortiz helped develop the ENRS (Environmental and Natural Resources Stewardship) Certificate, she also participates in the ENRS advisory board and helps mentor students in the program.
Mark Rosati, M.S. Biosciences Department Chair and Faculty

1) Professional growth activities:

As Biosciences Department Chair, Mark’s responsibilities and activities include the development and supervision of department budget and financial processes; class scheduling; the promotion of department courses, initiatives, mission, and goals; development of and participation in community partnerships; hiring, evaluation, supervision and promotion of professional growth activities of full time and adjunct faculty and support staff; resolution of student grievances and issues related to student faculty issues; promotion and initiatives to advance course curriculum and new courses and programs; instructional council representative. Since 2007, he has been active in the PC Title V grant activities developing student activities for information literacy and online Blackboard student support in the form of tutorials. Mark also serves as an Advisory Board member of the Title V grant. Mark was selected to serve on Budget Review and Department Reorganization due to the effective management of the Biosciences Department, his familiarity with the use of databases and the effective use of data in department management, and the effective promotion of actualizing data-based changes. Mark developed a college-wide department reorganization proposal based on comparison of several other similar colleges and state universities that reduced the number of Phoenix College teaching departments from 26 to 12. This proposal was accepted by the committee and adopted by the college administration the following semester. On Budget Review, it was an important step to propose substantive cost saving measures due to a decreased budget from state sources and revenues. Mark helped to develop and promote a proposal for underutilized building closures during hot summer months and condensing class offerings to fewer more efficient buildings that was adopted by college Administration.

2) Direct student support activities:

Mark continues to develop course work and student activities for BIO 205, (Microbiology) and BIO 156 (Introductory Bio for Allied Health), including lecture and lab materials to improve student success. He incorporates online student support and resource materials for student access in all his classes including reading, writing, and information literacy activities for student skill development.

In developing lecture and lab classroom activities for students in BIO 156 and 205, Mark places great emphasis on information literacy and student engagement through a set of routine activities through a semester. He has developed a set of student activities including problem sets and quizzes for each class meeting and learning module. These modules and quizzes develop a student’s skill and knowledge base for each writing assignment and exam. In collaboration with library faculty, we train students on how to access, retrieve and search valid biomedical information from the Internet-based databases and in other printed and computer resources. To assist the students in improving writing skills, he also uses writing assignments with self-
evaluative rubrics that give students the ability improve in basic science writing skills.

3) Advisory groups or Board or mentors for student support:

Mark is a Board member of several community organizations including the Environmental Fund for Arizona, Advisory Board member of Science Foundation Arizona STEM, Advisory Board member for PUHSD Biosciences High School, and Audubon Arizona Nina Pulliam Education Center Educational Advisory Board member. In my capacity as Board member to these organizations I have promoted and facilitated student internship pipelines with non-profit organizations including Audubon Arizona, Liberty Wildlife and Catholic Healthcare West Foundation. In addition, our Department last year, has hosted five Bioscience High School students as students’ interns working in our labs.

John Schampel, M.S. Residential Faculty

Curriculum Development
- Course redesign (with A. Chapman) of BIO 100 face to face lab modules to incorporate student note booking and active inquiry as core curricular components (ongoing)
- Professional Learning Community funded by Title V, to enhance instructional techniques in “gateway” courses (BIO 181). Learning community resulted in conversion to active, inquiry-based curricular approach in all BIO 181 laboratory modules, patterned after those already implemented in Schampel and Chapman’s BIO 100 labs. (2011-present)

Professional Development
- S-STEM meeting in Washing D.C. (June 2011)
- Teaching Professor Conference, Boston MA (June 2010)
- Ecological Society of America Meeting, Milwaukee WI (August 2009)
- MCLI Blended By Design Seminar, Phoenix AZ (May 2008)

Hiring Committees
- Biosciences hiring committee for full-time Residential Faculty in Spring 2012
- Biosciences hiring committee for full-time OYO Faculty in Spring 2012
- Dental Assisting hiring committee for full-time OYO Faculty, Summer 2012.

Campus Committees
- Staffing Committee (2011-present)
- Critical Thinking Assessment Committee - Administered the Test of Everyday Reasoning (TER) to PC students campus-wide (2007-2009)
- Curriculum Committee (2009-2011)
External Reviews


Sexually Transmitted Diseases Seminars

- For 6 years running on the week of Valentine’s Day, in cooperation with PC Faculty campus-wide, Planned Parenthood and Maricopa County Health Department, presented 3 seminars on STDs to hundreds of PC students and local community members.

Invited Talks

- Invited Phi Theta Kappa Symposium Seminar: “Global Climate Change and You” (Fall 2010)
- Invited Judge for ASU’s Graduate Student Symposium (2007-2009)

Faculty Leadership

- Phoenix College Faculty Senator, Zone 2 (2011-present)

James Sinner, D.C. OYO Faculty

1) Professional growth activities:

James Sinner is currently involved in the Second Life Project through Title V and has been since 2009. This goal of this project is to create virtual laboratories for the students that will increase student interest, access and success in their requisite bioscience classes.

2) Direct student support activities:

James has developed and conducted video tape interviews of allied health professionals for use by bioscience students since 2009. The purpose of these interviews is to increase the student’s knowledge of their specific career choices and to motivate them to succeed in realizing their career. There are currently 8 interviews covering pharmacy, nursing, dental hygiene and physician’s assistant. In 2011 he developed the BIO 202 Honor’s contract and helped to develop the BIO 201 Honor’s contract. These contracts were designed to give bioscience students the ability to earn honors credit in their biology classes. Since 2009 he has overseen the awarding of the annual Human Anatomy and Physiology Scholarship (HAPS). This scholarship is awarded to a single student on an annual basis to pay for BIO 202. James put together the standardized test and handles the process of selecting the best candidate. Since 2008 he has selected, trained and overseen the student workers that work in the open
labs for anatomy and physiology. These labs are set up to give the students extra time to work with lab materials that they otherwise would not have access to. James presented a workshop for the Movimiento Estudiantil Chicanos de Aztlan (MEChA) conference in 2011 and for the Arizona SciTech festival in 2012. During each of these workshops he took the participants into the cadaver lab to show them the cadavers and answer their questions with the hope of stimulating their interest in anatomy and physiology as well as science in general. He was a SASS mentor for the football team from two years from 2009-2010. The SASS program is designed to give the football players academic guidance and support throughout the semester. He was assigned sixty different players over that time and met periodically with those players to better see them succeed in the classroom. In 2012 James became the inaugural Professional Learning Community (PLC) leader for BIO 202. This is a group of 202 instructors that meet to discuss what improvements can be made to increase the learning and success of the BIO 202 students. It involves coming up with, implementing and assessing these changes with respect to student performance. In 2011 James participated in the BIO 201 PLC. This group looked at the improvements that could be made in BIO 201 to promote student success. It is currently in the process of trying to implement a forensic bone lab to facilitate student interest and success in BIO 201.

3) Advisory groups or Board or mentors for student support:

In 2010 James served on the Numeracy Assessment Committee and continues to do so. This Committee is designed to assess student learning in the area of math. It involves looking at pre and post assessment tests/problems in order to quantify to what amount the student solved the problem and thereby learned the information presented. This data is then used to help the math instructors better teach their students. He also serves on the Faculty Liaison Committee and has done so since 2010. This committee is focused on improving student success through the Success Center. The Committee looks at how best to utilize the SC resources to facilitate student academic success. James was selected to be part of the Supplemental Instruction (SI) pilot. This program involves having a former student (supplement instructor) attend classes as a regular student would. The SI then meets with the voluntary participants two or three times a week to facilitate groups discussions about the material presented in class.

Dijana Music, B.S. Administrative Secretary II

Dijana assists the Chair with daily management of administrative operations. Dijana has taken on a larger role with the management of student interns time and payroll processing, creation of course schedules, day course load analysis and the management of office supplies. Another important role that Dijana provides includes adjunct faculty recruitment. She offers invaluable support in the creation of advertising for faculty and is the first contact for department communication. Dijana also helps set up the financial budget.
Phoenix College  
Biosciences Department

Academic Program Review

Biosciences Department  
2011-2012

analysis for department operations. Furthermore, Dijana continues to take biology courses which enable her to provide better focused student support in areas such as: class expectations, exam preparation and tutoring opportunities. In addition, she will be completing the Navigate Maricopa Supervisor Training series and has been invited to assist with the Title V Grant activities as an administrator.

1.b. Authored by Robin Cotter, Ph.D., Residential Faculty

- Identify the educational learning outcomes assessed by your department during the past five years: (numeracy, written communication, oral presentation, information literacy, critical thinking).

The Phoenix College Biosciences Department is not only committed to providing high quality instruction in the biological sciences, but also to supporting efforts on campus to assess key learning outcomes such as numeracy, written communication, oral presentation, information literacy and critical thinking skills. In addition to participation in campus-wide assessment of these skills, our department regularly assesses these learning outcomes in our courses through both formative and summative assessment techniques.

Assessment of Critical Thinking Skills:

In the spring of 2009 the Test of Everyday Reasoning (TER) was administered to 442 Phoenix College students. Of the total 442 students surveyed on campus, 106 were students from the Biosciences Department. For each of these students, a total score and five scale scores for the skills of Analysis, Inference, Evaluation, Deduction, and Induction were measured and reported by the Critical Thinking Assessment Committee.

Based on the data reported by the Critical Thinking Assessment Committee, the mean total score on the TER varied significantly by major, with Legal Professions having the highest mean, 24.73 (N = 26), Health Professions and Related Clinical Sciences had a mean score of 18.14 (N = 102), Bio 201 (N = 32) had a mean score of 18.28, and Bio 202 (N = 74) had a mean score of 20.34. Although limited by the sample size, these findings suggest that students who successfully complete Bio 201 and move on to take Bio 202 consistently show an improvement in their critical thinking skills as compared to Bio 201 students and the campus as a whole.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Analysis</th>
<th>Inference</th>
<th>Evaluation</th>
<th>Deduction</th>
<th>Induction</th>
<th>N Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible Score</td>
<td>35</td>
<td>9</td>
<td>15</td>
<td>11</td>
<td>19</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Campus Mean Score</td>
<td>18.74</td>
<td>5.22</td>
<td>8.08</td>
<td>5.43</td>
<td>9.61</td>
<td>9.11</td>
<td>442</td>
</tr>
<tr>
<td>Bio 201 Mean Score</td>
<td>18.28</td>
<td>5.06</td>
<td>7.97</td>
<td>5.25</td>
<td>9.69</td>
<td>8.59</td>
<td>32</td>
</tr>
<tr>
<td>Bio 202 Mean Score</td>
<td>20.34</td>
<td>5.85</td>
<td>8.35</td>
<td>6.14</td>
<td>10.53</td>
<td>9.81</td>
<td>74</td>
</tr>
</tbody>
</table>
Assessment of Information Literacy Skills:

In the spring of 2008, 54 students from the Biosciences Department participated in the iSkills assessment test conducted by the Information Literacy Assessment Committee. These students had an average score of 141.02 out of 300 compared to the average PC student score of 133 out of 300. Note that 165 out of a possible 300 is the recommended passing score. Bio 105 and Bio 181 students compared to all students taking the core iSkills assessment test.

Based on the preliminary findings of the Information Literacy Assessment Committee (see above), faculty in the Library Instruction and Biosciences Departments worked to design instructional tutorials and classroom sessions to strengthen the information literacy skills of students in the Biosciences. As part of a Title V STEM funded grant, eight mini tutorials focused on promoting key information literacy skills were created and utilized in the Bio 181 and Bio 205 courses. Custom designed pre- and post-tests were utilized to assess students’ information literacy skills both prior to and following the completion of these online information literacy modules and participation in face-to-face library instruction sessions specifically designed for the BIO205 and BIO181 courses.

The Information Literacy Modules were administered to 5 sections (20 students per section) of Bio 205 Microbiology students in the fall of 2011. Students took a 15-question pre-assessment quiz (see attached) to determine the content areas where they needed the most assistance. Two sections of Bio 205 students then received in-class library instruction followed by a 15 question post-assessment quiz (see attached) to determine whether there was an improvement in their scores. As shown in the table and graph above, these students scored an average of 9.15 out of 15 on the pre-assessment. Following classroom instruction, the same group of students scored an average of 10.48 out of 15 on the post-assessment quiz.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Std Error</th>
<th>Post-Test</th>
<th>Std Error</th>
<th>Paired t-test</th>
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</thead>
<tbody>
<tr>
<td>Instruction only</td>
<td>9.15</td>
<td>0.49</td>
<td>10.48</td>
<td>0.38</td>
<td>0.0011</td>
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<tr>
<td>Tutorials Only</td>
<td>10.35</td>
<td>0.59</td>
<td>12.25</td>
<td>0.43</td>
<td>0.0047</td>
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<tr>
<td>Tutorials + Instruction</td>
<td>9.05</td>
<td>0.43</td>
<td>11.57</td>
<td>0.29</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

One section of Bio 205 students were asked to complete the pre-assessment quiz (see attached) and were then given one week to complete the eight Information Literacy tutorials. Upon completion of these modules, the students took the same 15 question post-assessment quiz administered to the Instruction Only group. As shown in the table and graph above, these students scored an average of 10.35 out of 15 on the pre-assessment. Following completion of the modules, the same group of students scored an average of 12.25 out of 15 on the post-assessment quiz. Two additional sections of Bio 205 students were asked to take the pre-assessment quiz and were then asked to complete the eight Information Literacy tutorials prior to receiving in-class library instruction. As shown in the table and graph above, these students scored an average of 9.05 out of 15 on the pre-assessment. Following classroom instruction, the same group of students scored an average of 11.57 out of 15 on the post-assessment quiz. As shown on the graph below, students who were asked to complete
the information literacy tutorials prior to receiving in-class instruction demonstrated a significant improvement in their scores.

<table>
<thead>
<tr>
<th></th>
<th>% Change</th>
<th>Std Error</th>
<th>Comparison</th>
<th>t-test p values</th>
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</thead>
<tbody>
<tr>
<td>Instruction only</td>
<td>8.89</td>
<td>2.41</td>
<td>Instruction Only to Tutorials Only</td>
<td>0.42</td>
</tr>
<tr>
<td>Tutorials Only</td>
<td>12.67</td>
<td>3.96</td>
<td>Instruction Only to Instruction + Tutorials</td>
<td>0.01</td>
</tr>
<tr>
<td>Tutorials + Instruction</td>
<td>16.76</td>
<td>2.23</td>
<td>Tutorials Only to Tutorials + Instruction</td>
<td>0.33</td>
</tr>
</tbody>
</table>

In the fall of 2011, the Information Literacy pre- and post-assessment quizzes were also given to students enrolled in Bio 181: Introduction to Biology for Majors. Four sections of Bio 181 students (24 students per section) were asked to complete the pre-assessment quiz to determine the content areas where they needed the most assistance. Students were then asked to complete the eight Information Literacy tutorials. Upon completion of these tutorials, the students received in-class instruction. Two weeks later the students were asked to complete the same 15 question post-assessment quiz administered to the Bio 205 students. Students in the 2 day sections scored an average of 8.55 out of 15 on the pre-assessment. Following completion of the tutorials and in-class instruction, the same group of students scored an average of 11.15 out of 15 on the post-assessment quiz. Students in the 2 evening sections scored an average of 8.53 out of 15 on the pre-assessment. Following completion of the tutorials and in-class instruction, the same group of students scored an average of 11.37 out of 15 on the post-assessment quiz. Together these results reinforce what we observed with the Bio 205 Microbiology students, students benefit from the combination of in-class instruction and self-paced, online review of material in the form of these tutorials.

Our department plans to continue using these custom-made assessment tools and instructional tutorials to further strengthen the information literacy skills of our students.

**Assessment of Oral Presentation Skills:**

Although the data provided by the Oral Presentation Assessment Committee was incomplete, it is to be noted that Bio 105 students were assessed for their oral presentation skills in the spring of 2010. However, only 6 students were rated using the committee’s criteria. Of the 6 students who were rated, each received a score from three independent raters. The average of these scores on a scale of 8 were as follows: 7.1, 6.8, 7.7, 6.4, 6.8, and 6.5. Thus, while based on a limited sample size of 6, the average score for the class was 6.9 out of a possible 8 points.
As appropriate, identify other learning outcomes specific to your department that were assessed in the past five years.

Biosciences students are preparing for professions that include patient care, pharmacy, dentistry, medicine, or any of the basic scientific research disciplines. Such careers demand of professionals outstanding decision making skills. Acquiring such a skill set entails, in addition to an absolute command of pertinent technical information, proficiency in critical thinking, problem-solving, understanding and following directions, manipulation of specialized instruments, data-recording, data interpreting, and data documenting. There are currently three learning outcomes specific to biosciences students that are routinely assessed: laboratory skills, technical reading and writing comprehension, and technical information literacy skills.

Lab sessions train future professionals in problem-solving, critical thinking, data-recording, data-interpreting, and data-documenting, as well as in the ability to efficiently manage time, to understand directions and execute protocols, and to effectively communicate using technical language. Biosciences faculty regularly evaluate such learning outcomes through a wide variety of assessment tools, which include quizzes, reports, and lab notebooks. Several courses have implemented or are in the process of implementing the lab notebooks as the main assessment tool (Fig. 1. BIO181 Lab Report Rubric/Checklist). The use of lab notebooks has been recognized as a teaching tool of proven efficiency in forging lab skills (McCormack, 1991).

Biosciences students will be required in their future job placements to comprehend and interpret technical information, and to effectively communicate using technical language. Improving such abilities is crucial to proper student training. Biosciences faculty use several assessment tools to evaluate such learning outcomes; those include bi-weekly textbook reading and writing assignments (BIO181, BIO 182) (Fig. 2. BIO 181 Assignment 1 (Chapter 2). Atoms & Chemical Bonds), case studies (BIO 181, BIO 205, BIO 202 Honors) (Fig. 3. Case Study #6 Klinefelter), papers or lab reports (BIO 181, BIO 182, BIO 100, BIO 201 Honors), identification and evaluation of bibliographical reliable sources (BIO 181, BIO 182, BIO100, BIO 108, BIO 156, BIO 202), and identification and evaluation of peer-reviewed publications (BIO 182, BIO 100).

summative assessments. Critical thinking, information literacy, numeracy and the understanding of scientific concepts and laboratory skills are assessed consistently throughout the department by both traditional and innovative means.

Summative assessments include traditional written exams, lab practicums, research papers, quizzes, oral presentations and lab reports. Some classes are also experimenting with innovative summative assessments such as case-studies (Cotter Bio 205, Marti-Subirana Bio 181, Finkenstadt Bio 201/202), lab notebooks (Chapman & Schampel Bio 100) and learning portfolios (Finkenstadt Bio 201/202). A couple of examples of innovative assessments include the Bio 205 lab Patient Unknown Project and the Online Bio 156 Birth Control Wiki. In the Patient Unknown project students isolate a patient microbial specimen, identify it in the lab, determine the proper treatment, and then create a patient report on the class website. This project is done instead of a lab practicum because students must apply all of the lab techniques learned in the lab course to their individual patient. In the Birth Control Wiki a collaborative final project where groups of students create a wiki on a specific birth control method. The wiki format allows students to collaborate asynchronously on what amounts to a multimedia research web page. The focus is on performing proper research and displaying it to a general interest audience. The final wikis are graded on the appropriate use of grammar, organization, web links, pictures, embedded video, and source citations.

Formative assessments are used to provide feedback for teachers to modify subsequent learning activities and experiences, and to improve students’ metacognitive awareness of how they learn (Nicol and Macfarlane-Dick 2006). Formative assessments in the Biosciences Department are conducted via audience response systems (Turning Point) and traditional exam review sessions. Other formative assessments used by faculty in the department include “clearest and muddiest point” student responses to lectures and/or reading assignments, and ungraded practice quizzes. An interesting example of a formative assessment used to help students is the progressive short answer portion of the Bio 156 course. Students are given difficult short answer questions as extra credit questions on every exam. Students figure out that if they go the extra mile to understand difficult concepts and can write a clear answer that this translates into free points. With each exam, the percentage of short answer questions in the normal credit section of the exam increases. This progression helps students learn to write effective short answer responses.

The Biosciences Department has also participated in campus-wide assessment efforts, including the Information Literacy Assessment (iSkills, 2008) [Average PC student score: 133, Average Bio student score: 141], Oral Presentation Assessment (Bio 105 presentations, 2010), Critical Thinking Assessment (2009).

1.e. Authored by Amanda Chapman, M.P.H., Residential Faculty

- Provide a summary of your department’s assessment data and discuss the outcomes of your department’s analysis of this data.

An online formative assessment was implemented in several of our sections including BIO160, BIO205 and BIO100. Overall, areas of student satisfaction were as follows: course instructions were clear, classes were well organized and directions were easily understandable. Assignments and assessments were reflective of the material presented in the course and students clearly understood how these were graded. Additionally, students felt that it was easy to keep track of their progress and that assignments helped them to learn. Finally, most students felt that their instructor responded to questions within a reasonable time frame.

This assessment indicated that the areas of greatest dissatisfaction for students were in peer-peer and peer-instructor interaction. The survey demonstrated that while approximately 3 out of 4 students felt encouraged to interact with their teacher and peers, only approximately 1 in 3 of students felt this interaction was effective.

Assessment data was also reviewed in the BIO156 Professional Learning Community (PLC). This data preliminarily indicated that the newly implemented prerequisite requirement is improving the completion and success rates.

1.f. Authored by John Schampel, M.S., Residential Faculty

- Describe follow-up actions based on assessment of student learning: How will/has your department use(d) these data to make changes/improve student success? What are/were the follow-up activities and actions in your department as a result of your analysis of data?

The survey described in section “E” above was designed by our Online Learning Professional Learning Community to gather formative data to allow for improvement on the part of the instructor and in the design of the course. This instructor-driven, course-specific improvement will be assessed through the use of a summative tool that was designed with input from the Online Learning PLC in consultation with representatives from the eLearning committee for the online Biology courses. This summative assessment was implemented in the Spring of 2012 and results have yet to be analyzed.

Prior assessment of student learning on the department, college and state levels has indicated that many of our students could benefit from improved written and oral communication skills. In response to this, several of our courses have implemented both notebooking and white-boarding interventions in our courses (BIO181, 160, 100). The notebooking model is based upon research from the Communication in Science Inquiry Project (CISIP) and has been extensively adapted to the needs of our student population. Notebooks are assessed with a standard rubric that is similar across the courses. The white-boarding intervention involves best practices as defined by research in the Science Modeling project at Arizona State University, once again, extensively adapted for our student.

Commented [1]: patpt03961: Need to make sure that “notebooking” is consistent throughout. Is it notebooking, note booking, etc. Similar with white-boarding.
population. This intervention requires students to systematically uncover knowledge through the use of scientific processes. They then must define that knowledge through the process of making a claim and support it in both written and oral formats to their peers. This process of presentation of findings and oral discourse about said findings is supportive both of the learning process and of acquiring requisite communication skills necessary in both science and higher education in general.
II. Report on Recommendations from previous Five Year Review

Authored by Mark Rosati, M.S., Biosciences Department Chair

- Provide an update on actions/improvement priorities from the most recent program review recommendations.

Renaming the department from Biology to Biosciences:

Biology, as a discipline, is made up of highly diverse and multi-disciplined areas of research, health-care, agriculture, and industry. Biology includes a range of areas, from environmental sciences and ecology, to medical sciences and a myriad of molecular level specialties. Consequently, we have updated the name of our Department to Biosciences to encompass the rapidly changing, diverse and multidiscipline nature of the biological sciences.

Updating Mission and Goals:

Our last revision of the department Mission, Vision, and Goals was completed for the last Department 5 year review. The new revised version for 2012-2013 is:

Mission:

The Phoenix College Biosciences Department is committed to providing high quality instruction in the biological sciences.

Vision:

The Phoenix College Biosciences Department will promote current bioscience education by utilizing research-based best practices and providing access to relevant scientific experiences.

Goals:

1. To ensure relevancy in biosciences curriculum employing current best practices and instructional technology.
2. To promote community relationships, service learning, and internship opportunities.
3. To encourage interdisciplinary collaborations to enhance student success.
4. To employ and retain biological scientists as faculty.
5. To encourage professional development for all department members.

Changes to Biology faculty minimum hiring qualifications:

The Phoenix College Biosciences faculty have a combination of education and science experience that rise far above the MCCCD required minimum qualifications, as
we all have substantive biological research, publishing and science education experience. The Phoenix College Biosciences Department has hired faculty and staff with current experiences in real scientific research and science education. To support the continuance of hiring and retaining of high quality scientist educators Department Chair, Mark Rosati, proposed changing Biology faculty minimum hiring qualifications to increase the depth and breadth of science training in our biology faculty hiring. This proposal was approved by the Biology Instructional Council (BIO IC) unanimously. The minimum qualifications are:

“a Master’s degree or higher in a biology related discipline, in a medical or health related discipline, or in education, with a minimum of twenty-four (24) upper division and or graduate semester hours in a biological or life science.” The required 24 hours of biological science semester hours includes a detailed list of acceptable areas within the biosciences.”

Proposal to change science lab work load:

In addition to changing the minimum hiring qualifications for biology faculty, Biosciences Department Chair, Mark Rosati, proposed changing the definition of work load for lab class teaching. Currently, science lab classroom work load is assigned for ⅔ of the lab classroom time being taught. One third of lab class time is designated as student directed with no instructor support or instructor preparation thus no pay for one third of the teaching time. This assumption does not reflect how we teach biology labs or how MCCCD Academic Affairs expects us to teach labs. In reality, lab science faculty are engaged and actively managing and teaching students for the entire duration of lab class time. The proposal is to make the teaching time equivalent to the designated work load. Our college District, MCCCD strongly promotes and funds the development of highly interactive lecture and lab course approaches. We as biology faculty create a learning environment that engages students in active and inquiry-based learning activities. Instructors must continuously instruct, supervise, and train students who are multi-tasking during lab in the use of a myriad of laboratory equipment and chemical and biological supplies that all have potential risk to students. The highly interactive nature of lab instruction should be commensurate with equal loading. Unlike a very traditional University approach to science lab instruction, MCCCD biology lab instruction is performed by faculty actively teaching, not student teaching assistants. The creation, development, testing and maintaining of current student lab activities is equivalent to an entirely separate and different prep than biology lectures. That means for every course we teach, we have two different preps: one for lecture and one for lab. This proposal for equal work loading for lab class time has been tabled as college Administrators have opposed this proposal.

Approved course prerequisites:

Most biology courses require students to have college-level abilities in reading, analytical skills, and technical writing to succeed in class. The Biology Instructional Council (BIO IC) had discussed strategies for increasing student success and retention in courses that require prior science, reading and writing skills and education. We determined that students
enrolling in majors and health-care biology benefit from remedial college coursework. Students enrolling in BIO 181 (majors introduction), BIO 156 (health-care occupation introductory biology), BIO 201 (health care anatomy and physiology) and BIO 205 (microbiology for health care) must pass a reading assessment test that qualifies them for college-level critical reading (CRE 101) over remedial level preparation.

Academic support for students:

The Phoenix College Biosciences Department has kept pace with several areas of advancements in college teaching and student support including developing and deploying academic student support programs, increasing use of assessments for student success tracking, creating an ongoing High School student dual enrollment internship program, and making advances in classroom teaching technologies.

1. Developing and Deploying Student Academic Support Programs:

   Two lab classrooms and one Department Office space have been developed as student tutoring centers during low use times and days of the week for all classes offered by Biosciences. Each room is staffed with faculty and student tutors that have successfully completed the courses they tutored. Drs. Robin Cotter and James Sinner have begun an exciting Supplemental Instruction program. Supplemental instruction involves employing students to become tutors for the courses in which they have been successful. Many of our full time faculty serve as student athlete advisors; James Sinner (temporary full time contract faculty), Patricia Finkenstadt, James Neuenfeldt, Robin Cotter and Jon Hayashi (temporary full time contract faculty) to support student athletes success. Dr. Robin Cotter has worked as an integral part of the campus Learning College to integrate a more seamless approach to teaching and service to students on a college-wide basis. An important contribution to students in the Biosciences Department has been to build course specific tutoring and student support program for students that we have identified as at-risk for success.

2. High School Internship and Dual Enrollment pipeline:

   Biosciences faculty, Amanda Chapman, started a Phoenix College Robotics Club to compliment the PUHSD Bioscience High School student Robotics Club. Amanda recruited Biosciences Lab Manager Joshua James to be a club advisor. This club was successful at establishing funding from the Phoenix College Title V grant for robotics equipment. Our High School internship program started and maintained by Amanda Chapman recruits senior high school students into a lab project internship. These students work with Amanda and our lab manager Joshua James to develop projects that establish a scientific process that can be carried out and completed within the school year. Students gain a working knowledge of hypothesis testing and the use of lab equipment to carry out their tests. High school interns then present their work at college forums for undergraduate research and at their high schools as senior capstone projects.
3. Teaching technology and online teaching developments:

For the past decade, an important goal has been to improve and update the delivery of our courses to students. Working with our library faculty we have developed information literacy activities for students that include student assessment of skills gained from their training. Our faculty consistently employ new audiovisual and computer teaching technologies to enhance student engagement and learning. Some of these technologies include electronic student responders, Smartboards, student WIKI site development, Panopto lecture AV capture technology, and several others. In our lab classrooms we have developed several digital microscope camera technologies to capture live images as a teaching tool for live in-class use and for students to capture images for projects.

Increasing the number of online courses and online support of traditional classes:

We have converted a number of courses from face to face to fully online: BIO 100 (Neuenfeldt and Pepe), 160 (Chapman), 108 (Neuenfeldt), and 156 (Neuenfeldt and Pepe). We have also converted courses to Hybrid courses, where the lectures are online, but the labs are in person: BIO 181 (Marti-Subirana), BIO 201 (Finkenstadt), BIO 205 (Cotter).

In addition to creating more online courses, we have added online support resources for traditional classes. All in-person courses offered in the Biosciences Department now have a wealth of student support materials online for all students, with required work and activities online developed and deployed by each faculty.

Challenges to enrollment:

The biosciences have always experienced strong enrollment trends as we offer classes in general education requirements, science majors that lead to professional degrees and local patient care programs. However, we have significant institutional obstacles to enrollment. The most significant challenges to enrollment in the biosciences have been, limited lecture and lab classroom spaces, severely understaffing of full time faculty and work load limits on adjunct faculty, and increasing poor service with class scheduling offices on campus.

We have had to continue to offer many of our courses to part time faculty as a result of maintaining annual full time faculty understaffing rates ranging from 30% to 50%. A further exacerbation of our understaffing problem began in Summer 2011. MCCC District Employee Services enforced a policy limiting the work load of part time faculty; thus we have and will continue to experience a decrease in course offerings due to the lack of available qualified adjunct faculty. In effect, our adjuncts can only teach one course at one campus. We have had to hire 30% more part time faculty within a couple of months to cover existing courses that were fully enrolled. This increased need to attract and retain 30% more part time faculty to maintain enrollment trends is very difficult given the competition with 9 other Biology Departments in MCCC.
Another obstacle to biosciences student enrollment has been a significant and repeated level of class schedule errors. Departments submit future schedules and schedule changes to a scheduling service on campus. These new schedules and changes are then input into the campus student information system. Recently, for each future schedule and existing changes we have submitted, more than 30% of these changes have been incorrect or neglected. As open student enrollment begins for each semester, scheduling errors have created confusion for students and a huge amount of repetitive work for the Department Chair and support staff. Consequently, all Biosciences faculty are asked to carefully review their future schedules repeatedly during each semester as we identify a significant number of errors each time the schedules are reviewed.
III. Departmental Data Analysis and Quality and Effectiveness

Authored by Mark Rosati, M.S., Biosciences Department Chair

- The department will provide a summary evaluation of the data to include new courses, programs, reallocation of existing resources, and other actions as determined by analyzing the data.

Trend Data for Biosciences Department Faculty and Staffing:

A significant challenge to increasing class offerings has been the lack of staffing and new Employee Services policies that limit part time assignments. Staffing includes full time faculty and support staff and adjunct faculty. About 50% (4 out of 11) of the Biosciences full time faculty have been temporary employees for the past several years as full time replacements for retirements have not been equal. Temporary faculty positions are assigned near the end of each academic year making accurate scheduling for classes impossible to predict each year. This neglect in full time replacements has made the addition of new class sections for enrollment growth during a growth boom for biosciences classes a serious problem and class scheduling for each semester a guessing game. Our full time faculty (temporary and appointive) have been wonderfully helpful as each have taken on overload classes every semester for the past several years to help our deficit. During the Summer of 2011 MCCCD Employee Services Administration instituted and enforced a limit on part-time faculty teaching loads. As a result, Biosciences had to recruit and hire ten new part time faculty within a month to make up the vacancies created by the policy. Further, several existing part time faculty left teaching as they needed other employment to make up for these new limits. The overall impact on the Biosciences Department class offerings has been negative as we have more difficulty attracting and retaining the additional part time faculty to cover existing classes as we compete for a limited number of part time faculty with the nine other MCCCD campuses. Consequently, we have had to cancel several classes this past year due to lack of adjuncts.

Since 2000, the Biosciences Department has been understaffed as approvals for full time faculty have never kept pace with our retirements while having a constant increase in in enrollment trend. Over the past several years faculty members John Arle retired in 2006, Phil Tate retired in 2007, Phil Pepe retired in 2009, and Mickie Bond in 2011. Since Fall 2011, we are understaffed by 50%, our calculated full time faculty is 13.67, compared to our actual faculty of 7. In a comparison to other campus BIO faculty in MCCCD, PC BIO is the most understaffed. Faculty vacancies have thus increased during while BIO enrollment has steadily increased overall with respect to the campus enrollment.
Trend Data for Biosciences Department Enrollment (FTSE) since 2001:

Since 2001 we have had an overall enrollment increase of 83% as compared to our campus that has remained essentially constant over the same time period. Since our last review in 2006, BIO enrollment has increased by over 40%. In order to help alleviate this increase BIO course demand we have significantly increased part-time faculty since we have had no increase in the number of full time faculty from 2001.
**Trend Data for Classroom Size and Room Utilization:**

Biosciences at Phoenix College are efficient stewards of classroom space. Our class sizes and utilization of classroom capacity have been significantly greater than the PC campus and other BIO classes throughout MCCCD. Large class sizes create a high student to teacher ratio. MCCCD and all community colleges promulgate small classroom environments with more instructor interaction and support for greater student success and retention. We have, however, consistently applied for more full time faculty to help decrease our student to faculty ratio but have been unsuccessful and thus have had a long history of being one of the highest understaffed disciplines at PC.

PC BIO lecture classes average more than 25% more students per lecture than other MCCCD BIO classrooms and almost twice the number of students in PC BIO lectures as compared to other PC campus classes averaging about 40 students per BIO lecture class and an average of 20 student for non-BIO lectures. BIO lab classrooms fit a maximum of 24 students as this a lab class size restriction. We enroll 24 students and average 21-22 students per classroom by midterm. As compared to other labs at PC we average more than twice the number of students per lab classroom.
Student Survey Trends:

Evaluations of faculty by their students is an important measure of quality giving some of the student perspective on teaching effectiveness. All Biosciences students are given faculty evaluation surveys every semester. The Biosciences Department evaluations consistently contribute to about 11% of campus evaluations. Two separate surveys are given, one for lecture and one for lab classes since the student activities and approaches in lecture and lab are different. In the Fall of 2011 our online faculty have developed an online specific student evaluation and it will take several semesters of evaluations to accumulate meaningful data. Over the past six years BIO lecture evaluation results have been consistent with no significant changes over this period. BIO lecture evaluations have been similar to the overall campus evaluations over this same time period with BIO rating above the campus average in five of the ten measured semesters. The survey averages are from twenty questions that refer to six factors for students to rate on a scale from zero (lowest) to five (highest). These sections of measure include: Course Assignments, Course Objectives, Instructor Commitment to Student Learning, Instructor/Student Interaction, Testing and Preparation and Organization.
In 2011, the Biosciences Department created a student survey to evaluate faculty in lab class since the lab classroom environment and lab specific activities were not represented in the existing survey. We first implemented this survey in the Fall 2011 semester and thus have only one semester of data. Although there are no other lab class surveys on campus, the average BIO lab evaluation rating is 4.66 as compared to the ten semester BIO lecture average rating of 4.53 and campus average of 4.47. Students report that teaching and activities in lab are effective and that safety considerations are appropriate. It will take several semesters to acquire meaningful trend data however 4.66 out of 5 indicates positive feedback from students covering sixty lab section evaluations.

The BIO lab surveys have nine questions rated on a scale from zero (lowest) to five (highest) similar to the lecture evaluation scale. These questions are:
1. Instructor is prepared for lab activities.
2. Instructor is effective in teaching laboratory activities.
3. The instructor uses lab time effectively.
4. Instructor shows students how to effectively use lab equipment and supplies.
5. Instructor presents the safe use of equipment and supplies and safe disposal methods.
6. Instructor effectively utilizes visual aids, handouts, and technologies to support student understanding and learning.
7. Instructor effectively interacts with students during lab activities.
8. Instructor monitors the progress of lab activities.
9. Laboratory activities support concepts learned in lecture.
Community College Survey of Student Engagement (CCSSE) data:

The CCSSE survey focuses on classroom practices and student behaviors that relate to student engagement and are correlated with student learning and retention. Benchmark results relate to five areas of educational practice that include: Active and Collaborative Learning, Student Effort, Academic Challenge, Student-Faculty Interaction, and Support for Learners. The CCSSE survey results for the Biosciences Department in 2011 are taken from one lecture of Introductory Biology for majors (BIO 181) with N = 33. The last CCSSE completed for Biosciences in 2006 was from the same course, BIO 181 lecture, with N = 35. Overall, the mean differences with comparable institutions indicate the Biosciences assessment of student engagement in Biosciences at PC is very positive as results are above comparable institutional measures and Active and Collaborative learning that is equal to all other measured institutions.

The largest increase in student engagement from 2006 to 2011 was in Academic Challenge with a mean score difference of +4.8. Compared to PC campus, all Maricopa colleges, and large comparable colleges, Biosciences at PC has a +9.8, +7.7, and +5 mean difference respectively. This increase in Academic Challenge for BIO from 2006 indicates an increase in course work, learning new skills, and student off-campus responsibilities that may be interfering with student success and retention. Students enrolling at Phoenix College may be less prepared for science coursework than other disciplines surveyed thus reporting a significantly greater Academic Challenge than the college +9.8 difference. In Fall 2011 our instructional council approved a prerequisite measure to help increase student success and retention adding a passing score in a remedial reading assessment to enroll in BIO majors courses.

The next increase within BIO at PC from 2006 in a benchmark factor is Support for Learners at +1.86. Compared to PC campus, all Maricopa colleges, and large comparable colleges, Biosciences at PC has a +2.7, +1.7, and +2.4 mean difference respectively. This measure refers to non-academic support of students and may relate to BIO classroom policies.
and practices that have taken student personal into greater consideration. BIO PC faculty allow make up for work or classes missed, dropping of a low scores from evaluations that repeat through the semester, and a significant shift to online work that creates a flexible environment for off campus work as it can be achieved anywhere with internet access.

**Student Effort** also had increased in BIO at PC from 2006 by +1.01. Compared to PC campus, all Maricopa colleges, and Large comparable colleges, Biosciences at PC has a +9.6, +10.8, and +9.2 mean difference respectively. Our increase since 2006 is modest at +1.01 however, BIO is about +10 points over our campus and other colleges. Student effort relates to students preparation for class and the use of academic support such as tutoring. Biosciences has consistently delivered a system of academic student support with biology tutoring within our department using lab classrooms and department office space. We have increased our course specific tutoring starting a tutor training for supplemental instruction outside of the classroom. We train students that have been successful in our courses to deliver support to students for difficult content and activities that require skill development.

Our **Student faculty interactions** benchmark has decreased slightly from 2006 by -1.51. However, compared to PC campus, all Maricopa colleges, and large comparable colleges, Biosciences at PC has a +7.6, +7, and +5.9 mean difference respectively. Our decrease from 2006 is slight at -1.51 however, BIO is significantly higher than our campus and other colleges. We succeed in student instructor interactions as a result of our rapid and substantive feedback and grade returns. Although PC students reported that they use email communication less than at other institutions, Biosciences students must interact with instructors by email and through Blackboard online delivery as all of our classes require this access and communication mode. Additionally, we make ourselves available for college and career advice in class, out of class, and with supplemental instruction tutors.

CCSSE benchmarks for **Active and Collaborative Learning** show that Biosciences had a slight decrease in our mean from 2006 by -2.03 although we are higher than our campus by +2.1. Compared to all Maricopa colleges, and large comparable colleges, Biosciences at PC has a -1.4 and -0.2 mean difference respectively. The data is taken from one lecture section of biology for majors and thus does not reflect all Biosciences classes at PC. All of our courses employ Blackboard internet applications, information literacy and many written assignments. To help increase student interactive activities, majors biology instructors are currently developing class presentation projects for data analysis and group projects out of class in information literacy. These targeted projects have previously been individual student work.
In summary, CCSSE benchmark data shows that the PC Biosciences Department has performed equal to or greater than our college, colleges in our district and large comparable colleges nationally. Improving the quality of student academic support, content delivery and the training of our students in science-specific skills is a fundamental strategy and goal of Biosciences at PC. In the lab sciences, we have additional challenges of providing student support in technical and analytical writing and reading skills, mathematics and the understanding of data and data analysis. Many of our students are not prepared for college-level lab science classes and have the additional burden of work and commitment to dependents outside of their educational and career-goals thus impeding their success and persistence. Our goal is to continue to improve on student accessibility to academic support and the development of class work activities that are flexible using online delivery modes.

Noel-Levitz 2010 data:

The Noel-Levitz student surveys address the overall experience and perception of students enrolled at the college. Nation-wide data shows that college students have the greatest challenges entering their second year of college producing a high second year
attrition. Causes of this attrition relate to financial aid and student advisement. Noel-Levitz identifies student persistence requiring a greater presence and involvement of college resources toward improved and more efficient and effective financial aid, flexible payment plans, and majors and career planning. In the Biosciences Department, Noel-Levitz surveys were given to students in three classes taught by part-time faculty. The classes surveyed one night section of a non-majors general education course, (BIO 108), one section of an introductory biology course for health-care program (BIO 156), and one section of a required health-care program anatomy and physiology course (BIO 201).

Areas of strengths identified by Noel-Levitz related to academics are excellent quality of instruction, faculty being fair and available and adequate support in computer labs and library services. Those areas identified as opportunities for improvement in academics are more convenient class times, early alert of grades, and academic advisement. The Biosciences Department has been creating online and hybrid versions of each face to face course to increase accessibility and enrollment. We also offer face to face classes during days, evenings and weekends to meet the needs of students. One limitation in face to face science class offerings are lab meeting times that require students to have additional class meetings per week compared to non-science courses. To minimize the impact of having multiple meetings per week on students we offer labs once a week and lectures twice a week for each course. All of our faculty use the internet via Blackboard and the students Gmail account to post grades and student progress in a rapidly after each graded evaluation thus keeping the student aware of their progress all throughout the semester.

Although all of the surveyed Biosciences classes were taught by part-time faculty, Biosciences contribution to campus positive outcomes are related to our process of support and training and the emphasis on preparation and consistency in the classroom of part-time faculty.

In addition to many of our strengths, Biosciences faculty have all moved a significant amount of coursework to Blackboard (internet) format and incorporated many new teaching technologies to further help students with accessibility and enhanced delivery methods. We use student remote response technology in face to face classes to facilitate student understand of content and receive non-verbal feedback to course materials. Other classroom technologies we use are monitor stylus for PowerPoint slide markups and emphasis during lecture. Since 2000, we have participated in and initiated several cross-curriculum projects with English, Chemistry, Math, Reading and Library faculty to develop learning communities and common conceptual activities for students. Currently, through a Tile V grant we are working on several Professional Learning Communities that involve courses that students enroll in concomitantly. We also offer career and course, and internship advisement sessions for Bioscience students that are health-care and STEM career specific, for example our faculty is the lead advisor for the Pharmacy Club and another co-leads the Science Club. Many of our faculty student advisors with the student athlete academic success program (SASS) on campus advising and tutoring students. Student tutoring has been a priority for our department and we have increased biosciences tutoring significantly since our last department review. We use several Biosciences classrooms for out of classroom
supplemental instruction. Supplemental instruction and tutoring is done by faculty and students that have been successful in course they tutor.

Authored by Mark Rosati, M.S., Biosciences Department Chair; Joshua James, B.S., Lab Coordinator and Matt Haberkorn, M.A., Lab Technician

Laboratory classroom operations and support in student labs:

Operations - Lab technicians Joshua James and Matt Haberkorn directly support Bioscience student lab activities. During a typical week, Joshua and Matt provide laboratory activity preparations and support for approximately 70 individual student laboratory sections. This works out to nearly 1000 individual lab section preps and support during the course of a term. These preps involve nine different lab courses, each course with approximately 14 different lab activities and experiments directly utilized by students.

The Phoenix College Biosciences Department strives to promote current bioscience education through a dynamic and broad curriculum and relationships with health care, biotechnology, and environmental organizations in the community. The laboratory rooms of the Bioscience Department at Phoenix College occupy over 14,000 square feet of the first floor of the Dalby building which was built in 2000. Among the lab rooms there are two specialized labs, the microbiology lab and the anatomy and physiology (A&P). The microbiology lab is equipped with four incubators and a level II biosafety cabinet. One A&P lab has a two tiered cadaver room with a digital camera and two LCD displays. In order to ensure that students get the best learning experience possible, Bioscience Department lab technicians regularly monitor operations and equipment to ensure all labs run smoothly. Inventory is taken on a daily basis to ensure there are ample supplies to meet the demands of the teaching labs without incurring the cost of expedited last-minute shipping and avoiding overstocking. After the completion of each lab week, a debriefing is held with the instructors to insure that the lab went as expected and to address concerns with the set-up, equipment, and reagents used during the execution of the laboratory exercise. In order to ensure that equipment is working optimally, routine inspections are performed.

Student internships and undergraduate research: In 2008, the Bioscience Department faculty took the opportunity to host interns from a local high school. The program was designed to give students the experience of working in a science lab as well as giving them the opportunity to do independent undergraduate research by working closely with Joshua James and Matt Haberkorn. In 2009 the intern program was expanded by lab technicians Joshua and Matt, along with faculty advisor Amanda Chapman and offered as the independent study course Bio 298. College and high school students enrolled in Bio 298 develop independent research projects which are publically presented at college and high school forums for undergraduate research. The program is now in its third year and we intend to further expand student offerings.

Robotics in Biosciences - During the spring semester of 2010, Amanda Chapman and Joshua James became the mentors of the Phoenix College Robotic Club. An important goal
of the club is to involve PC students in a project to design, build and program robots thereby increasing student interest, engagement and retention in STEM programs.

**Departmental Laboratory and Operational Budget:**

The Biosciences Department mission and goals specify that we will deliver a high quality classroom experience, with up-to-date equipment and supplies that reflect the workplace or are used to develop student skills for success and career choices. Our mission states that the "Phoenix College Biosciences Department faculty and staff are committed to providing relevant and current biology instruction in an accessible and respectful atmosphere." Our goals include: "1. To facilitate an accessible, safe, and respectful learning environment for students, faculty, and staff. 2. To encourage and broaden the student learning experience by employing a variety of instructional delivery methods and current technologies. 3. To ensure relevancy in bioscience education by reflecting current practices and technology used by industry and research in health care, biotechnology and environmental areas."

Because the PC Biosciences Department does not receive college operational funds for classroom equipment and supplies, student printing and binding, supplies and equipment, student course fees must cover all aspects of the science lecture and lab classroom materials, equipment, supplies and expendables for the Biosciences Department's instructional activities. Our department classroom and laboratory operations and student support programs serve over 4,000 students per year. To maintain adequate instructional facilities and equipment, we carefully follow a strategic plan for the maintenance and replacement of equipment from semester to semester and year to year. Most of our equipment must be replaced or significantly rebuilt in 3 to 5 years. Human cadavers need to be replaced every 3-5 years. Many of the large pieces of equipment require an annual service contract to save costs on emergency breakdown that interrupt service to the students.

This is a list that provides a good overview of the facilities, equipment and student support services we maintain through student course fees:

- 7 teaching lab classrooms
- 1 student tutoring and support room with 4 computers
- 6 classroom preparation rooms
- 3 supply storage rooms
- 1 wash and sterilization room
- 1 equipment and supply receiving area
- 52 student teaching lab computers 50 student teaching lab notebook computers
- 125 student microscopes 100 student dissecting scopes
- 150 human anatomy models
- 50 human bones with skeleton
- 7 supply refrigerators
- 5 incubators
- 4 light/grow boxes
- 3 supply freezers
- 2 sterile work hoods with HEPA filters
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2011-2012

- 2 centrifuges 2 microcentrifuges
- 21 spectrophotometers
- 100 micropipettors
- 280 square foot greenhouse
- 1200 square foot outdoor garden
- Cadaver lab room with cadaver chemicals and storage containers and gurneys
- 5 human cadavers (which must be replaced every 3-5 years)
- 1 water softener
- 50 gallon capacity reverse osmosis
- Autoclave sterilizer
- Basic set of hardware tools for limited repair maintenance

In addition to these equipment needs, we employ two hourly staff to provide lab technical support during hours of student class utilization and preparation. Our technical staff supports and maintains living and preserved animal, bacterial, and plant cultures. We also use our student course fees to support our students with 6 part-time tutors that tutor during student convenient hours in the Bioscience Department classrooms.

Finally, we use course fees to cover printing and binding of student materials to reduce the financial burden on students to purchase printed materials at retail costs since we are charged an institutional rate per MCCCD contract. We consistently look for in-class provided printed alternatives to textbooks, because science lecture texts cost between $150 and $250 and lab texts cost between $50 and $100. To control printing, all of our courses include internet-based student support materials that can be accessed by students on a 24-hour basis. Our costs for printing and binding cover handout materials for about 4,000 lab students and 4,000 lecture students per year, which include notes, detailed instructions, activities, quizzes, worksheets, and exams.

In short, maintaining high quality biosciences educational experiences and opportunities for our students involves a substantial budget for facilities, equipment and student support services and materials. We provide and excellent level of service and equipment for students to use while being careful stewards of our student course fee fund, to ensure that our expenditures provide value directly back to our students.

Student Demographic Trends:

A comparison of student gender in Biosciences courses shows that the percent of males to females has increased since the last report. This trend of higher male enrollment may relate to the higher unemployment rate as more males maybe pursuing health-care related careers since job opportunities are much greater in these related fields.
The percent of Biosciences student ethnicities have remained similar to the campus percentages since the 2006-2007 review. The percent of Hispanics have increased by about 5% to equal the percent of white students in campus and Biosciences enrollment since the 2006-2007. The change in Hispanic enrollment may relate to the overall increase in MCCCD and PC enrollment in the past several years or may relate to employment status.
Student age demographics are overall not significantly different from the last review in 2006-2007. The 15 to 19 and 20 to 24 age group has shown decreased enrollment, about 4% per group, in BIO courses compared to the last review. Younger students may need to have more hours of employment to help support families affected by the decreased overall employment.
Responsibility: The Phoenix College Biosciences Department demonstrates responsibility in a variety of ways.

1. Good stewardship of resources. Biosciences Department maintains nearly $2 million dollars of laboratory supply and equipment. We strategically plan our course fees and purchases so that we have an adequate supply of expendables each semester. We also include planning for regular maintenance of equipment as well as allow for emergency expenditures.

2. Use of online learning resources. Where appropriate, Biosciences faculty utilizes online resources for course content. Over the past several years, the Biosciences Department has increased the online and hybrid course offerings in BIO100, 108, 145, 156, 181, 201, 202, and 205. Furthermore, the in-person courses utilize online resources to decrease the usage of paper and other expendables.

3. Development of student-centered areas and materials. The Biosciences Department and faculty have established a Student Support area within the departmental office suite where students can get one-on-one tutoring support with faculty and peer-tutors. Many courses offer open lab and regular review sessions that increase student success and retention.

Collaboration: Bioscience faculty and employees are involved in a variety of collaborations with colleagues in the department, college, and the community.
1. Collaboration within the department. A number of Professional Learning Communities (PLCs) exist within the department. We have a PLC for online learning aimed at increasing the efficacy of online education, a BIO 156 PLC focused on redesigning the curriculum in a collaborative manner, a BIO 201 PLC that developed an innovative and interactive lab project, a BIO 181 PLC working on the incorporation of case studies, and a BIO 202 PLC that has developed an inquiry-based acid-base physiology lab project.

2. Collaboration with college colleagues. Several Bioscience faculty work with a variety of other disciplines to develop curriculum. For example, a series of mini-modules were developed to address student deficiencies in math, chemistry and biology. This project was developed in conjunction with bioscience, math and chemistry faculty. Another example is the development of Bio Bootcamp, which was developed in conjunction with Library faculty. Other collaborations with library staff in the development of courses activities, particularly in BIO 105, 108, 156, 181, and 202. Many of these courses utilize embedded librarians to increase student support in information literacy and research skills. A recent collaborative project has increased the Honors offerings in Biosciences. Drs. Ortiz, Sinner and Finkenstadt have all worked with the Honors programs to develop innovative and interactive projects for Honors sections of several bioscience courses.

3. Collaboration with community partners. A number of the Biosciences faculty are significantly involved in the larger scientific and educational community. For example, Mr. Rosati is on the advisory board for Science Foundation, Dr. Ortiz serves on the advisory board for the Arizona Association for Environmental Education certification programs, Ms. Chapman works closely with Biosciences and Maryvale High Schools to develop dual enrollment courses, Mr. Haberkorn has completed research with the Desert Botanical Gardens, Ms. Bond worked with the Native Seed Search program, Drs. Finkenstadt and Sinner organized a number of cadaver tours for local area middle and high schools, and Dr. Finkenstadt partnered with the Arizona Science Center to offer educational curriculum to local teachers.

4. Involvement in college wide initiatives and projects. Bioscience faculty are routinely invited to participate in college initiatives and projects. Some recent examples include the Learning Commons Initiative, the College Sustainability Project, National Food Day, Earth Day, Sexually Transmitted Diseases seminars, and the Honors program. Furthermore, they work closely with Title V, STEM, ACE and Junior Ace, and the SASS programs. The faculty are also are involved in student life and serve as club advisors for Pre-Pharmacy, Garden, and Robotics clubs.

Communication: The Bioscience Department maintains a significant level of departmental and college communications.

1. The Biosciences Department has regular departmental meetings on an approximately monthly basis. All faculty are invited to contribute informational items to the agenda.

2. The faculty of the department consistently communicate verbally and via email about college- and district-wide events, including Faculty Senate, Phoenix College Leadership Council, Budget Review Committee, Meet and Confer, Staffing, Curriculum, and Assessment. As necessary, informal meetings among the faculty and
employees are held to ensure important information is propagated to the appropriate people.

3. The Biosciences Department web site is kept up-to-date with relevant resources for students, faculty and community members.

4. All full-time faculty maintain regular academic support hours and adjunct faculty are available by appointment to their students. Additionally, all courses have incorporated Blackboard resources into their in-person sections, increases the ability for communications between the faculty and students, as well as among the students themselves.

Evaluation: The Biosciences Department is committed to regular and substantive evaluation and assessment.

1. Several faculty are past or current members of the Assessment Committees. Dr. Cotter served on the Critical Thinking Committee, Dr. Ortiz and Ms. Chapman are members of the Information Literacy Committee, and Dr. Sinner serves on the Numeracy Committee.

2. All faculty incorporate both formative and summative assessments in their courses. Several faculty attended the day-long workshop on formative assessment offered by MCLI.

3. BIO 100, 105, 201 and 205 have utilized several of the college-wide assessment rubrics for Information Literacy, Oral Presentation, and Numeracy. It is expected that additional courses and sections will be evaluated and assessed in the future.

4. All full and part time instructors participate in the student evaluations prepared by the Office of Planning Research and Institutional Effectiveness. The Bioscience faculty consistently score above institutional average on all measures.

5. The departmental Professional Learning Communities are committed to evaluating and improving the curriculum in BIO156, 181, 201 and 202.
IV. Goals and Outcomes

Authored by Mark Rosati, M.S., Biosciences Department Chair

- Identify the goals and outcomes of your proposed five year plan for your department. Include information about the resources and support that your department will need to attain these future goals and outcomes.

The areas that need the greatest attention in the Biosciences Department are increased service to students, the lack of full time faculty, and the increased cost of operations coupled with decreased support. There is a consistent and increased need for focused student support as the number of unprepared students has increased and is expected to continue to increase in the future. The cost of operations increases with each year, and the college has steadily decreased our supply budget. Since the last department review, our college-allotted supply budget was decreased from over $8,000 to about $800 per year. Consequently, we have increasingly relied on course fee revenues for all operations.

Our goals for the next department review are similar to the last stated goals since the demands on our department operations and the needs of our students remain the same. Our future goals are: 1) To increase support activities for student success and retention. For example, we anticipate continued development of student tutoring, supplemental instruction, and online resources. Our focus is on student success in science thus we continue to work on information literacy, critical reading, data analysis, and technical report writing. 2) To continue to request and pursue approval for more full time faculty to close the large and continuing deficit in full time faculty. The reliance on part time faculty is problematic for several reasons; a high rate of turnover, lack of classroom technology ability and knowledge, and far less responsiveness to students. 3) To continue to request and pursue more and larger classroom spaces to accommodate the large biosciences lectures and labs. The Biosciences Department has not been allotted more classroom space since 2000. 4) To continue to develop more online and hybrid classes allowing for more student schedule flexibility and greater non-traditional enrollment sources. 5) To continue to pursue and utilize current teaching and classroom technology in support of student success and retention. 6) To continue to pursue grants for funding for programs designed to increase student success and retention in our classes and STEM areas.