

Focus On Mission

1. Authored by Mark Rosati, M.S.

Describe the program, its mission, and goals. In responding to this question include discussion about:

- How has the program evolved over time?
- Has the context within which the program is expected to operate changed over time? How has the program adapted to these changes?

1.a. Biology Department Mission:

The Phoenix College Biology Department faculty and staff are committed to providing relevant and current biology instruction in an accessible and respectful atmosphere.

1.b. Biology Department Vision:

The Phoenix College Biology 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.

1.c. Biology Department Goals:

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.
4. To promote community partnerships and service learning with biotechnology, health care and environmental organizations and assist students in developing skills to apply in the work force.
5. To maintain a diverse and professional faculty and staff base, to employ trained biological scientists as faculty, and to encourage professional growth for every person in the Department.
6. To introduce students to the variety of career opportunities in the biosciences.

1.d. Background on the Biology Department:

Biology, as a discipline, has developed two relatively new names, Life Sciences and Biosciences, that are frequently used in lieu of 'biology' in an effort to reflect trends that have occurred within the last 25 years. The Phoenix College Biology Department has kept pace with these developments and is a comprehensive lab science department offering courses in the biosciences, including molecular biology, biotechnology, pre-med and pre-allied health anatomy and physiology, microbiology, natural history, environmental science and a Geospatial Technology program.

The field of biology is a broad, diverse discipline, encompassing such study areas as genetics, cell biology, neurosciences, physiology, microbiology, plant sciences, immunology, ecology, anatomy, and marine biology. In addition to covering these fields, the Biology Department also offers courses and programs to teach supportive and employable technology for science applications, such as applied biotechnology, biosciences and geospatial technology, GPS/GIS. The courses we offer serve students in four community demand areas: 1) lab science requirements for general education, 2) health care program prerequisites, 3) science majors that include pre-research, pre-medical, pre-pharmacy, and pre-dental school applicants, and 4) students seeking careers that require geospatial technology training (GIS/GPS). We currently offer BIO 100,105,108,109,145,148, 149,156,160,162,181,182, 201, 202, 205, and 247 and a Geospatial Technology Program (GPS/GIS) BIO 119, 219, 273, 295 with only eight full time residential faculty, one half time faculty, one full time one year temporary faculty, and between 15 and 22 adjuncts during any given semester.

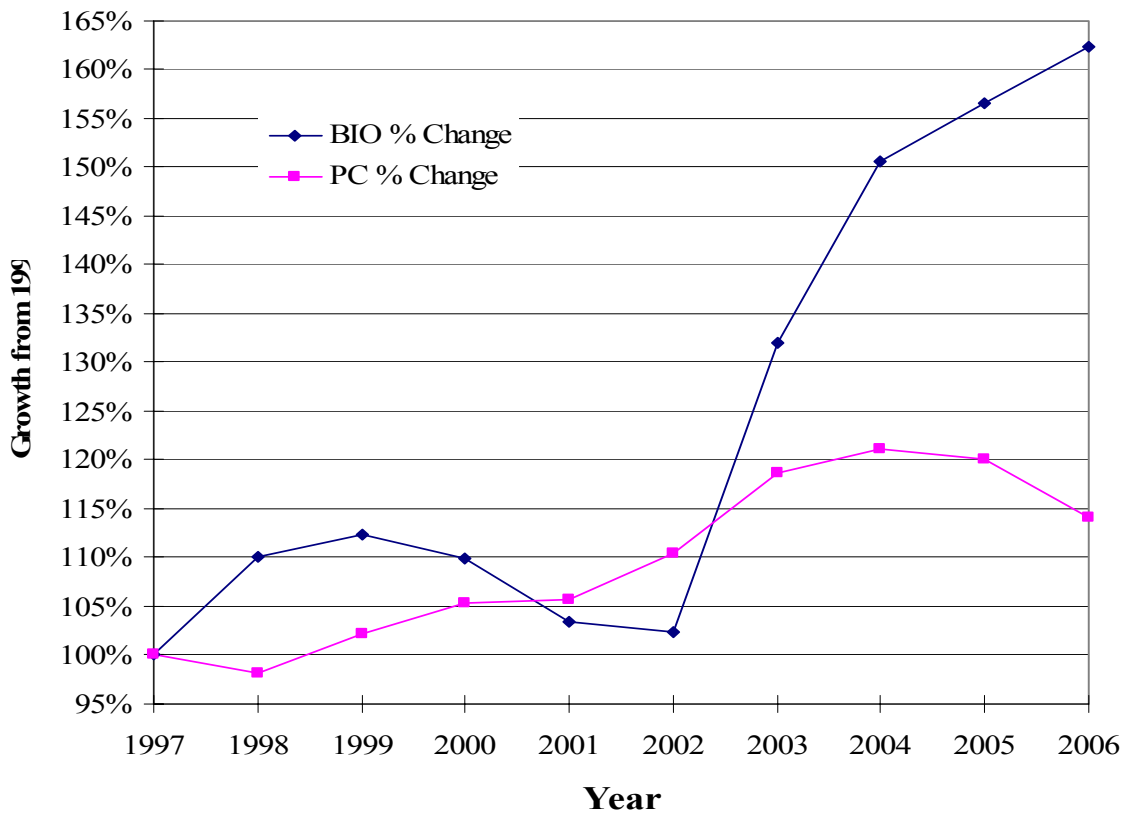
The PC Biology faculty have a combination of education and experience that rise far above the MCCC required minimum qualifications, as they all have substantive biological research, publishing and education experience. The PC Biology Department has hired faculty and staff with current experiences in real scientific research and college education. The experience of performing biology research, including grant writing, publications, and laboratory research, is invaluable as these skills are transferable to the community college setting and offers highly credible validation to our university and industry partners. As each of our faculty have undergraduate and graduate degrees in the biological sciences, each has performed substantive biological research and most have written or coauthored scientific research grants and scholarly reviewed research journal articles. Most biology faculty have been active in substantive college committees and have applied for and received funds for curriculum development, book and web authorship and professional conference travel.

1.e. The Evolution of the Biology Department:

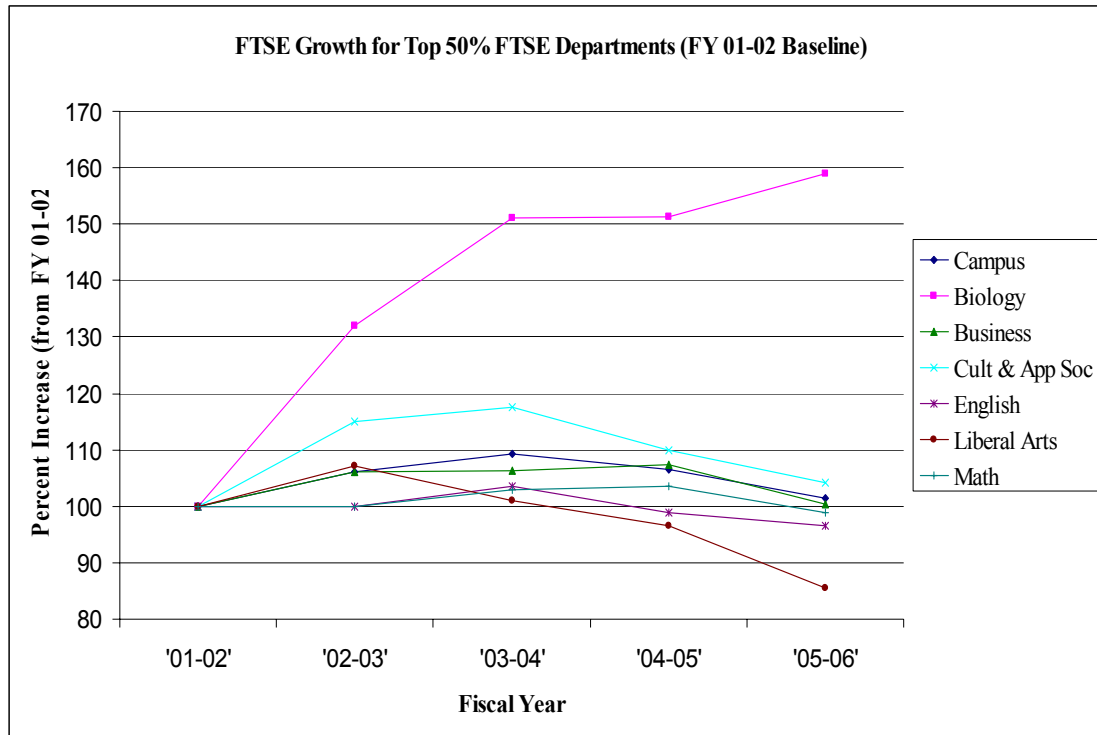
Over the past six years the Biology Department has evolved in several ways: 1) we substantially increased enrollment; 2) we increased and modernized our lab operations and equipment; 3) we considerably increased our course offerings and created three new programs in response to community and industry demand, as well as to meet the diverse needs of our student body; 4) we offer biology student scholarships; and 5) we improved our budgeting process.

(1) Student Enrollment, Instructor Staffing, and Classroom Capacity: The Biology Department at PC has become the largest contributor to campus 45th day FTSE of all Biology Departments in MCCCDC with 7.69% of campus FTSE. The PC Biology Department is the third largest FTSE contributor to PC. Biology Department FTSE has experienced a much faster fiscal year growth rate compared to PC campus FTSE over the past several years. The Biology Department 45th day student enrollment increased from 305.6 FTSE in FY 2001-2002 to 485.63 FTSE in FY 2005-2006, a 60% overall increase, averaging a >10% increase per year as per Planning, Research & Institutional Effectiveness Director report.

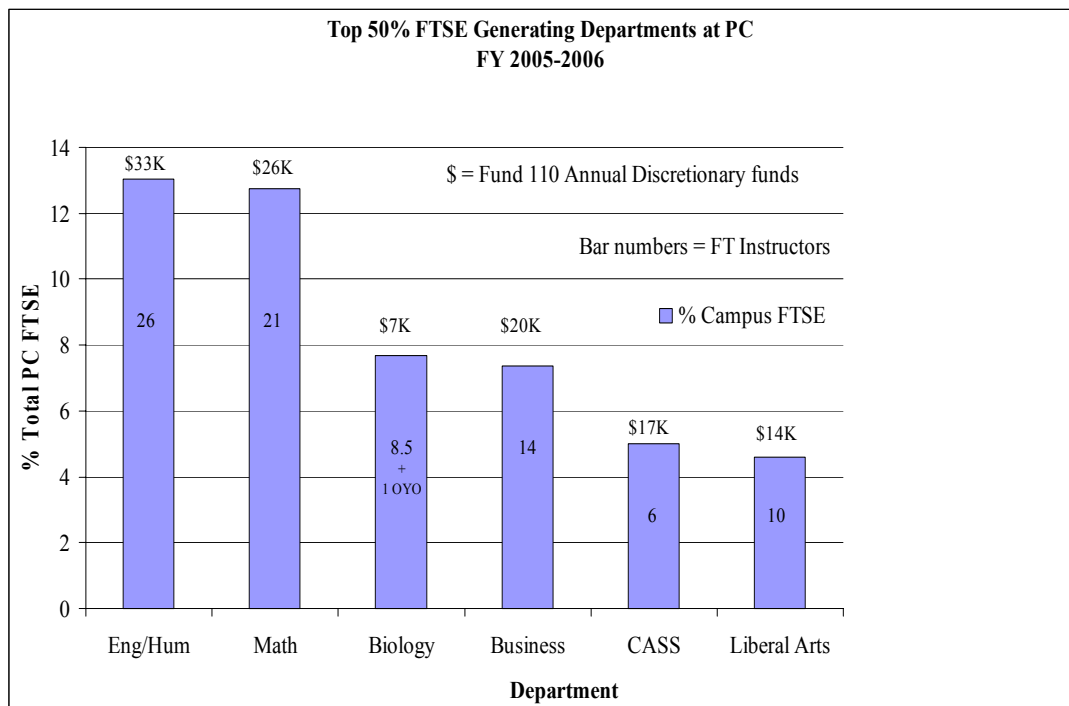
FTSE Growth from 1997 FTSE - Biology v Campus



In comparison, the overall PC FTSE has increased less than 10% since 2001. Biology Department enrollment has had a significant increase in enrollment as compared to the 5 largest enrolling college departments since 2001 as per Planning, Research & Institutional Effectiveness Director report.

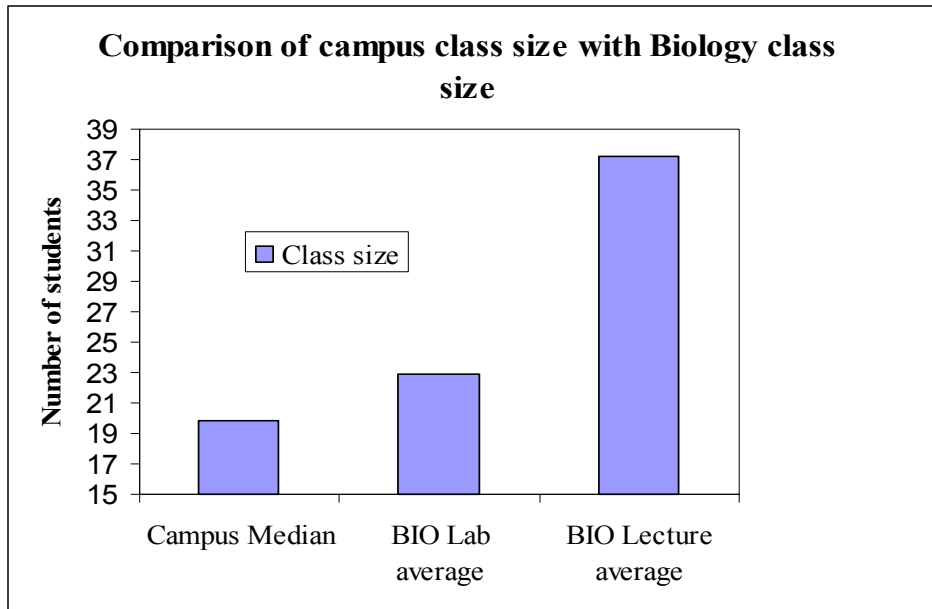


The primary limiting factor on Biology FTSE growth is the continuous understaffing of full-time biology faculty. Even though the Biology Department has one of the highest faculty understaffing at PC for the past six years, we offer an extremely high diversity of classes 100,105,108,109,145,148, 149,156,160,162,181,182, 201, 202, 205, and 247 and a Geospatial Technology Program (GPS/GIS) BIO 119, 219, 273, 295 with only eight full time residential faculty, one half time faculty, and one full time one year temporary faculty. The highest number of faculty in the Biology Department was attained in 1994 with 9 full time faculty. Since 1999 there have been a series of retirements that have decreased the number of full time faculty only this year FY 2006-2007 rising to 8.5. The number of adjunct faculty hired has varied from 15 to 22 per semester depending on availability between FY 2003 and 2006.

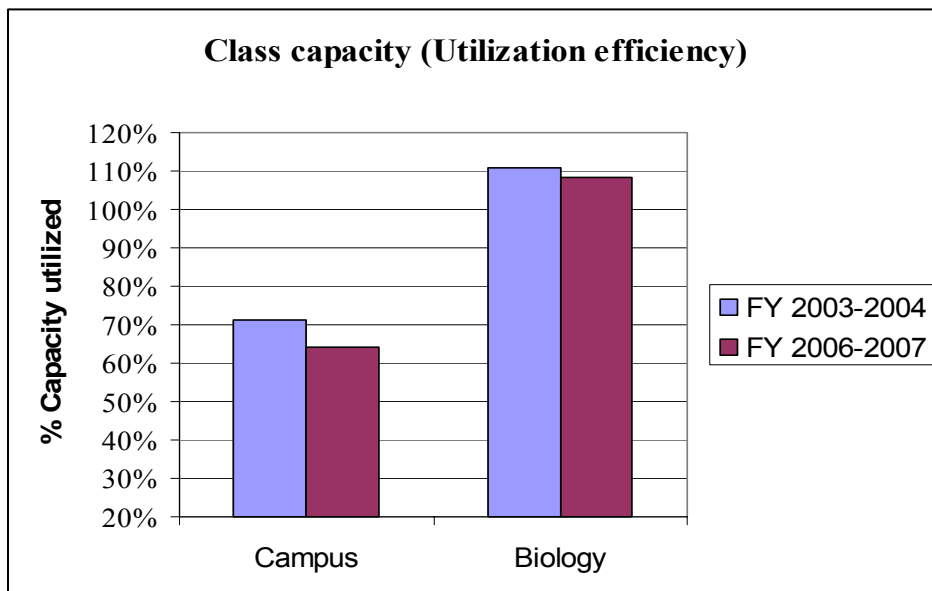


PC Biology lecture class sizes range from 72 to 36 and lab class size are set at 24 as the lab classrooms have a limited number of equipment and supplies and instructors can only safely manage about 24 students in lab. Lecture classroom availability at PC are an important limiting factor of biology lecture class offerings. Lecture classrooms that can accommodate between 36 and 72 students with internet connections, data projectors and teaching computer stations are few on campus.

Classroom utilization is also a function of the number of students in a classroom (i.e. class size). The average Biology Department classroom size is the largest on PC campus with over 37 students per classroom as an average lecture class and 23 students per lab class from FY 2003-2006. For comparison, the PC campus median class size is 19.8 students as per Planning, Research & Institutional Effectiveness Director report.



Biology Department classes are the most highly efficient user of classroom capacity for the past 3 years at PC with 728 students over capacity (112.6%) and 518 students over capacity (108.5%) compared to a decreasing campus capacity utilization over the same period from 28,274 students under capacity (71.1%) to 34,403 students under capacity (64%) as per Planning, Research & Institutional Effectiveness Director report.



(2) Modernization of Lab Operations and Equipment: As a result of increased enrollment, our lab needs have increased dramatically over the past six years. We currently are running 18 different lab classes per semester that require a new lab preparation each week, totaling over 270 lab preps per semester. During one week of classes, lab technicians service 70 lab meetings to replenish supplies and reset equipment. In addition, many of our faculty have been awarded grants to purchase new laboratory equipment, audiovisual equipment, and computers to increase student lab skill development. Consequently, we experienced a dramatically increased need for lab support personnel to aid in prep setups that involve a multitude of equipment and supplies. The Biology Department has hired outstanding professionals to support the more sophisticated lab operations—our Lab Supervisor (Jim Neuenfeldt) and two lab technicians (Matt Haberkorn and Theresa Johnson).

Vendors, through yearly service contracts, maintain all of our critical lab equipment. Jim Neuenfeldt has taken steps to ensure the safety and security of the lab resources by adding all metal fire doors at all exterior entry points to the labs, each door equipped with a security card reader and creating a digital picture database of all assets in the lab area that can be removed. The Biology Department is in the process of setting up a system to assess the utilization of equipment and to forecast replacement schedules and budget accordingly. As a result of equipment tracking and utilization assessment we will be able to more accurately plan and strategize equipment needs.

Jim Neuenfeldt also has substantially upgraded the operations and safety of our lab operations. He has completed a Certificate of Completion for DOT Hazardous Materials Transportation training. Mr. Neuenfeldt also authored an 80-page Instructional Laboratory Safety Manual, which was approved by Phoenix College administration and MCCCDC Risk Management. Under this safety plan, Mr. Neuenfeldt placed NFPA (fire protection) placards throughout the labs, completed a PPE assessment, completed THIS labeling, checked and initiated repair on all student safety equipment, and updated the chemical inventory and Material Safety Data Sheets. Mr. Neuenfeldt also addressed the security of lab assets the Biology Department, as we have expensive laboratory equipment and supplies to protect.

(3) Increase in Course Offerings and Creation of New Programs: The Biology Department faculty have created three new programs and modernized existing curriculum to meet advances in the biosciences. In 2005, Dr. Philip Pepe created an entirely new Geospatial Technology program for those requiring training and certification in the quickly emerging GIS/GPS applications. Our Geospatial Technology program consists of four courses that prepare students for a nationally recognized GIS examination and certification.

In 2006, Dr. Pepe also created an entirely new multidisciplinary program named Environmental Sciences, in which he has drawn from the traditional MCCCDC lab science disciplines to collaborate in the creation of an instructional council for this new discipline. The MCCCDC “Science Alliance” group was formed as a consortium of academic faculty, non-profit and industry experts from MCCCDC, ASU, NAU, the Arizona Audubon Society, and the Center for Global Sustainability. We have since forged a 2+2 agreement with NAU for an environmental science baccalaureate degree and created a learning community between biology and chemistry course instructors that have a high student cohort rate.

Matt Haberkorn, with Dr. Pepe, has helped develop new environmental science program curriculum in collaboration with the Phoenix Desert Botanical Garden for student internships. Mr. Haberkorn has worked to bring the GLOBE program (Global Learning and Observation to Benefit the Environment) from the University of Arizona to PC ushering the GLOBE hydrology training seminar to PC in January of 2007 and receiving professional GLOBE training to include PC as a GLOBE satellite.

As a result of Arizona's new promotion of bioindustry and bioindustry workforce preparedness, Dr. Anna Marti-Subirana has created an applications course called Applied Biotechnology (BIO 247), which is designed to prepare students for biotechnology in bioindustry and research. BIO 247 is transferable to ASU as the same course for an undergraduate molecular biology degree requirement. Students that successfully complete BIO 247 are then selected to enter a competitive biotechnology internship (BIO 214) at one of Phoenix's prestigious research institutes such as TGen and Barrow Neurological Institute.

The Biology Department faculty also have routinely submitted and have had approved curriculum changes for existing biology courses to meet the changes that have occurred in biology, including new lab skill competencies and current trends in bioindustry. The Biology Department faculty are very active in biology course curriculum and state Articulation Task Force activities. Our faculty have initiated MCCCDC course curriculum changes in several core biology courses, including microbiology and biology for majors, to reflect current trends and include specific lab skill competencies previously absent from state course descriptions. In 2003, we initiated an inventory of current biology course lab practices within MCCCDC biology departments, then compiled this information and presented it to the Biology Instructional Council for a review of needed skills and submitted course curriculum changes to reflect these recommendations. One of our new faculty, Dr. Robin Cotter, is a member of the MCCCDC Bioindustry Curriculum Taskforce that has worked to establish core standards and competencies for courses and programs that translate to the emerging bioindustry. The impact on our biology courses will be in the form of updated curriculum with defined skill sets with an emphasis on data collection and analysis and laboratory for students.

The Biology Department also has increased its offering of biology courses at times and days that meet the needs and interests of our diverse students for associate degrees, transfer baccalaureate degrees and MCCCDC occupational programs. We also have updated our course delivery and instructional methodologies to include computer-based and student-based activities. Over the past five years we began offering a non-majors general education course, Marine biology (BIO 145), and pre-allied health courses including introductory biology (BIO 156) and anatomy and physiology (BIO 201 and 202) that are fully online for greater student accessibility. These online courses fill to capacity and it is clear that we could fill additional offerings with additional faculty.

In an effort to offer a greater variety of course delivery methods to serve students, several instructors also are developing 'hybrid' courses, where lecture material is delivered as web-based activities but assignments and laboratory activities are held in our on-site biology labs for non-virtual skill-based activities. In addition, all Department faculty utilize multimedia equipment, including PowerPoint presentations embedded with Internet animations and film clips to enhance visual understanding of complex biology phenomena.

We also employ several alternative student instructional methods such as collaborative learning activities in class, project and portfolio-based activities for student engagement, analytical written reports, and oral presentations of course content.

4) Biology Student Scholarships: The Biology Department also supports students through student scholarships. In January of 2005, our colleague Dr. Gerald 'Jerry' Traut unfortunately passed away. Dr. Traut was a Phoenix College faculty for 32 years, teaching general education biology courses. Dr. Traut is remembered by his past students as their most influential teacher and mentor for environmental awareness. As a result of the outpouring of Dr. Traut's past students to his memorial service and generous donations from alumni and faculty, we established the Gerald Traut Environmental Biology Scholarship. This scholarship awards \$500 per year to a student enrolled in a Biology Department course who is identified as interested in environmental issues, maintains a high grade point average, and receives good recommendations from a Biology Department faculty member.

The Biology Department also maintains the Margaret Groh Biology for Majors Scholarship, in the memory of our colleague Margaret Groh, who passed away in 1984. The scholarship had been inactive for many years until Mark Rosati reviewed archived Biology Chair files and reactivated this scholarship. This scholarship supports students enrolled in the Biology 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 and books for the second required anatomy and physiology course.

(5) Improved Budgeting Process: Finally, Department Chair Mark Rosati improved the Biology Department budgeting process. Because of the substantial changes over the last six years in the number and scope of classes offered and the extensive lab equipment purchased, our Department has increased its sophistication in financial and asset management. Our lab budget structure required changes to reflect the increase in utilization and modernization, as we now use and maintain more than \$ 1.7 million of current laboratory equipment.

The Biology Department's Operating Budget is based on two funding sources – Fund 1, (college apportioned operational monies) and Fund 2, (student course fee revenues). Fund 1 accounts for a small fraction of the overall budget, about \$7,700, which pays office supplies, office and lab staff printing expenses, advertising, and membership dues to professional organizations. The Biology Department Fund 1 is the lowest of the top 6 enrolling departments at PC. Fund 2 accounts for all of the expenses associated with student labs, that include such things as equipment maintenance, equipment purchases, consumable purchases, part-time staff, and computer hardware and software purchases. All items, regardless from which fund they are purchased, are recorded and classified by course number, general lab use, or office use. In this way, we are able to track which courses may potentially need to increase lab fees.

Course resource allocation is based on the number of students enrolling in that particular course. For example, if BIO100 enrolls 100 students with a \$50 per student lab fee, then BIO100 is allocated \$5000 in resources for lab consumables, developmental supplies, and/or technology. Instructors are held to that budgeted amount and are not allowed to let their classes go into a deficit situation. All purchases are reviewed and must be approved in advance of purchases.

This department budget process that closely follows course supply and equipment usage and purchases provides data for the accurate assessment of student course fees and allows our department to operate completely within a budget separate from college operational monies. This process has taken over four years to develop and implement. Maintaining and further improving the new biology budget process is a high priority. This budget system is working well so far and has allowed us to work accurately with student course fees.

Our lab manager, Jim Neuenfeldt, has created and developed a detailed asset tracking system. Mr. Neuenfeldt is responsible for creating and implementing property control measures, inventory and budget management exceeding two million dollars, personnel databases, and a comprehensive departmental health and safety plan.

2. Authored by Mark Rosati, M.S.

Explain the alignment of Department goals with College goals. Considerations in responding to this should include your analysis of the following:

- **How does the program help advance the mission of the College?**
- **How does the program help advance the goals of the strategic plan?**
- **What illustrations/examples can you provide that support alignment?**

We believe the Biology Department Mission, Vision and Goals are in close alignment with the Phoenix College Mission, Vision and Goals in a number of important ways. The Phoenix College Mission is to deliver teaching and learning experiences that inspire the lifelong pursuit of educational, professional, and personal goals for our diverse urban community. The Phoenix College Vision is to be the premier provider of learning opportunities for our community “to go far close to home.” The College also has specific strategic goals to implement the Mission and Vision, which the Biology Department works hard to achieve.

Our Mission is to provide relevant and current biology instruction. Biology-related fields of research and industry are dynamic and fast-changing as a result of key biotechnological breakthroughs. The PC Biology Department has responded to these changes by hiring faculty and staff with current experience in real scientific research and college education. The experience of performing biology research, including grant writing, publications, and laboratory research, is invaluable as these skills are transferable to the community college setting and offers highly credible validation to our university and industry partners.

Phoenix College goals' include the support of university transfer education, workforce development, community partnerships, student support and global engagement. The Biology Department supports these in a number of ways:

2.a. University Transfer Education:

The Biology Department maintains an active role in biology course and program articulation, transferability, and curriculum issues within the state. All PC Biology courses transfer to ASU, NAU, and UA as the equivalent course or degree requirement. Our transfer agreements with ASU include all of the biology courses offered at PC as Science General (SG), Science Quantitative (SQ), Global Awareness (G), or Statistics and Computer Sciences (CS); this is particularly important because most of our transfer students attend ASU.

The PC Biology Department faculty are very active in biology course curriculum and state Articulation Task Force activities. Our faculty have initiated MCCCDC course curriculum changes in several core biology courses, including microbiology and biology for majors, to reflect current trends and include specific lab skill competencies previously absent from state course descriptions. In 2003, we initiated an inventory of current biology course lab practices within MCCCDC biology departments, then compiled this information and presented it to the Biology Instructional Council for a review of needed skills and submitted course curriculum changes to reflect these recommendations. One of our new faculty, Dr. Robin Cotter, is a member of the MCCCDC Bioindustry Curriculum Taskforce that has worked to establish core standards and competencies for courses and programs that translate to the emerging bioindustry.

In 2006, Dr. Philip Pepe created an entirely new multidisciplinary program named Environmental Sciences, in which he has drawn from the traditional MCCCDC lab science disciplines to collaborate in the creation of an instructional council for this new discipline. The MCCCDC "Science Alliance" group was formed as a consortium of academic faculty, non-profit and industry experts from MCCCDC, ASU, NAU, the Arizona Audubon Society, and the Center for Global Sustainability by Dr. Phil Pepe to move the new Environmental Science discipline forward. We have since forged a 2+2 agreement with NAU for an environmental science baccalaureate degree and created a learning community between biology and chemistry course instructors that have a high student cohort rate.

2.b. Workforce Development:

In 2003, Department Chair Mark Rosati and Dr. Philip Pepe wrote and were awarded one of the first MCCCDC Proposition 301 grants, which was awarded for the modernization of academic biology labs, "Advancing Applied Bioscience Laboratory Skills". This grant included current biotechnology equipment and supplies for the development of student skills to support current biosciences. The dollar amount awarded was over \$145,000 for equipment essential to bring the student biology lab experience to current bioscience research and industry levels.

Biology faculty were awarded more than \$250,000 in the 2005-2006 year in grants and awards for Prop 301 Workforce Development and Phoenix College "new initiatives" grants.

A departmental cooperative effort between a number of biology faculty was created to obtain additional biosciences and computer equipment for a continuance of laboratory modernization of student equipment. Dr. Patricia Finkenstadt, a first year faculty, was awarded a grant to obtain non-invasive electro-physiological equipment for anatomy and physiology courses for student data collection and analysis on their own physiological data. Dr. Ana Marti-Subirana and Dr. Robin Cotter (a first year faculty) were also awarded a grant to obtain current biotechnology equipment for DNA and infectious disease analysis. Dr. Philip Pepe was funded at \$63,680.00 for “Advancing Laboratory and Field Skills in Environmental Biosciences” to update the curriculum and incorporate modern laboratory and field skill competencies, to introduce our students to technology and environmental bioscience skills relevant to these emerging industries at a formative level giving them an advantage in the bio-workplace. In addition, we have identified a key area of workforce development at the intersection of geospatial technology and environmental biosciences projected by the U.S. Department of Labor.

We also have instituted a suite of GPS/GIS technology courses that constitute a program offering students that complete a nationally recognized skill set. Dr. Philip Pepe developed and successfully implemented a Geospatial Technology workforce training program at Phoenix College. He began this program with a fully funded “New initiative” grant from Phoenix College to purchase, implement and advertise for the program. This four-course program leads students to a nationally-recognized exam that, when passed, is an officially recognized GIS/GPS skills certification. Dr. Pepe coauthored the curriculum for the four-course program with City of Phoenix Workforce Development Educator and Biology Department and GIS instructor, Remy Autz.

Six of our faculty have been awarded funds for professional growth activities, course curriculum development and international education and travel. Dr. Philip Pepe coauthored a USDA Hispanic Serving Institution grant with SMCC biology faculty Marshall Logvin to fund a program to track underrepresented students through his new environmental sciences program and degree.

2.c. Community Partnerships:

Our community partnerships are as varied as the field of biology. We have written partnership agreements with several non-profit institutions that include student service learning activities and paid student internships. Some of the more visible institutions with which we partner are the Translational Genomics Research Institute (TGen), Barrow Neurological Institute, the Biodesign Institute at ASU, Arizona Audubon, City of Phoenix Parks, and the Arizona Science Center. In addition to partnerships, we have advisory relationships with the local USDA Agricultural Research Station Laboratory at Maricopa, the Phoenix Union High School (PUHSD) Science curriculum advisor, and the PUHSD Bioscience High School principal and science faculty.

We have advisory members from each of our partnerships. For our Environmental Science program, we participate the Science Alliance, a consortium of academic faculty, non-profit and industry experts from MCCC, ASU, NAU, the Arizona Audubon Society, and the Center for Global Sustainability. Our advisors include Tice Vashti Supplee

(Director of Bird Conservation Arizona Audubon), Cheryl McNab (Education Center Director Arizona Audubon), Sam Campana (Executive Director Arizona Audubon), Remy Autz (GIS Education Coordinator of the City of Phoenix and Education Committee member of the Geospatial Information Technology Association) and Diane McKee (Arizona Science Center). We also serve as advisors for planning and development of Arizona Audubon Education Center at the Rio Salado Project and the Bioscience High School, part of the Phoenix Union High School District.

For Biosciences and Bioindustry, we have had five student interns admitted to the Summer Internship Program at TGen over the past three years. We plan to expand internship opportunities at other equally prestigious, high-profile local research institutions, such as the Biodesign Institute at ASU and Barrow Neurological Institute at St. Joseph's Hospital. Our advisors include Candice Nulsen, Ph.D. (Program Manager-Education & Outreach for TGen and Associate Editor for Molecular Cancer Therapeutics), Christiane Robbins (Senior Scientist TGen), and Adrienne C. Scheck, Ph.D. (Senior Research Scientist at the Barrow Neurological Institute). Our Departmental advisors for biosciences include faculty member Dr. Robin Cotter PhD. (molecular neuroimmunologist) Dr. Patrica Finkenstadt (molecular neurophysiologist), Dr. Ana Marti-Subirana PhD. (molecular developmental neurobiologist) and James Neuenfeldt M.S. (molecular biotechnologist). We also have a partnership with Arizona Science Center, and Dr. Patricia Finkenstadt was selected by the Arizona Science Center as a teacher's educator for the new BodyWorlds III exhibit.

Mickie Bond initiated a partnership with Native Seeds/SEARCH, a non-profit organization, to educate, store, propagate and promote important traditional horticultural plants of Native Americans and Hispanics of Northern Mexico and the Southwestern U.S. Ms. Bond facilitated fifteen student interns with Native Seeds/SEARCH. We have plans to continue and expand this relationship.

Dr. Elena Ortiz is currently working with community partners (Arizona Audubon) and K-12 partners (teacher at Ignacio Conchos Elementary) to develop a service learning partnership, called the Science Mentor program in conjunction with Arizona Audubon. Dr. Ortiz is building a relationship with PUHSD elementary schools that are proximal to the Rio Salado Project to develop a K-12 teacher-student mentoring and training program. A 5th grade class joined Dr. Ortiz-Barney's Environmental Biology class on field trips and are learning from the college students. This partnership was highlighted in an article in the Arizona Republic on April 7, 2005.

Matt Haberkorn, lab technician, has developed an ongoing internship with the Phoenix Desert Botanical Garden learning various techniques and methodology in plant ecology. Part of this internship is a research project on local plant communities of ephemeral drainages from which preliminary research was presented along with the PC Environmental Science and Geospatial Technology programs to the State legislature at the 2007 Arizona Water Expo on 2/27. Matt has recently began working with Native Seeds/SEARCH to monitor garden success of native crops in Phoenix.

2.d. Student Support:

All Biology faculty strive to support our diverse student body in many ways. Biology student lab activities are collaborative and interactive by nature. PC biology courses science labs are an experiential application of science principles, engaging students individually and in groups in tasks that employ equipment, information, mathematics and analysis for skill development. All biology faculty employ student activities that encourage the development of skills in numeracy, analysis, data collection, writing, critical thinking, use of electronic and printed information resources, and use of equipment. Many instructors use rubrics (evaluation matrices) to evaluate student work and for students to use for self-evaluation.

The Biology Department faculty also extensively use computer-based activities in three applications: 1) faculty and student in-class use of Internet resources to broaden available resources; 2) Internet delivery of courses (including hybrid courses, in which the lectures are done on the Internet, and the labs are in class); and 3) student in-class application of computers and software used in the biosciences industry, such as for real science data collection.

Biology faculty collaborate with other department faculty from Chemistry, Math, English, Reading and the Library for the development of student skills. Faculty have been funded for and created learning communities that integrate cross-curriculum based projects and activities in critical thinking, data analysis and critical reading and math skills. Currently, majors biology faculty is collaborating with chemistry faculty on a learning community for science majors and anatomy and physiology and microbiology faculty are collaborating for allied health care majors to ensure a comprehensive and cohesive connection between competencies and skills in each separate course.

Phoenix College biology faculty also spend many hours per week with office hours used to tutor our biology students. Many of us hold regular study sessions before exams and skill workshops to help students become more effective report writers. Most biology faculty have web pages for additional student tutorial support. Several faculty have received grants to advance student support in the form of computer software that allow students to access course materials outside of class time.

Biology faculty Mickie Bond has worked on projects with the Phoenix College Title V grant group and has received funding for computer applications in BIO 108. The course is designed to be student friendly and provides particular help for ESL students. Ms. Bond always has provided strong leadership in disability accessibility to her courses. For several years Ms. Bond has lobbied for physically disabled and elderly student access for BIO 108 garden activities and was successful in facilitating the construction of a raised bed garden in 2004. Currently we are planning repairs and improvements to existing greenhouse that will include greater accessibility for the disabled.

2.e. Global Engagement:

Internationalizing our courses and infusing global awareness as a theme in biology is a natural alignment because biology issues are global by nature. Our biology courses

examine the local as well as international implications of course content. Faculty member Mickie Bond has contributed significantly to global engagement of Phoenix College students by developing Plants and Society course (BIO 108) around an international theme. Ms. Bond also has been a participant in Internationalizing and Interculturalizing the Curriculum (ICC) since 1998 and piloted BIO 108 through the process of achieving the designation for Global Awareness (G) at ASU in addition to its general science requirement qualification. 2005 was the first Earth Day Celebration at Phoenix College in many years, in which Ms. Bond actively participated as a committee member. At the 1st Annual Faculty Conference at Estrella Mountain Community College in April 2006, "Engagement in the Global Community: Social Justice, Nature, Politics, and Economics," Ms. Bond presented a paper.

For many years, Dr. Pepe has sponsored international educational opportunities for Phoenix College students and is an active member of MCCCDC international education groups. Over the past twenty years Dr. Pepe has developed and hosted student tropical research trips at several sites in the Caribbean, Hawaii and Australia. Over the last several years, Dr. Pepe created a partnership with Whitsunday College in Queensland, Australia, and has conducted a Summer International study in Australia since 2004 for faculty and students. Most recently, Dr. Pepe is developing an agreement with the University of Hawaii at Hilo to host Phoenix College students in study of Hawaiian ecology during the summer of 2007.

For several years biology adjunct instructor, Remy Autz, has been providing support to the PC International Club students by helping them create presentations about their countries of origin. For his work in student support and program development in the Business Department and Biology he has been awarded the Golden Bear Award for campus service in 2006.

2.f. Alignment of Biology Department with Phoenix College Strategic Goals:

The Biology Department meets the college's strategic goals in the following ways:

(1) Strategic Goal #1—Anticipate, plan and implement technology changes to maximize educational delivery and college infrastructure. This strategic goal is addressed above in Sections 1(e)(2) (Modernization of Lab Operations and Equipment) and 1(e)(3) (Increase in Course Offerings and Creation of New Programs).

(2) Strategic Goal #2—Develop and implement an Enrollment Management Plan that addresses student access barriers and increases annual FTSE. This strategic goal is addressed above in Sections 1(e)(1) (Increase in Student Enrollment), 1(e)(2) (Modernization of Lab Operations and Equipment), 1(e) (3) (Increase in Course Offerings and Creation of New Programs), 1(e) (4) (Biology Student Scholarships) and 2(a) (University Transfer Education), 2(b) (Workforce Development), 2(d) (Student Support), and 2(e) (Global Engagement).

(3) Strategic Goal #3—Explore and develop new programs and services to meet the needs of our diverse community. This strategic goal is addressed above in Section 1(e)(3) (Increase in Course Offerings and Creation of New Programs).

(4) Strategic Goal #4—Provide excellent teaching and learning experiences supported by student outcomes assessment and program review. This strategic goal is addressed above in Sections 1(e)(3) (Increase in Course Offerings and Creation of New Programs) and 2(d) (Student Support).

Teaching excellence is a hallmark feature of the Phoenix College Biology Department as most of our faculty have received teaching awards. Dr. Philip Pepe was the recipient of the Phoenix College Distinguished Teaching Award in 2006 as a result of his outstanding achievements in pioneering alternative delivery methods at Phoenix College, international ecology education of students, and new curriculum and program development. Most of our faculty members have been nominated or awarded the Distinguished Teaching Award in the past: Mickie Bond was the first recipient of this award at Phoenix College, and Dr. Elena Ortiz-Barney, Dr. Ana Marti-Subirana, Dr. Patricia Finkenstadt, Felicia Brenoe (one year only faculty), John Arle, Dr. Pepe, Dr. Tate, and Jim Kennedy have been nominated for this award. Dr. Pepe also received the Faculty of the Year award in the past. Many of our faculty also have received NISOD awards, including Mickie Bond, Mark Rosati, Dr. Pepe, Dr. Marti-Subirana, and John Arle, in addition to other retired faculty members. Our faculty consistently receive outstanding evaluations from our students, and Phoenix College Student Advisement and Counseling often tell us how highly they regard our teaching abilities, accessibility and outreach to students. Many of our faculty members have been recognized in “Who’s Who” in American Teaching. Other awards include the 2006 Latino Institute Community Leadership Award to Luis Bleuze, the 2005-2006 Golden Bear Award to Remy Autz, and the 2006 “Caught in the Act of Excellence” Award to Dr. Patricia Finkenstadt and Dr. Robin Cotter. Dr. Elena Ortiz has recently received recognition for inspiration and support for college teaching and learning as a Wakonse Arizona Fellow since 2004.

Several members of the Department are engaged in continuing education in fields different than those within their disciplines. Lab Supervisor Jim Neuenfeldt is currently completing a Masters Degree in Educational Leadership as a working professional and has been admitted to the W.P. Carey School of College of Business MBA program, and Dr. Anna Martí-Subirana has completed a Master of Arts (M.A.) in English and American Literature with emphasis on Contemporary American Poetry.

(5) Strategic Goal #5—Improve and expand the physical learning environment to increase efficiency and support additional learning opportunities. This strategic goal is addressed above in Sections 1(e)(2) (Modernization of Lab Operations and Equipment) and 1(e)(3) (Increase in Course Offerings and Creation of New Programs).

(6) Strategic Goal #6—Expand community outreach and internal and external partnerships based on identified needs and opportunities. This strategic goal is addressed above in Section 2(c) (Community Partnerships).

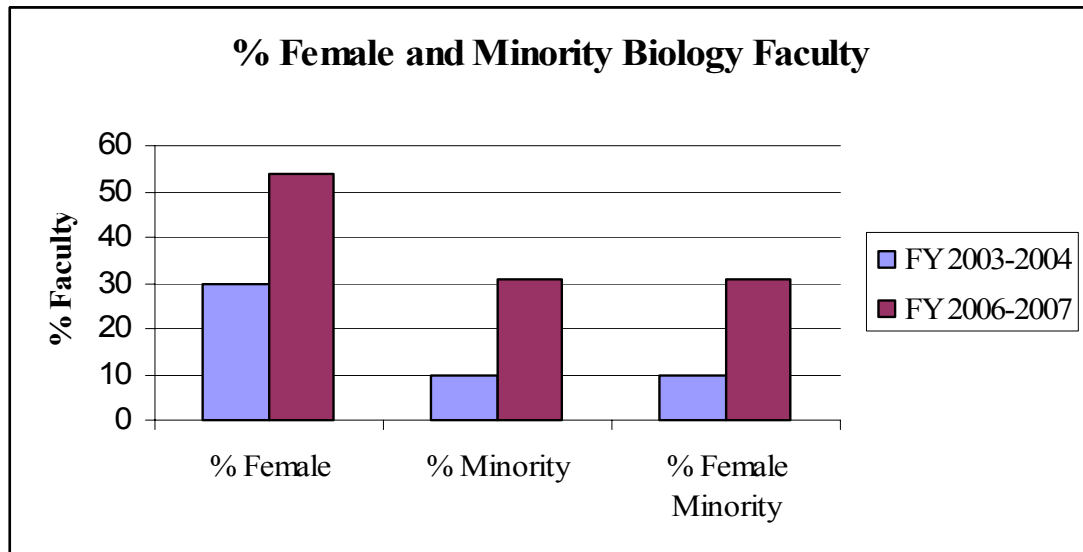
(7) Strategic Goal #7—Review financial management strategies to maximize resources. This strategic goal is addressed above in Sections 1(e)(2) (Modernization of Lab Operations and Equipment) and 1(e)(5) (Improved Budgeting Process).

(8) Strategic Goal #8—Pursue alternative funding sources. This strategic goal is addressed above in Section 2(b) (Workforce Development).

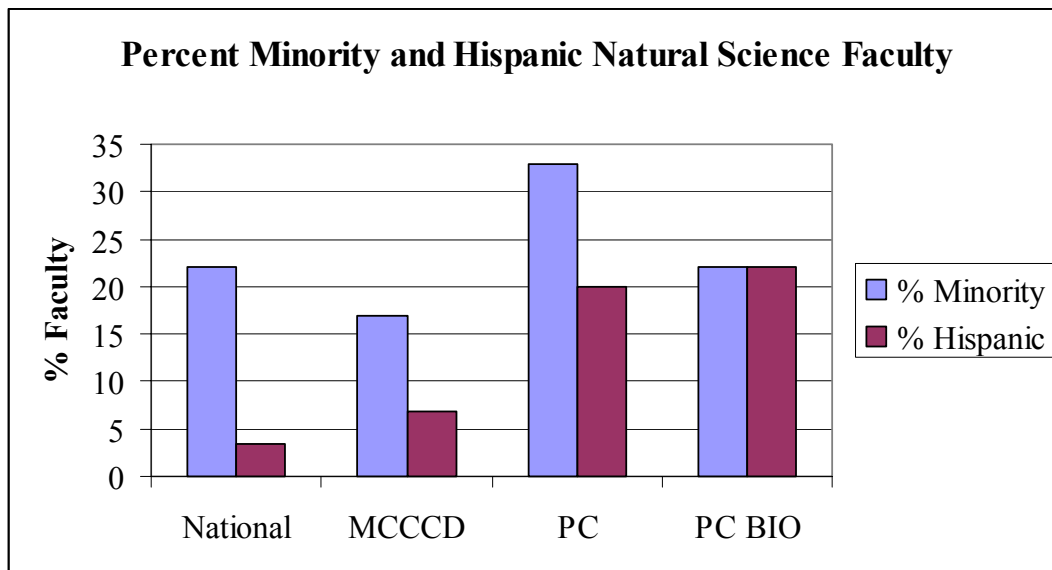
(9) Strategic Goal #9—Hire quality, diverse faculty and staff. The PC Biology faculty have a combination of education and experience that rise far above the MCCCDC required minimum qualifications. Of our 8 full time faculty 5 have and research baccalaureate and PhD's in the biological science and 3 have research baccalaureate and Master's degrees in the biological sciences. The PC Biology Department has hired faculty and staff with substantive and current working experiences in scientific research and college education. As each of our faculty have undergraduate and graduate degrees in the biological sciences, each has performed substantive biological research and most have written or coauthored scientific research grants and scholarly peer-reviewed research journal articles. The experience of performing biology research, including grant writing and publishing, is invaluable to Phoenix College because these skills are transferable to the community college setting and offer highly credible validation to our university and industry partners. This deep research and teaching experience is reflected in the accomplishments of the Phoenix College biology faculty in obtaining grants, establishing community partnerships, engaging in curriculum development, writing books, offering advanced course delivery methods, and offering global educational opportunities.

The Biology Department also has made enormous efforts to hire minority candidates. We have expended our own department resources to publicize openings in professional journals that reach minority biological scientists: since 2000 the Biology Department has spent an average of \$2,000 of department funds per position to advertise in minority science and general biology periodicals. Department Chair Mark Rosati also personally does outreach to universities and colleges across the country to find minority candidates that would be interested in teaching at the community college level.

The sciences are particularly challenged in finding minority candidates, as the availability of minority candidates with the desire to teach at the community college remains a significant barrier. Despite these challenges, the Phoenix College Biology Department has been successful in finding minority and women faculty members and staff members. We currently have 8.5 faculty members and one full time one year only faculty. Of these, six are women, and two are Hispanic women; both of these statistics exceed the percentage of available candidates according to National Science Foundation report, *Women, Minorities, and Persons With Disabilities in Science and Engineering: 2000*. Biology Departments are considered a “natural science” discipline by U.S. Labor Statistics and the U.S. Department of Education. From FY 2003-2004 to 2006-2007 the percentage of female and minority employees has significantly increased in the Biology Department. In 2003-2004 the Biology Department had 30% female employees, 10% minority (Hispanic) and 10% female minority (Hispanic). By 2006-2007 it increased to 54% female employees, 31% minority (Hispanic) and 31% female minority (Hispanic) according to MCCCDD Affirmative Action Workforce Analysis of PC by Department Fall 2006.



The PC Biology Department with 22% minority natural science faculty compares favorably to national figures at 22% minority natural science faculty at institutions of higher education. PC Biology faculty are 22% Hispanic female. This compares favorably with MCCCCD as a whole, which has 17% natural science minority faculty with 6.9% being Hispanic. In addition, PC Biology faculty are 55% female as compared to national figures of 25% female faculty in the natural sciences.



(10) Strategic Goal #10—Provide professional development opportunities and training for all employees. Department Chair Mark Rosati encourages faculty and staff to engage in professional growth activities that benefit the employee as well as the department. As a result of this encouragement, Lab Supervisor Jim Neuenfeldt is pursuing a Master’s degree in educational leadership. Mr. Neuenfeldt is also active on campus and at District. He acts as representative of the MAT (Management, Administrative, and Technology) employee group on campus and at the District level and was elected as the campus MAT employee group President-elect. He is actively involved in employer sponsored leadership and management development programs, including Health and Safety Ad Hoc Committee. In addition, Mr. Neuenfeldt is very active and recognized in MCCCCD and on campus for his professional growth activities, including a Certificate of Completion for MCCCCD Supervisor Development Program, Certificate of Completion for DOT Hazardous Materials Transportation training, Certificate of Completion for Phoenix College Positive Climate Campus Program (PC3), and Conflict Resolution through Mediation training. He also is involved with department and campus hiring processes. Mr. Neuenfeldt is an invaluable resource to faculty for course and program development as well as grant writing. He manages all purchasing and budget related activities for the department including grants and special funding.

In addition to Mr. Neuenfeldt’s managerial roles, he has managed to coauthor a biomedical research article in gene therapy research, “ Multicistronic lentiviral vectors containing the FMDV 2A cleavage factor demonstrate robust expression of encoded genes at limiting MOI,” which was published in Virology Journal (3, 1) 2006. He is also currently

completing a Masters Degree in Educational Leadership as a working professional and has been admitted to the W.P. Carey School of College of Business MBA program.

Dr. Robin Cotter has continued her neurological research activities as she has recently coauthored a peer-reviewed research paper investigating the antiviral effects of natural plant extracts based upon research performed while at Albany Medical College, (Paskaleva, E, Lin, X, Li, W, Cotter, R, Klein, M, Roberge, E, Yu, E, Clark, B, Veille, JC, Liu, Y, Lee, D, and Canki, M. 2006. *Inhibition of highly productive HIV-1 infection in T cells, primary human macrophages, microglia, and astrocytes by Sargassum fusiforme*. AIDS Res Therapy 3:15). Dr. Cotter is also contributing to another paper entitled "*Neuroprotective effects of Abeta-induced human neuronal IL-8*" that has been accepted by the Neurobiology of Aging Journal.

Lab technician Matt Haberkorn has now completed a Master's degree in Ecology and is facilitating lab skill training sessions for instructors—Global Learning and Observations to Benefit the Environment (GLOBE)—to incorporate current lab methods in our lab instruction. GLOBE is an international environmental monitoring program designed to train K-12 and community college teachers to implement scientifically valid environmental measurements in the classroom. The goal of the GLOBE program is to provide a place for students to publish data on the Internet, aid in map and graph creation through web resources, and develop collaboration between teachers, students, and scientists.

Another of our lab technicians, Theresa Johnson, completed a USDA Hispanic Serving Institution (HSI) Summer Internship program at the headquarters in Washington D.C. Ms. Johnson's internship was competitive and required the support of Dr. Anna Solley, Phoenix College President, and Mark Rosati, Biology Department Chair, to extend pay and benefits during the month-long internship. The focus of the internship was to perform USDA research with investigators and receive information to train Biology Department faculty in the promotion of USDA HSI student programs. As a result of the Department's new partnership with the USDA, Dr. Philip Pepe, is applying for a more in-depth training in the recruitment of Hispanic biology students into USDA student internships.

The Biology Department Administrative Secretary, Guadalupe Candanedo, has successfully completed several training programs including Microsoft Access, Excel, Dreamweaver, and a number of workshops on office operations and procedures. Ms. Candanedo has helped craft increased support of new adjunct faculty through her attention to continuous communication with adjuncts regarding department and important student announcements and correspondence. Ms. Candanedo has developed a comprehensive personnel filing system that incorporates all pertinent documentation and a detailed checklist for 'quick glance' referencing. As an important service and support to our students Ms. Candanedo has a rapid response ethic for student correspondence.

(11) Strategic Goal #11—Develop marketing strategies that promote an image that continuously demonstrates the strengths of the college. The Phoenix College Biology Department has implemented an interesting, engaging Web site that highlights our departmental offerings as well as offering a depth of information that allows viewers to use course and program information to self-advise on educational needs and directions through

the Biology Department courses and services. Department Administrative assistant Ms. Candanedo continuously updates the site.

We also have been marketing our new programs through press releases and mailer information advertisements. We provide announcements for the Public Radio station KJZZ and keep the campus Office of Marketing and Public Relations updated with all press releases and developments that should be communicated to the community regarding our courses and programs. Additionally, we target Phoenix area industry, government and educational institutions for mailer information on courses and programs for employee training. We employ the Phoenix College Continuing Training and Education (CTE) Department to support and promote our courses and programs to their community partners.

(12) Strategic Goal #12—Expand internal and external communication. Department Chair Mark Rosati instituted a department-wide system for meetings regarding laboratory operations; these meetings are held at least twice per semester or more often as requested by faculty and staff to address ongoing operational issues. Mr. Rosati also conducts two comprehensive department meetings per semester. He also updates all faculty after Department Chair meetings, so that all faculty are informed of campus developments and issues.

For external communications, See Goal #11 above. Also see Section 2(c) (Community Partnerships).

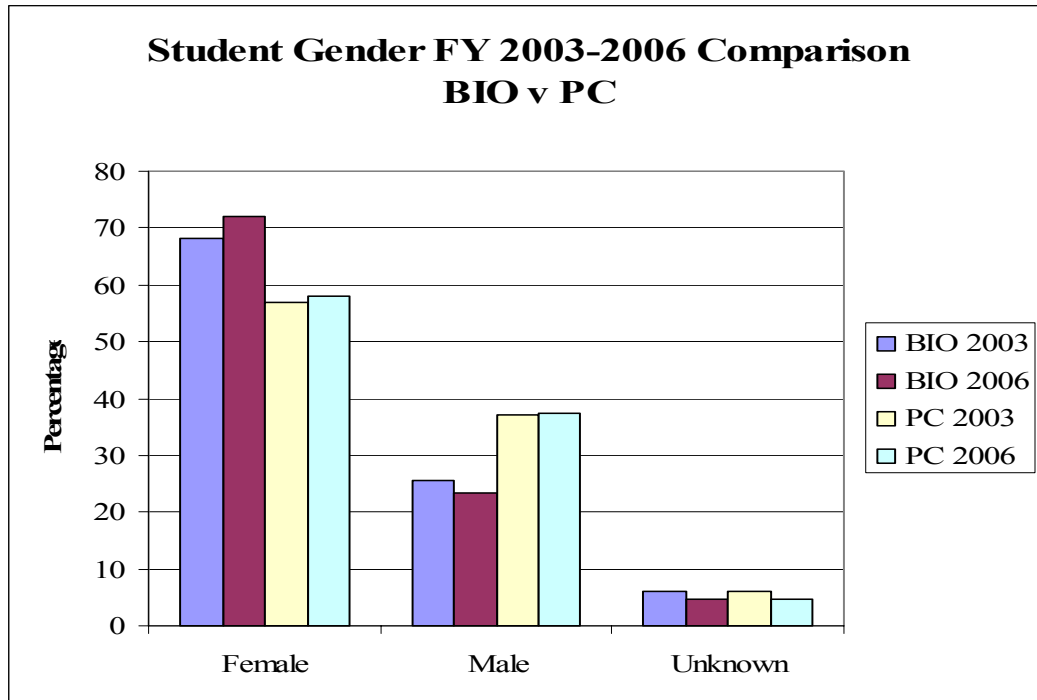
3. Authored by Mark Rosati, M.S.

Describe how the program supports student success. Your response should include:

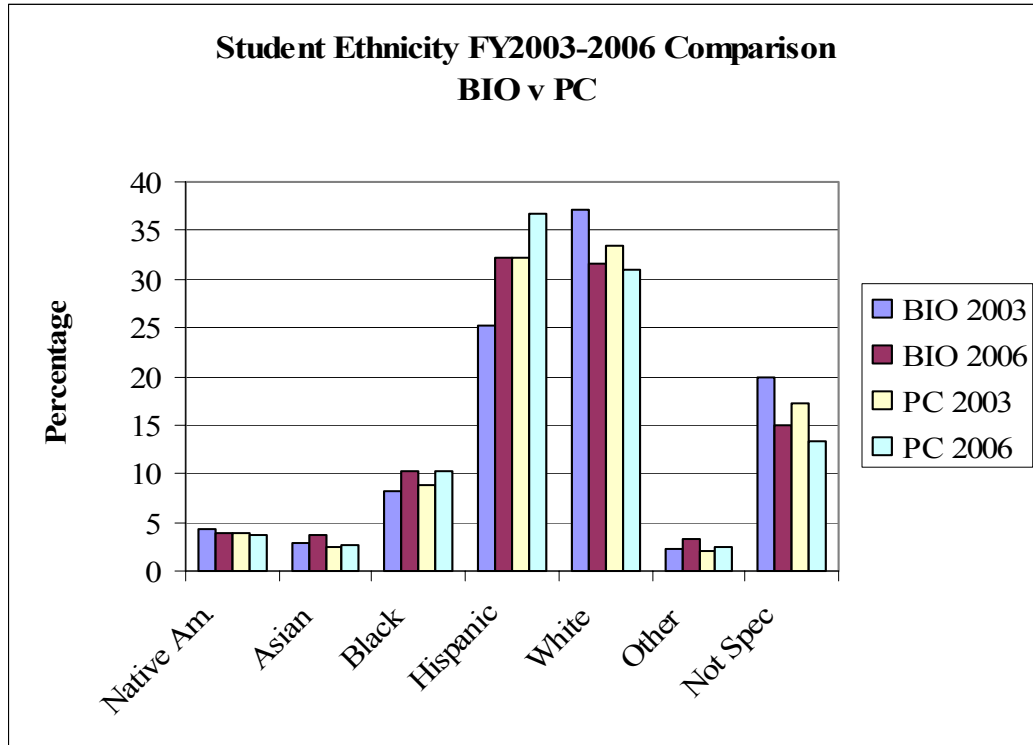
- **Analysis of your program demographics for the past three years. (Refer to IR web site; Program Review, Student Demographics.)**
- **Analysis of enrollment and completion rates for the past three years. (Refer to IR web site; DBase Access, Completion Rates by Prefix.)**
- **Analysis of your program recruitment and/or retention efforts over the past three years.**
 - **Identify program plans to maintain/improve recruitment and retention efforts.**
 - **Attach as an appendix any program recruitment/advisement materials that help explain the program or recruit students. Indicate when these materials were last reviewed.**

The Biology Department supports student success in a number of important ways that include extensive instructor accessibility, instructor tutoring, instructor training in current methods to increase student success

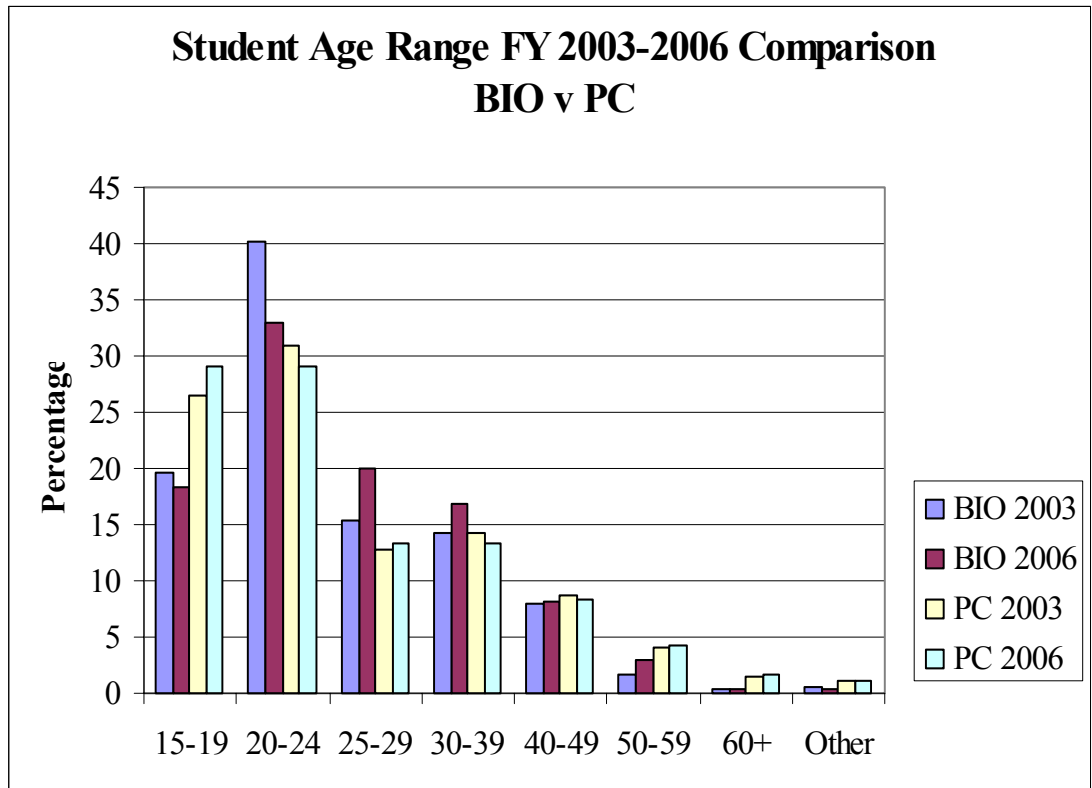
PC has a substantially diverse student population in terms of ethnicity and age. During FY 2003 to FY 2006 the percentage of female students have increased in Biology class from 68% to 72% and female students for campus overall increased from 57% to 58%. Biology have more than 10% greater percent of female students than campus.



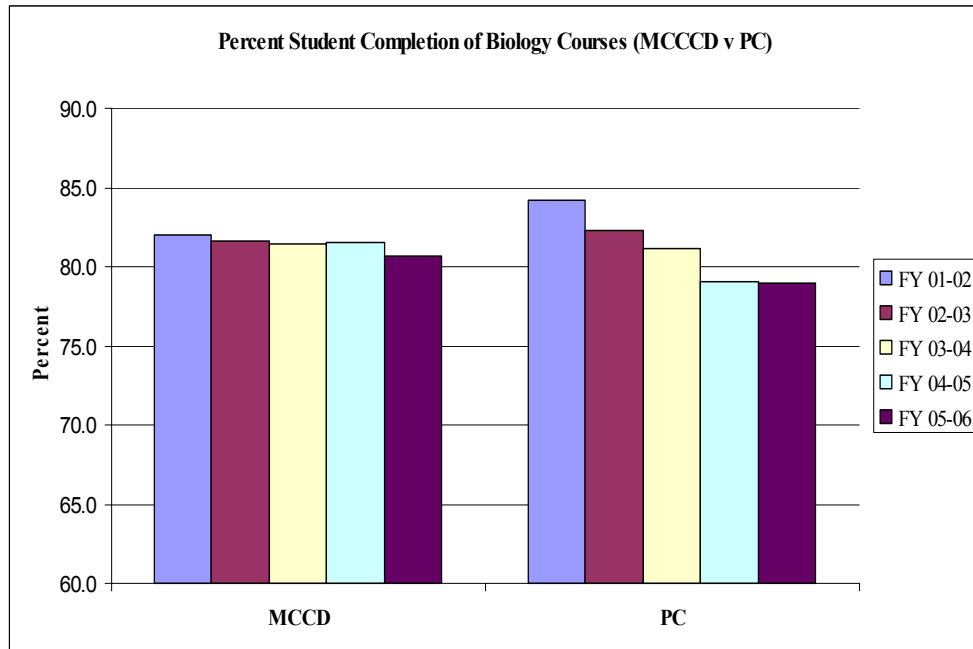
Biology Department diversity in terms of ethnicity is similar to the campus with only about 5% less Hispanic students than campus and all other ethnic groups with 1% difference or less.



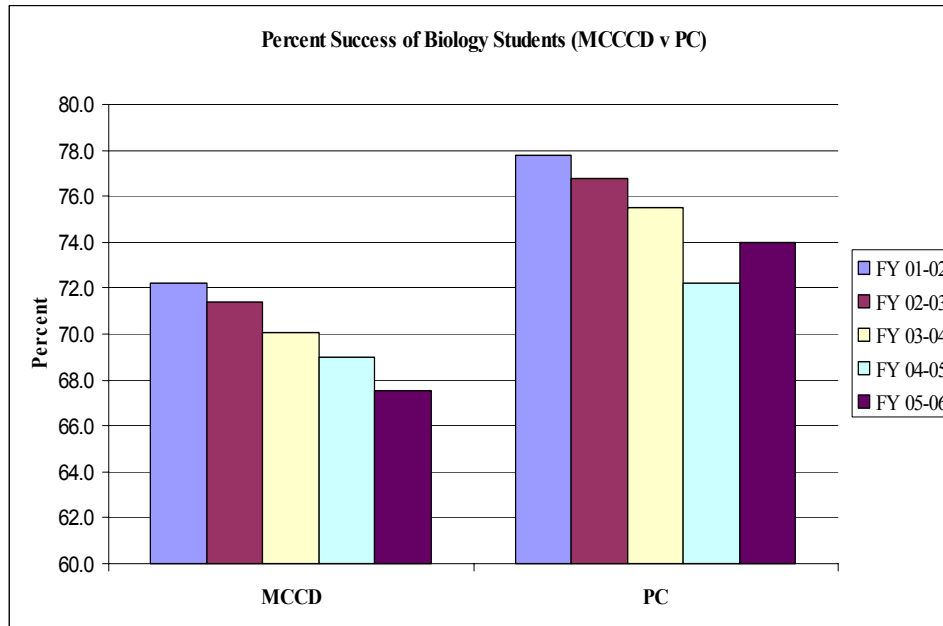
Since FY 2003, the Biology Department has had a decrease in the number of 20 to 24 year old students from 40% to 33% and had an increase in the percent of 25 to 29 year olds and 30-34 years olds by 3 to 4%. Other Biology student age ranges have remained essentially unchanged from 2003 to 2006.



Students enrolled in biology classes at PC from FY 2003-2004 to 2006-2007 have completed their courses at a yearly average of 77% ranging from 76% to 79%. Students in required 100-level general-education lab science courses and more advanced 200-level courses with required prerequisites have completion rates of over 80%. There are higher rates of completion for evening and summer enrolled students at nearly 90%. Evening and summer students have an older age range than day students, PC biology faculty believe emotional maturity and career goals are different for older than younger aged students.



Students enrolled in biology courses at PC have maintained an average of 74% success rate (students obtaining a C grade or better) from FY 2003-2004 to FY 2005-2006.



To recruit students into our classes, the Biology Department has engaged in a variety of activities from public advertising in local periodicals to campus career days and PUHSD counselor events. Department Chair Mark Rosati regularly presents at the Counseling Department's high school recruitment meetings for high school counselors. Dr. Pepe conducts outreach sessions at high schools to promote our Biology classes and programs; Adjunct Instructor Remy Autz conducts outreach to high schools, as well.

As discussed above, the Biology Department also has implemented an interesting, engaging Web site that highlights our departmental offerings. We also have been marketing our new programs through press releases and mailer information advertisements to local public radio and to industry, government and educational institutions. We employ the Phoenix College CTE Department to support and promote our courses and programs to their community partners.

Biology Department faculty are actively engaged in retaining students and supporting successful student completion of courses. Each faculty uses extensive student conferencing time for course-specific support and encouragement to aid in student retention and success. Department Chair Mark Rosati has routine meetings with campus Learning Support Services and Advisement to keep current on student trends, including satisfaction with their Biology courses, course offerings and availabilities, and instructor support and accessibility. Biology faculty contact also actively monitor student progress: they contact students that fail to attend class or sign in to Web-based classes, in order to help students to keep up with their course work and to identify problems that may be affecting their attendance or performance in class. We have created and implemented biology course advisement webpages that allow any user to review ASU transfer information, sample syllabi, lead instructor contact

information and a detailed inventory of activities for each course offered by the PC Biology Department.

Refer to the attached printed Webpage excerpts of Biology Course Advisement, Faculty/Staff information, News, Partners and Resources, Scholarships, Special Courses & Programs and Mission & Goals.

Focus on Student Learning and Teaching Effectiveness

1. Authored by Mickie Bond, M.S.

Course syllabi serve as a contract with the student. Because of their importance, please address the following:

- What activities/processes are used to review course syllabi for currency in statements of learning objectives, clarity in classroom management policies, and completeness of evaluation/assessment measures?
- How are faculty involved in defining expected student learning objectives?
- What outcomes and/or changes have resulted from the review of syllabi during the past three years?

1.a. Activities/Processes used to review course syllabi:

All faculty prepare their syllabi in accordance with the 1/5/07 instructions from the District Office. All policies such as absences are referred to the current Student Handbook (available online) at <http://www.maricopa.edu/gypolicy/adminregis/instruction/3.6htm>

Refer to the attached printed sample syllabus at the end of this section.

1.b. Faculty involved in defining expected student learning objectives:

All faculty are involved in defining expected student learning objectives and in making these expectations occur. Specific examples include:

- Faculty meet several times a year to define and discuss expected student learning objections.
- Emphasis is placed on consistency with course competencies.
- The necessary use of many adjunct instructors make this a particularly difficult area to encourage consistency.

1.c. Outcomes and/or changes have resulted from the review of syllabi during the past three years:

Recent review and consolidation of contents of syllabi have produced a predictable and consistent product. Samples of changes to syllabi include:

- Review of syllabi over the past three years has produced a solid and increasingly consistent product.
- Legal issues are addressed.
- Examination of all syllabi, before release, has prevented most errors because of elimination.

2. Authored by Mickie Bond, M.S.

Discuss the assessment plan/process for your program with respect to course/program learning goals.

- **Identify outcomes of this assessment process and what changes, if any, took place as a result of these outcomes.**
- **Describe how program faculty are involved in determining strategies to measure classroom and/or program effectiveness?**

2.a. Activities/Processes used to review course syllabi:

The assessment plan/process for the Biology Department is patterned on a combination of past documents and new particulars based on the recent accreditation visit. Goals were reset after the accreditation visit and have been applied to the Biology Department.

All Assessment areas, including Numeracy, Writing, Oral Presentation, Critical Thinking and Information Literacy have been assigned to specific faculty based on their individual interests. Specific examples include Dr. Pepe – Critical Thinking, Oral Presentation – Dr. Finkenstadt, Writing – Mr. Rosati, Numeracy – Dr. Marti-Subriana and Information Literacy – Ms. Bond.

Biology Department faculty participate fully in many types of committees. Specific examples include PC Downtown (Academic Committee) – Mr. Rosati, Campus Technology Advisory Committee (College Committee) – Mr. Neuenfeldt, Dr. Cotter – Curriculum Committee (Academic Committee), Distinguished Teaching Award (Academic Committee) – Dr. Pepe, Dr. Cotter – Learning Communities (Academic Committee), Ms. Bond – Lifelong Learning (College Committee), Dr. Ortiz-Barney – Service Learning (College Committee), Dr. Pepe – Service Learning (College Committee), Dr. Tate – Learning Center, Dr. Cotter, Dr. Pepe, Mr. Rosati – Math & Science Center.

Most faculty use rubric style grading of their own design. The prepared assessment forms have been required to be completed by the end of the semester.

The assessment documents have recently (2006-07) been re-examined and updated using new methods. Graphs have been recalculated and improved to reflect current items.

Direction by Kristin Anderson (Chair) and Jan Binder (Director of Planning, Research and Institutional Effectiveness) have provided new assessment for both Biology lectures and labs. These forms are now in progress of completion (S-07).

As in the past, these evaluation forms will be reviewed and discussed by all faculty before the following semester begins.

Particular attention is paid to consistency between instructors in courses with multiple sections. This includes content, grading and some aspects of presentation. This task is always difficult because of the large number of adjunct instructors and the high turnover rate in those low paying positions.

2.b. Program faculty are involved in determining strategies to measure classroom and/or program effectiveness:

All Faculty review/discuss their individual classroom evaluations with the Department Chair at the end of the academic year.

- Suggestions are made and communication is encouraged. Points of improvement are mentioned.
- Positive comments are always stressed.

3. Authored by Robin Cotter, Ph.D.

How is program curriculum reviewed for currency and relevancy to college, community, and student needs? Include in your response a discussion on recent deletions, additions and revisions. Describe your upcoming plans for curriculum review, revision and/or development and how program faculty are involved in the process.

The Biology Department faculty have developed advisories made up of community non-profit, industry, and government entities to evaluate the relevancy of existing curriculum and identify the need for new curriculum to better prepare students for the bioscience workforce. In addition, Biology Department faculty serve on a variety of curriculum development and review bodies including the Phoenix College Curriculum committee, the Biology Instructional Council, the Articulation Task Force, the MCCC Bioindustry Task Force, and the recently developed Environmental Instructional Council. In response to recommendations outlined in The Battelle Memorial Institute report, "Preparing for the Future: Arizona Bioscience Workforce Strategy," the Biology Department faculty have been active in updating pre-existing and implementing new curricula that will better prepare students for the bioscience workforce and that will meet transferability requirements for NAU, U of A and ASU.

The Biology Department is continually working to maintain currency and relevancy in biology course content, including integrating currently accepted scientific techniques and competencies into pre-existing courses and, where needed, developing new courses to meet the evolving needs of the bioscience workforce. In 2004, Dr. Anna-Martí-Subirana initiated the development of Introduction to Biotechnology for non-majors (BIO 107) and major (BIO 247), which emphasize integral, hands-on knowledge of current biotechnology concepts and techniques. Instructors Drs. Phil Pepe and Anna-Martí-Subirana have also been instrumental in the creation of internship programs that provide experiential learning for students in the fields of bioindustry and environmental science. For example, Dr. Martí-Subirana developed a bioindustry internship program (BIO249) that enables students to acquire hands-on experience through a paid internship in local bioindustry institutions, including T-Gen, Barrows Neurological Institute and Sun Health Research Institute. In 2006, Dr. Phil Pepe successfully initiated and implemented a new multidisciplinary Environmental Science (ENV101, 230, 280) curriculum within MCCC that was approved by campus and MCCC curriculum groups. In addition to MCCC environmental sciences, Dr. Pepe facilitated a degree transfer agreement with NAU so that students may take all of their lower division

environmental sciences at PC and complete their baccalaureate degree through NAU Phoenix Campus in environmental sciences. Working with adjunct instructor, Remy Autz, Dr. Pepe also developed and successfully implemented a Geospatial Technology workforce training program at Phoenix College, which is an officially recognized GIS/GPS skills certification program. Many of the Biology

Biology Department faculty are currently in the process of reviewing and updating pre-existing and implementing new curricula to incorporate new bioscience technologies and laboratory skill competencies in the following areas: 1) Cellular and Molecular Biology (BIO 245/246); 2) Applied Biosciences: Biotechnology (BIO 247/248); 3) Introduction to Biotechnology (BIO 107); (4) Introductory Biology for Allied Health (BIO 156); (5) Introductory Biology for Majors (BIO 181 and BIO 182); (6) Microbiology for Allied Health (BIO 205); and (7) Microbiology for Majors (BIO 220). Biology Department faculty are also working to develop online and hybrid courses to enhance the current offerings of the department.

4. Authored by Patricia Finkenstadt, Ph. D.

Are there dual enrollment agreements with area high schools? If yes, what are the courses provided? (Refer to IR web site; Reports, Dual Enrollment) From your perspective, how can the relationship with the high school be strengthened or better supported?

The Biology Department currently has no dual enrollment courses. However, an agreement between the Phoenix Unified High School District Bioscience High School and the Biology Department is currently under development that will offer dual enrollment courses for Bioscience High School students.

This partnership will be supported by:

- Biology faculty contributing to and serving on advisory boards for curriculum development
- Curriculum sharing between Bioscience High School faculty and Biology faculty
- Development of professional development workshops
 - i. Currently, the Arizona Science Center Institute for Teaching offers two professional development workshops in partnership with the Biology Department
 1. Dr. Patricia Finkenstadt teaches an Anatomy and Physiology for Teachers workshop
 2. Ms. Dianne McKee is developing an Environmental Science for Teachers that will be offered through the multidisciplinary prefix ENV

5. Authored by Robin Cotter, Ph. D.

What instructional methods/techniques are used in program courses (i.e., lecture, PowerPoint presentations, small group discussion, case studies, simulation exercises, service learning, etc)?

- **Discuss how these methods/techniques contribute to student learning/student success?**
- **What assessments are being used to determine if current teaching methods used in the program are adequately meeting student needs.**
- **How are the results of these assessments currently being used?**

The biology department utilizes a wide variety of instructional methods and techniques to address the diverse learning needs and styles of our student population. Nearly all Biology Department classrooms are equipped with state-of-the art multimedia instructor stations that enable instructors to project PowerPoint images, play DVDs and videos, and provide access to internet activities that supplement lecture content with visual images, videos, animations, and computer-simulated activities. In addition, faculty utilize internet for course enhancement and delivery including the development of course-specific websites that supplement learning in the classroom, as well as hybrid courses, in which the lectures are done on the Internet. In the laboratory, students are trained to use scientific equipment to acquire and analyze data and apply technologies relevant to the bioscience workplace. In addition to industry relevant technologies, many of our courses incorporate the use of equipment such Vernier and Bio-Pak to investigate physiological processes such as cellular respiration and muscle fatigue. The newly established GIS program utilizes industry standard software including ArcGIS, Leica Geosystems and Analytical Graphs software to complete Geospatial Technology assignments.

In addition to the use of technology in the classroom, Biology Department faculty utilize small group activities, collaborative projects and experiential learning to enhance delivery of biological concepts and techniques. Biology Department faculty engage students through small group activities, collaborative projects, experiential learning, and problem-based case studies. For example, Mickie Bond has established Service Learning opportunities for 15 Plants and Society students in association with the Native Seeds/SEARCH program. Students in Dr. Elena Ortiz's class in conjunction with local elementary school students had the opportunity to engage in field work as part of the Rio Salado Project. Anatomy & Physiology instructor Dr. Patricia Finkenstadt organized student tours of the Body Worlds 3 exhibit for students enrolled in BIO 201/202. Drs. Phil Pepe and Anna-Marti-Subirana have been instrumental in the creation of internship programs that provide experiential learning for students in the fields of bioindustry and environmental science.

2.a. Methods/techniques contribute to student learning/student success:

All biology faculty employ student activities that encourage the development of skills in numeracy, analysis, writing, critical thinking, and equipment use. Each biology course incorporates student activities that involve data collection and analysis, access and use of electronic and printed resources, mathematics and computation, technical lab equipment use, writing activities, and oral presentations. All biology courses have laboratory components which are taught hands-on both in the lab and in the field. Through participation in laboratory experiments and research projects, students develop critical thinking

computational, and scientific writing skills, as well as proficiency in the use of scientific equipment and techniques. For example, BIO 181 students generate, analyze, and plot data regarding the effects of temperature and pH on enzymatic activity. The students then utilize this data to generate a scientific paper that describes their results and the implications of their data.

2.b. Assessments that are being used to determine if current teaching methods used in the program are adequately meeting student needs:

Biology Department faculty utilize homework, quizzes, and exams to promote student maintenance of scientific content. Many instructors use rubrics to evaluate student work and for students to use as tool to develop successful work. Working with Jan Binder, Director of Institutional Planning and Research, the Biology Department faculty recently updated the student evaluation form to better assess the effectiveness of delivery styles, technology in the classroom and supplemental materials. The results from these assessments will be compiled each semester and used to identify the strengths and weaknesses of the department in these areas. Recently, our department submitted a Capital Funds proposal for the acquisition of Student Response Systems that would enable instructors to engage students in the classroom and actively assess learning in real-time.

2.c. How the results of these assessments are currently being used:

Biology faculty collaborate and regularly discuss ideas for the development of student skills within the Biology Department and with other department faculty from Chemistry, Math, English, Reading and the Library. These assessments are used to identify areas where students need assistance and how working with the Learning Center and Math & Science Center, the Biology Department can better serve our students. These assessments have led the development of hybrid courses, course-specific webpages, installation of instructor media stations in all of our classrooms, implementation of new technologies that enable instructors to develop course-specific, internet-based review tools, and the adoption of Student Response Systems for the active assessment of student comprehension and learning.

6. Authored by Patricia Finkenstadt, Ph. D.

How does your current semester scheduling of courses adequately support student access and completion needs. In responding, address the following

- Describe your scheduling review/analysis method and the process used to plan future schedules.
- Analysis patters of prefix by FTSE for the past three years.

6.a. Method and process used to plan future schedules:

For each scheduling term, the members of the Biology department meet to discuss course offerings. Biology faculty use enrollment trends from previous semesters as a primary indicator of what and how many courses to offer each semester. Additionally, the changing needs of the community and suggestions from PCs college advisors are considered for each semester. Additional input comes from various advisory boards and other programs

(e.g., Bio-Industry and Nursing). Examples of how the Biology faculty have addressed student needs in the past include

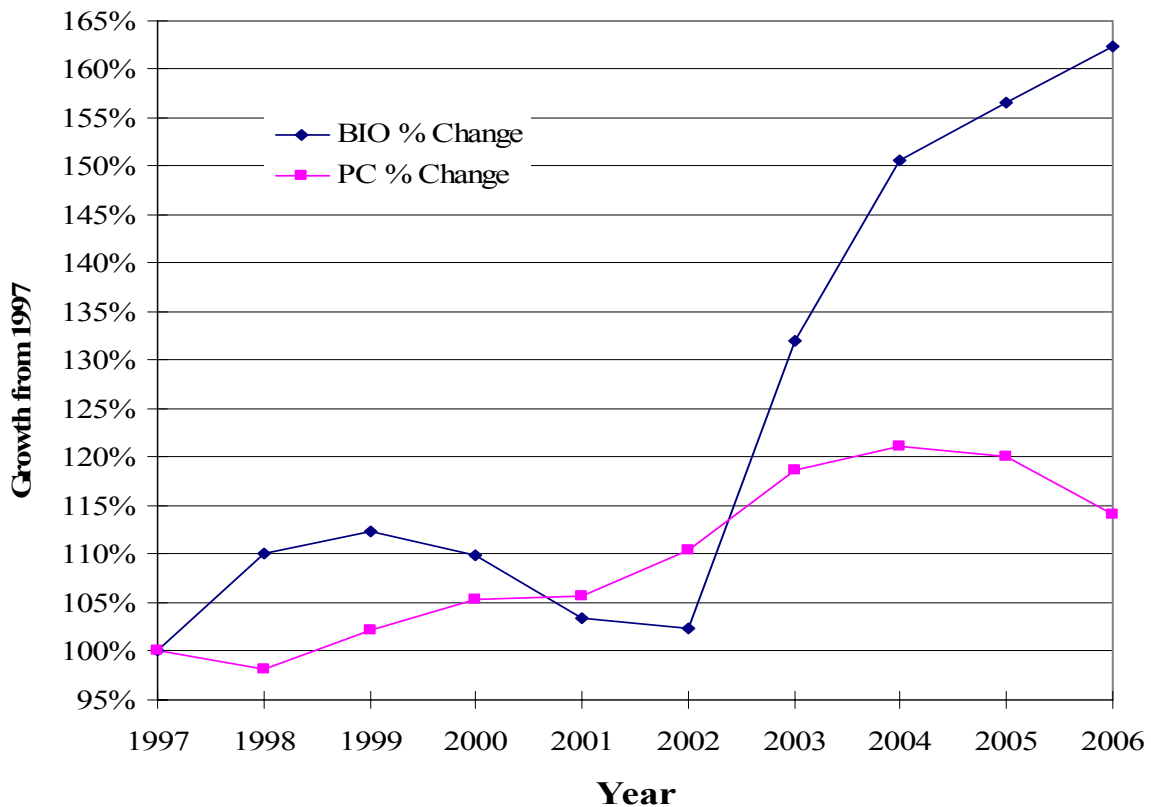
- The number of on-line courses offered has increased from 2 courses in the 2001-2 academic year to 8 courses in 2005-6. The number of student enrolled in these courses rose from 100 to nearly 500.
- Dr. Ana Marti-Subirana offered a hybrid BIO 181 (majors biology) in Fall 2006.
- Dr. Philip Pepe created a new Geospatial Technology program for those requiring training and certification in GIS/GPS applications.
- Dr. Philip Pepe created a new multidisciplinary Environmental Sciences program.

The primary limiting factor for scheduling is the continuous understaffing of full-time biology faculty.

6.b. Analysis patters of prefix by FTSE for the past three years:

The PC Biology Department is the third largest FTSE contributor to PC. Biology Department FTSE has experienced a much faster fiscal year growth rate compared to PC campus FTSE over the past several years. The Biology Department 45th day student enrollment increased from 305.6 FTSE in FY 2001-2002 to 485.63 FTSE in FY 2005-2006, a 60% overall increase, averaging a >10% increase per year as per Planning, Research & Institutional Effectiveness Director report.

FTSE Growth from 1997 FTSE - Biology v Campus



7. Authored by Mickie Bond, M.S.

Comment on your program's level of collaboration with student support services such as advising, admissions, registration, financial aid, tutoring, counseling, etc.

- Advising, the week of accountability is covered at all times by Faculty of the Biology Department. Because of limited seating in the labs, it is very important that over-rides not be assigned by Admissions or Advising without contacting the instructor for any course.

Several members of the Counseling Department work closely with individual faculty in Biology. Cheryl Axtell has been a long time advocate. Kay Harrison is dedicated and efficient in information on transferring to four year Universities, both in and out of state. Doris Sleeper keeps Current on graduation requirement and Milli Sprague can help with all medically orientated training questions.

Each lead instructor is available by phone or e-mail to talk to students who wish to sign up for a filled class. Generally a student will be advised to come to the first class meeting in hopes of "Drop/Add" made available by a "No Show".

- Admissions, complete descriptions of all Biology courses are kept current in Advisement. These are prepared on a semester basis by the lead instructor. An Online Syllabus is included for each course.

The Biology Website is kept current and includes photos of most Faculty and instructors. This site is maintained by the Biology Administrative Assistant. See PC Home Page.

- Registration, all rosters are prepared and returned in a timely manner. This is the responsibility of the instructor for each course.

Adequate catalogs and class schedules are always available to students in the Biology office. Students are provided with directions to the Financial Aid Office at the beginning of each semester.

We collaborate with the PC Alumni Office (check the correct title) as we have developed three scholarships and list them. Scholarship meetings are announced to all Biology classes and students are encouraged to apply for both general and Biology Department Scholarships.

- Math + Science, several Biology instructors participate in the Math + Science Center. Individuals participate in tutoring and present specialized lectures if requested. (Pepe, Rosati, Tate)

Announcements of activities at the Math + Science Center are made in all Biology classes and bookmarks and flyers are distributed in classes. (All fulltime and adjunct faculty)

- Counseling, contact is maintained with the Counseling Center. All requests are responded to in a timely manner.

Care is taken not to jeopardize student identification.

- Student Considerations, all students are greeted upon coming into the main Biology Office. Anybody who is in this office does this. Students are routinely asked to be seated” while the greeter locates the instructor of choice. (All faculty and Administrative assistant)

Students are escorted into Faculty offices. Most tutoring and mentoring are done within Faculty offices.

- Disability Resource Center, written notification of Special Needs students provide a connection between Disability Resources and the instructor, these needs are met.

All labs have adjustable tables to accommodate students in wheelchairs. Lecture room have tables for larger students.

A raised bed garden enables students with mobility issues to join into planting the garden.

- REACH/Trio, requests and receives grade information on students in this program. Biology instructors provide this grade information in a timely fashion.
- Learning Technology & Development, all faculty are kept advised of these meeting and courses. All are encouraged to update and exceed their current skills.

Focus on Promoting a Life of Learning

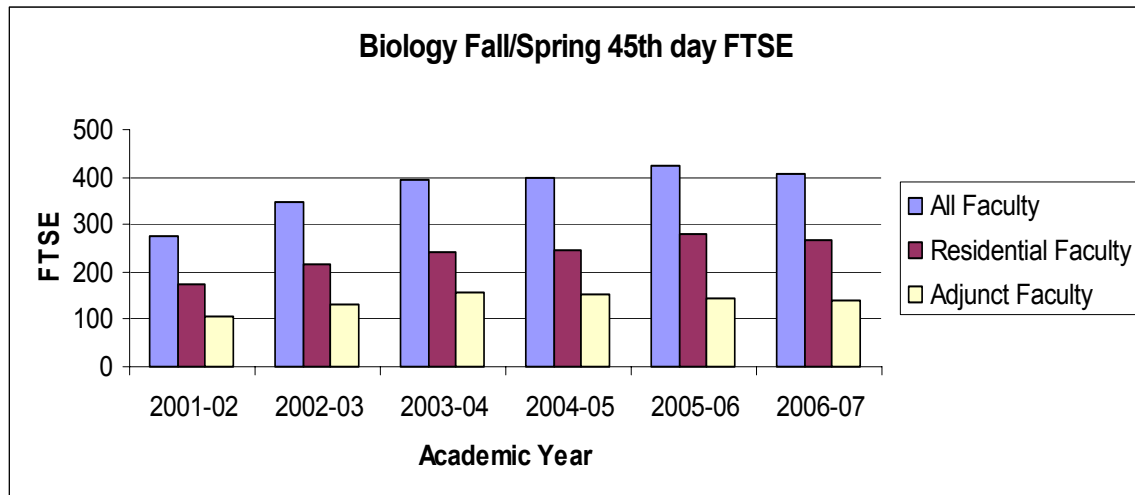
1. Authored by Patricia Finkenstadt, Ph.D.

Describe the FTSE load of faculty in the program.

- FTSE taught by residential faculty and adjunct faculty for the past three years. (*Refer to IR web site; Program Review, Faculty FTSE*)
- Analysis of the reassigned time allocated to faculty in the program. Include the purposes for this reassigned time and resulting program benefits. (*Refer to Academic Affairs Office*)

1.a. FTSE taught by residential faculty and adjunct faculty for the past three years:

The FTSE taught by Biology faculty has increased over 50% over the past five years with no increase in the number of full-time instructors. The primary limiting factor for increased FTSE is the continuous understaffing of the biology department.



1.b. Analysis of the reassigned time allocated to faculty in the program, including the purposes for the reassigned time and resulting program benefits:

Several faculty have received reassign time in the past three years.

Academic Year 2003/4 – Total Hours 16.8 Reassign time: 9 hours, Special Services
7.8 hours

- Dr. Ana Marti-Subirana received 3 hours on a Special Services contract for new course development. She created the course Applied Biosciences: Biotechnology for MCCC which was adopted as fully-transferable to ASU. This is a cutting-edge course that meets the Biology Department's and the Arizona Biosciences Roadmap goals of mentoring and training future bioscientists.
- Mr. Mark Rosati received 9 hours reassign time for serving as Department Chair. As the Biology Department Chair, Mr. Rosati administers departmental activities, including, but not limited to, supervising and mentoring junior faculty members, supervising the lab manager and technicians, hiring and managing adjunct

instructors, managing the departmental budget and overseeing the purchase of new equipment, and lab space utilization.

- Dr. Phil Tate received 4.8 hours on a Special Services contract while he served as the Human Anatomy and Physiology Society (HAPS) Past-President. This involvement with HAPS brought the annual HAPS meeting to Phoenix College and established funding for a scholarship for continuing Anatomy and Physiology students.

Academic Year 2004/5 – Total Hours 9 Reassign time: 9 hours

- Mr. Mark Rosati received 9 hours reassign time for serving as Department Chair. As the Biology Department Chair, Mr. Rosati administers departmental activities, including, but not limited to, supervising and mentoring junior faculty members, supervising the lab manager and technicians, hiring and managing adjunct instructors, managing the departmental budget and overseeing the purchase of new equipment, and lab space utilization.

Academic Year 2005/6 – Total Hours 20 Reassign time: 9 hours, Special Services 11 hours

- Mr. John Arle received 8 hours on a Special Services contract for serving as Ocotillo Instructional Technology General Chair for the Maricopa Community Colleges. The Ocotillo Learning Group serves as a faculty-driven catalyst for addressing technology and learning at MCCC. The Ocotillo Learning Group provides district instructors with access to current information and practice related to learning technologies as well as Ocotillo Research and Development group activities and products.
- Dr. Philip Pepe received 3 hours on a Special Services contract for serving as Director of the GPS/GIS Program. Dr. Pepe developed and successfully implemented the Geospatial Technology workforce training program at Phoenix College. He began this program with a fully funded “New Initiative” grant from Phoenix College to purchase, implement and advertise for the program. This four-course program leads students to a nationally-recognized exam that, when passed, is an officially recognized GIS/GPS skills certification.
- Mr. Mark Rosati received 9 hours reassign time for serving as Department Chair. As the Biology Department Chair, Mr. Rosati administers departmental activities, including, but not limited to, supervising and mentoring junior faculty members, supervising the lab manager and technicians, hiring and managing adjunct instructors, managing the departmental budget and overseeing the purchase of new equipment, and lab space utilization.

2. Authored by Philip Tate, D.A.

Explain how faculty and staff in the program maintain expertise in their discipline or area of responsibility. Include in your discussion information on the following:

- **Professional growth needs for residential faculty and staff in your program area over the next three years.**
- **Plans to ensure that these needs are met, including discussion of resource needs.**

On a daily basis, faculty and staff in the biology department maintain their expertise by updating their courses and improving delivery of course content and services. Phoenix College and MCCCDC provide workshops and technical support and Professional Growth opportunities include funding for courses, attending conferences, sabbatical leave, etc. Over the next three years there will be a continuing need to maintain up-to-date content knowledge and technological expertise. To ensure that these needs are met, the faculty and staff in the biology department will be informed of the opportunities available within and outside of the district.

- Dr. Anna Marti-Subirana will be on sabbatical leave for the Fall 2007 and Spring 2008 to receive training in cell and tissue culture techniques, clinical diagnostic techniques, and the management of biological databases (bioinformatics). In addition Dr. Marti-Subirana has completed a Master of Arts (M.A.) in English and American Literature with emphasis on Contemporary American Poetry.
- Dr. Philip Pepe had a sabbatical for the Fall of 2005 with the Arizona Audubon Society to promote environmental education, especially in the Rio Salado Park. He was also involved in the preliminary planning of an education center at Central Avenue and the Salt River. Dr. Pepe participated the planning of a mentoring program between Phoenix College and Phoenix Elementary School.
- Dr. Robin Cotter has coauthored a peer-reviewed paper, based upon research performed while at Albany Medical College, which investigated the antiviral effects of natural plant extracts, (Paskaleva, E, Lin, X, Li, W, Cotter, R, Klein, M, Roberge, E, Yu, E, Clark, B, Veille, JC, Liu, Y, Lee, D, and Canki, M. 2006. *Inhibition of highly productive HIV-1 infection in T cells, primary human macrophages, microglia, and astrocytes by Sargassum fusiforme*. AIDS Res Therapy 3:15). Dr. Cotter is also contributing to another paper entitled "Neuroprotective effects of Abeta-induced human neuronal IL-8," which has been accepted by the Neurobiology of Aging Journal.
- Dr. Philip Tate maintains content expertise and creates innovative teaching strategies by writing anatomy and physiology textbooks and study guides.
- Jim Neuenfeldt is pursuing a Master's degree in educational leadership and has been admitted to the W.P. Carey School of College of Business MBA program. Mr. Neuenfeldt has also obtained a Certificate of Completion for MCCCDC Supervisor Development Program, Certificate of Completion for DOT Hazardous Materials Transportation training, Certificate of Completion for Phoenix College

Positive Climate Campus Program (PC3), and Conflict Resolution through Mediation training. Mr. Neuenfeldt has coauthored a biomedical research article in gene therapy research, “ *Multicistronic lentiviral vectors containing the FMDV 2A cleavage factor demonstrate robust expression of encoded genes at limiting MOI,*” which was published in Virology Journal (3, 1) 2006.

- Lab technician Matt Haberkorn has completed a Master’s degree in Ecology and is facilitating lab skill training sessions for instructors—Global Learning and Observations to Benefit the Environment (GLOBE)—to incorporate current lab methods in our lab instruction. GLOBE is an international environmental monitoring program designed to train K-12 and community college teachers to implement scientifically valid environmental measurements in the classroom.
- Lab technicians Theresa Johnson completed a USDA Hispanic Serving Institution (HSI) Summer Internship program at the headquarters in Washington D.C. The focus of the internship was to perform USDA research with investigators and receive information to train Biology Department faculty in the promotion of USDA HSI student programs.
- As a result of the Department’s partnership with the USDA, Dr. Philip Pepe, is applying for a more in-depth training in the recruitment of Hispanic biology students into USDA student internships.
- The Biology Department Administrative Secretary, Guadalupe Candanedo, has successfully completed several training programs including Microsoft Access, Excel, Dreamweaver, and a number of workshops on office operations and procedures.

3. Authored by Robin Cotter, Ph.D.

Comment on the major development needs of adjunct faculty within your program?

- **Describe development activities that are in place for adjunct faculty in your program.**
- **Indicate what development activities you would like to implement. Identify your plan to accomplish this, including discussion of resource needs.**

3.a. Development activities that are in place for adjunct faculty in your program:

Currently the biology department has 20 adjunct faculty teaching day, evening, weekends and internet courses. It is particularly difficult to staff Biology adjunct positions due to the lack of biology-trained individuals in Phoenix who are willing to work part time. To address the training and retention of adjunct faculty, Mark Rosati, the Biology Department Chair, has instituted a program to increase the quality of adjunct instructors within the department. Instructors who will be teaching in-class laboratory classes are required to undergo a lab in-service with the lab manager to orient them to the safe and effective operation of lab equipment and supplies. Instructors who will be teaching online

are required to take “WebCT Boot Camp” to ensure they have the skills necessary to independently administer their classes. In addition to these department specific developmental activities, adjunct faculty are also encouraged to participate in Phoenix College and District related activities such as Day of Learning, LTD training courses, and MCLI workshops.

3.b. Development activities we would like to implement, the plan to accomplish this, and resource needs:

In order to identify the developmental needs of our adjunct faculty, the Biology Department recently administered a survey to all adjuncts currently teaching within the department. On this survey, adjunct faculty indicated that they would like to receive additional training in the following areas: 1) use of classroom audiovisual technology and software; and 2) grant writing opportunities for course development and professional growth. In response to these adjunct-identified needs, the Biology Department would like to implement more training opportunities for adjunct faculty in use of the instructor media stations, TurningPoint Student Response Systems, WebCT, Blackboard, SoftChalk LessonBuilder, Adobe Acrobat, Dreamweaver, as well as course-specific technology, such as Bio-Pak, Vernier, and Leica Geosystems. Many of our adjuncts, who have already completed this training, are actively implementing this technology within their courses to enhance delivery and student comprehension of course material.

4. Authored by Philip Tate, D.A.

Comment on facilities, equipment, and technology that the program uses, their current adequacy and any immediate needs for the program. In your discussion, consider the following:

- **Strategies to overcome any deficiencies.**
- **Immediate needs and plans for funding/resource development.**

Classroom space has been a continuing problem for biology class lectures that has not been adequately addressed. Biology lecture sizes range from 36 to 72 students per class. PC has few rooms to accommodate these numbers of students. This Biology Department need for larger lecture rooms has been expressed in annual reports, room requests, capital and building requests, and new building projects.

Most biology course offerings include a laboratory experience, which requires scientific equipment for student use. In addition to the usual AV needs in a classroom, there is a special need for AV equipment that can be used for demonstration purposes. For example, some of our labs have video cameras and monitors for projecting macroscopic and microscopic images. We also have video cameras on carts that can be shared between labs for macroscopic and microscopic demonstrations (see equipment list below).

Biology laboratory classrooms have been routinely upgraded with scientific and AV equipment. We have been successful with campus and district level grant awards, receiving over \$465,000 in the last four years to fund our continuous improvement of our laboratory

teaching environment. As opportunities arise, the biology department will seek additional grant money.

In addition to equipment used by students, there is a need for support facilities and equipment. The biology department has a chemical stock room, five preparation/storage rooms, and a dishwashing/autoclave room.

Laboratory safety is a primary goal for our laboratory classrooms as faculty, staff, and students use scientific equipment and supplies that require safe handling and disposal. Jim Neuenfeldt has developed a lab safety standard that has been adopted by our District Office of Risk Management.

Facilities, equipment, and technology available to the faculty and staff of the biology department include the following:

- Office Equipment
 - All residential faculty and staff have desktop computers with a shared printer. Two computers are available for adjunct faculty. There is a departmental scanner, copier, and fax machine.
- Lecture Rooms AV Equipment
 - Lecture rooms have computers, DVD, VHS, data projectors, and overhead projectors. Most faculty use PowerPoint presentations for delivery of lecture material.
- Laboratory AV Equipment
 - Four labs each have the newest, integrated instructor stations on campus, which includes computer, StarBoard, Elmo, DVD, VHS, and data projector.
 - Three labs each have DVD/VHS players, two 35 inch monitors, and overhead projector.
 - Two labs each have a video camera on a movable arm mounted on a cart, with 13 inch instructor monitor.
 - One lab has 13 computers (with ADAM and Biopac software) and a shared printer.
 - Cadaver lab has VHS, two 32 inch monitors, video camera mounted on movable arm, and surgical lighting.
- Laboratory Equipment
 - Microbiology lab has ELISA plate reader.
 - Molecular Biology lab has laminar flow hood, fluorescent microscope w/ digital camera, inverted microscope, CO2 incubator, centrifuge (high speed, refrigerated), electrophoresis apparatus (agarose and PAGE), UV/Vis spectrophotometers, thermocycler
 - Chemical stock room has a biosafety hood.

- Other Laboratory Equipment
 - 142 binocular microscopes
 - 47 dissecting scopes
 - 1 demonstration cart with video camera and monitor
 - 4 demonstration microscopes with digital cameras
 - 25 laptops
 - Vernier data acquisition hardware and probes
 - Autoclave
 - RO water purification system
 - pH meters
 - Spectrophotometers – digital and analog
 - 1 UV gel box BIODOCIT
 - 4 micro centrifuges
 - Shaker
 - Digital balances
 - Ice machine
 - Refrigerators
 - -80 C freezer
 - -20 C freezer
 - Incubators
 - Water baths

- Models
 - Many different plant and animal models.

4.a. Strategies to overcome any deficiencies:

To overcome our limited lecture room size, we will pursue as many campus processes that are available to us to request the lecture room facilities we have lacked. To overcome any equipment/models/supplies deficiencies, the biology department relies upon money from course fees, capital funding, and grants.

4.b. Immediate needs and plans for funding/resource development:

The following are plans for improvements in AV capability in our labs and capital equipment requests for various courses.

- Four of seven labs have the newest, integrated instructor stations on campus, which includes computer, StarBoard, Elmo, DVD, VHS, and data projector.. The remaining three labs will be upgraded as soon as possible to have the same equipment and capabilities. Most likely funded from course fees
- TurningPoint Student Response System (SRS) – 100 units for \$4698. Most likely funded from capital request.
- The Trimble® Recon® GPS XB is a GPS solution for field data collection and mobile GIS – 12 units for \$14,388. Most likely funded from capital request.

- Airmetrics MiniVol™ Portable Air Sampler samples ambient air for particulate matter and non-reactive gases (CO, NO_x) for \$3,570. Most likely funded from capital request.
- Ion chromatograph (Dionex ICS- 90™ IC Entry Level IC System) for \$14,000. Most likely funded from capital request.

Focus on Engagement and Service

1. Authored by Elena Ortiz, Ph.D.

Describe activities initiated and led by program faculty/staff that have positively impacted our college and community. Include in your response information concerning:

- **Future activities the program is considering.**
- **Leadership roles in other activities that individuals in your program are pursuing or are interested in pursuing.**

The Biology Department is involved in and provides leadership for many activities that positively impact the college and the community. Those activities include joint projects with community partners, K-12 outreach activities, and college and district-wide committee memberships.

Some examples include:

- **Summer Internships in Molecular Biosciences and Biotechnology:** Students become involved and participate in ongoing research projects at research institutions such as TGen (<http://www.tgen.org/>), Biodesign Institute at ASU (<http://www.biodesign.asu.edu/>), and Barrow Neurological Institute at St. Joseph's Hospital (<http://www.thebni.com/home.asp>). Through summer internships of a duration of approximately two months, students experience first-hand current, cutting-edge research projects and procedures in the field of Genetics, Bioengineering, Bioinformatics, and Biomedicine.
- **Summer Internships in Biomedicine:** The Arizona Biology Network (ABN) program (<http://ecc.pima.edu/~achristensen/abn/>). The ABN program "is designed to help under-represented minority students realize their goal of a career in the biomedical and behavioral sciences" (ABN Program Overview). The program, funded by the National Institutes of Health, provides a 10 week summer research experience in biomedical or behavioral sciences at The University of Arizona.
- **Science Alliance:** A group of environmental science faculty from 4 MCCD campuses in partnership with members of the conservation community at-large, including, but not limited to, Arizona Game and Fish, Arizona Audubon Society, Arizona Department of Environmental Quality. The Science Alliance was formed for the purpose of improving environmental science education while serving the conservation and natural resource management community. The faculty involved seek to provide authentic research experiences in the environmental sciences for students of all levels as a means of improving learning and retention; while at the same time providing a source of timely and accurate environmental monitoring data to the community partners.
- **Arizona Science Center:** Dr. Patricia Finkenstadt was selected by the Arizona Science Center as a teacher's educator for the new BodyWorlds III exhibit.
- **Native Seeds/SEARCH:** Mickie Bond initiated a partnership with Native Seeds/SEARCH, a non-profit organization, to educate, store, propagate and promote important traditional horticultural plants of Native Americans and Hispanics of Northern Mexico and the Southwestern U.S. Ms. Bond facilitated fifteen student interns with Native Seeds/SEARCH. We have plans to continue and expand this relationship.

2. Authored by Elena Ortiz, Ph.D.

Identify what has the program done to establish communication, partnerships, and cooperation with high schools, other community college programs, the community, and four-year institutions in support of program and the College's mission and goals In your discussion point out challenges, lessons learned, and how these will be applied to future plans.

The Biology Department actively seeks out opportunities to partner with other educational institutions in support of the College's mission and goals.

These include:

- Biotechnology & Bioindustry partnerships: (In addition to the partnerships described in previous section, Biology faculty are also involved in the creation of the Phoenix Union Bioscience High School. The project mostly involves instructional partnership.
- AZ Science Center: Biology faculty offer workshops in the Arizona Science Center's Institute for Learning. The Institute for Learning offers workshops on a variety of topics to community (K-12 and home-school) educators.
- NAU ENV transfer program: Biology faculty have created a new transfer program in environmental sciences in partnership with Northern Arizona University and South Mountain Community College.

3. Authored by Elena Ortiz, Ph.D.

Discuss what your program does to support diversity, cultural awareness, and/or community engagement. As part of your discussion, identify the following:

- **The program's desired outcomes in these areas.**
- **The steps the program has taken to accomplish these outcomes.**

The Biology Department supports diversity, cultural awareness and community engagement in many ways. These are accomplished primarily through the incorporation of diversity and cultural awareness throughout the curriculum, and study-abroad offerings. The Biology Department also offers students opportunities for community engagement through selected course offerings.

The Department offers students opportunities for global and community engagement as a way to meet our broader goals of:

- Encouraging and broadening the student learning experience by employing a variety of instructional delivery methods and current technologies.
- Ensuring relevancy in bioscience education by reflecting current practices and technology used by industry and research in health care, biotechnology and environmental areas.
- Promoting community partnerships and service learning with biotechnology, health care and environmental organizations and assisting students in developing skills to apply in the work force.

Some examples of how these goals are accomplished include:

- BIO 108, Plants and Society: BIO 108 has been a participant in 'internationalizing and interculturalizing the curriculum' (ICC) since 1998. This course is a science

- course that also fulfills the Global Awareness component of the Arizona General Education Competencies (AGEC). The course curriculum emphasizes the historical and cultural context of the scientific knowledge of botany.
- Tropical Marine Biology in Australia course: This course provides a comprehensive look at environmental problems and the social and cultural issues surrounding them. The course also exposes students to the tropical marine environments of the Great Barrier Reef ecosystem, and the roles of the public and private sectors in the effort to conserve this global resource.
 - Bio 105, Environmental Biology: This course's Science Mentor program partners college students with local elementary students as they both learn about Environmental Science in their community.

Focus on the Future

1. Authored by Dr. Anna Marti-Subirana and Dr. Philip Pepe

Identify strengths of the program. Consider the following in your response:

- Program achievements/accomplishments, major activities or initiatives, progress made since last review, celebrations and recognitions.
- Identify potential strategies to maintain or improve program performance.

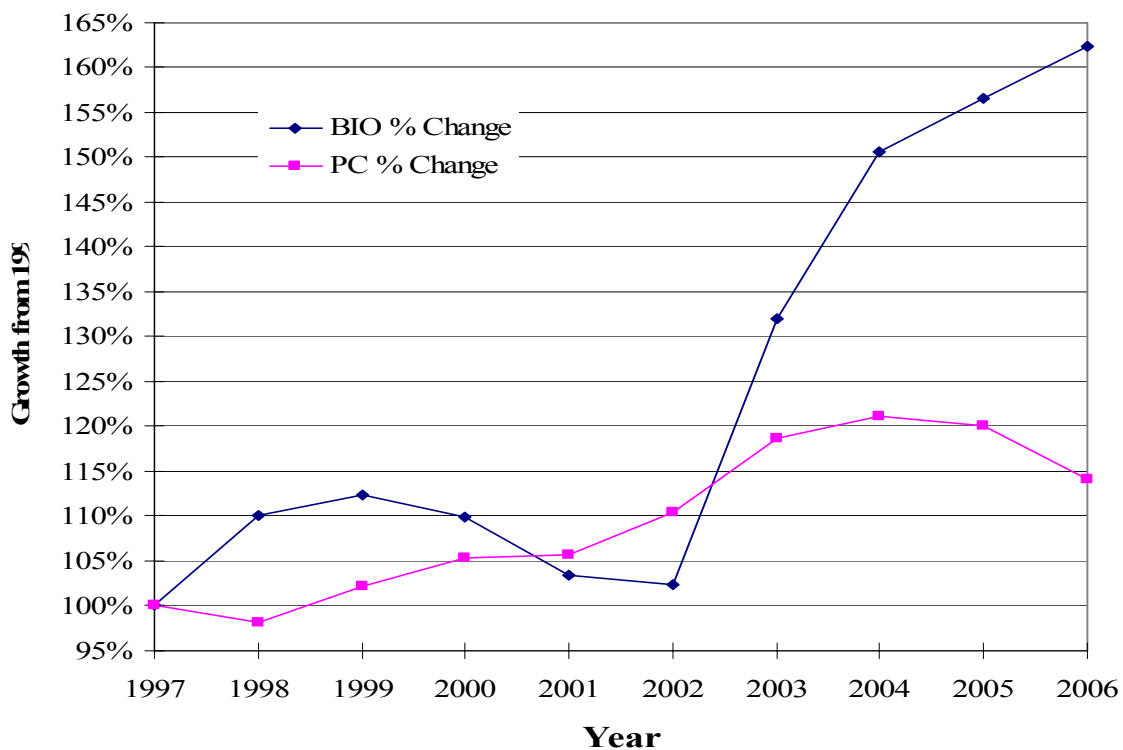
Include consideration of the following in your response:

- Opportunities for the program to continue in a similar or different format.
- Opportunities for cost-containment through restructuring or technological innovations.
- Opportunities for collaboration with other programs, with other institutions. How can duplication be avoided?
- Potential for re-engineering the way curriculum is delivered?

1.a. Program achievements/accomplishments, major activities or initiatives, progress made since last review, celebrations and recognitions:

The Biology Department offers a wide variety of courses clustered around professional, majors, and non-majors programs. Over the past six years, all of the programs have experienced a substantial increase in enrollment, a modernization of their lab operations and equipment, a considerable increase in course offerings in response to community and industry demands, and a modernization of the courses' delivery methods with the creation of on-line and hybrid course sections. The programs' success lies on the fact that courses are student-centered and in alignment with the department's Mission to provide relevant and current biology instruction. As a result, the Phoenix College Biology Department has become the largest contributor to campus 45th day FTSE of all Biology Departments in MCCCDC with 7.69% of campus FTSE (see table below):

FTSE Growth from 1997 FTSE - Biology v Campus



Teaching excellence is a hallmark feature of the Phoenix College Biology Department as several of our faculty members have received teaching awards. Dr. Philip Pepe was the recipient of the Phoenix College Distinguished Teaching Award in 2006 as a result of his outstanding achievements in pioneering alternative delivery methods at Phoenix College, international ecology education of students, and new curriculum and program development. Most of our faculty members have been nominated or awarded the Distinguished Teaching Award in the past: Mickie Bond was the first recipient of this award at Phoenix College, and Dr. Elena Ortiz-Barney, Dr. Anna Marti-Subirana, Dr. Patricia

Finkenstadt, Felicia Brenoe (one year only faculty), John Arle, Dr. Phil Tate, and Jim Kennedy have all been nominated for this award. Dr. Pepe also received the Faculty of the Year award in the past. Many of our faculty have also received NISOD awards, including Mickie Bond, Mark Rosati, Dr. Pepe, Dr. Marti-Subirana, John Arle, and other retired faculty members. Other awards include the 2006 Latino Institute Community Leadership Award to Luis Bleuze, the 2005-2006 Golden Bear Award to Remy Autz, and the 2006 “Caught in the Act of Excellence” Award to Dr. Patricia Finkenstadt and Dr. Robin Cotter.

Several members of the Department are engaged in continuing education in fields different than those within their disciplines. Lab Supervisor Jim Neuenfeldt is currently completing a Masters Degree in Educational Leadership as a working professional and has been admitted to the W.P. Carey School of College of Business MBA program, and Dr. Anna Martí-Subirana has completed a Master of Arts (M.A.) in English and American Literature with emphasis on Contemporary American Poetry.

1.b. Identify potential strategies to maintain or improve program performance. Include consideration of the following in your response:

○ **Opportunities for the program to continue in a similar or different format**

A crucial element of our program’s success has been its flexibility. Our program is adaptable and responds to the constant and rapid changes in the technical demands of science and the medical professions. Biology faculty are establishing partnerships with industries, hospitals, museums, research institutions, and other governmental and non-governmental organizations to collaborate, share know how and equipment to satisfy the changing needs of students, and maximize the use of human and material institutional resources. Partnerships have already been established with the Biodesign Institute at ASU, the DNA Diagnostics lab at St. Joe’s hospital, Arizona Audubon Society, AZ Game and Fish, and the AZ Science Center.

Biology faculty members are fully committed to serve students by assisting them in every aspect of their learning process. Such commitment entails not only helping students with classroom or laboratory related activities and course material, but also providing them with student support services, career counseling, and networking opportunities. The Faculty has worked with existing support services to promote science student services, recruitment, and retention on campus including the Learning Center, Math Science Center, and the Office of Recruitment and Retention. We could use additional help from support services dedicated specifically to science student recruitment, tutoring, and networking.

Maintaining and expanding the network of internship and job opportunities for students is among Biology faculty priorities, as it represents both a direct benefit for student careers, and an appealing aspect of the programs.

- ✓ The Bioscience program has already placed three interns in the TGen Summer Internship Program, and two interns in the Arizona Biology Network Summer Internship Program at the University of Arizona.
- ✓ The Geospatial Program has already helped a student get gainful employment in the field while still in the certificate program.
- ✓ The Environmental Science Program is planning internship programs with AZ Audubon, AZ Game and Fish and Americorps.

- **Opportunities for cost-containment through restructuring or technological innovations**

As a result of re-structuring of the Department's financial management, the program's budget, course fees, procurement, and tracking processes are one of the most efficient of all academic departments in MCCD. The department budget process closely follows course supply and equipment usage. Tracking purchases provides data for the accurate assessment of student course fees. As a result, our department is able to operate completely within a budget separate from college operational monies. This budget system has taken over four years to develop and implement. It is working well.

Maintaining and further improving the new biology budget process is a high priority. It is important to maintain our PSA and MAT staffing who play a key role. Our lab manager, Jim Neuenfeldt, has created and developed a detailed asset tracking system. Mr. Neuenfeldt is also responsible for creating and implementing property control measures, inventory and budget management (exceeding two million dollars), personnel databases, and a comprehensive departmental health and safety plan.

The Biology Faculty have worked hard to pursue funding from outside sources by writing grant proposals, participating in, and administering grants. We have received funding from Prop 301, Title V, and NSF grants. We are currently part of proposals that have been submitted to USDA (United States Department of Agriculture) and SFA (Science Foundation of Arizona). The Biology Faculty push to spearhead collaboration with other institutions enhances our ability to obtain outside funding.

- **Opportunities for collaboration with other programs, with other institutions. How can duplication be avoided?**

All programs within the Biology Department have an extensive network of community and campus collaborators. Our community partnerships are as varied as the field of biology. They are aimed at collaboration among science faculty at PC, MCCD, Arizona's Universities, K-12 Schools, and science institutions outside academia.

The Biology Faculty is developing Learning Communities with members of other Departments and Institutions. Dr. Anna Martí-Subirana is working with faculty in the Clinical Laboratory Sciences and Laboratory Assisting Programs and Felicia Brenoe is working with faculty in Dental, Therapeutic Massage, Medical Billing and Coding Programs. Dr. Phil Pepe and Dr. Anna Martí-Subirana have been working with Dr. James White and Dr. Ed Ong in the Chemistry Department to develop common goals and practices for teaching the Pre-Professional students they all serve. Dr. Elena-Ortiz Barney, Dr. John Schampel, Dr. Phil Pepe, Vashti Supplee, and Matt Haberkorn have developed and are participating in an alliance of scientists, educators, and managers to promote environmental education. This Science Alliance includes members from MCCD, ASU, UA, City of Phoenix, Maricopa Flood Control District, DEQ, AZ Game and Fish, Project Wet, SARA, GLOBE, and AZ Audubon.

Dr. Robin Cotter, is a member of the MCCC Bioindustry Curriculum Taskforce that has worked to establish core standards and competencies for courses and programs that translate to the emerging bioindustry. The impact on our biology courses will be in the form of updated curriculum with defined skill sets with an emphasis on data collection and analysis and laboratory for students.

Dr. Phil Pepe has worked with MCCD Science, technology, engineering and mathematics faculty to develop an ENV IC to provide District-wide faculty governance for further development of the new Environmental Science program. The new IC is composed of 20 voting members; one member elected from each college and one member from each of the following ten IC's: Agriculture, Biology, Chemistry, Computer Science, Engineering, Geography, Geology, Industrial Technology, Mathematics, and Physics.

The Biology Department has written partnership agreements with several non-profit institutions that include student service learning activities and paid student internships. Some of the more visible institutions with which we partner are the Translational Genomics Research Institute (TGen), Barrow Neurological Institute, the Biodesign Institute at ASU, Arizona Audubon, City of Phoenix Parks, and the Arizona Science Center. In addition to partnerships, we have advisory relationships with the local USDA Agricultural Research Station Laboratory at Maricopa, the Phoenix Union High School (PUHSD) Science curriculum advisor, and the PUHSD Bioscience High School principal and science faculty.

The Biology Department has advisory members for each of its partnerships. For the Environmental Science program, we consult with the Science Alliance and the Center for Global Sustainability. For Biosciences and Bioindustry, we have advisory members from TGen the Biodesign Institute and Barrow Neurological Institute. We also have a partnership with the Arizona Science Center, Native Seeds Search, and the Phoenix Desert Botanical Garden. We are developing a service learning partnership, called the Science Mentor program in conjunction with Arizona Audubon and PUHSD elementary schools.

- **Potential for re-engineering the way curriculum is delivered?**

In response to diverse and evolving student learning styles, the Department has diversified its delivery. Biology student lab activities are collaborative and interactive by nature. PC biology labs are an experiential application of science principles, engaging students individually and in groups in tasks that employ equipment, information, mathematics and analysis for skill development. Biology Faculty encourage the development of skills in numeracy, writing, oral communication, critical thinking, and information literacy. Many instructors use rubrics (evaluation matrices) and surveys to evaluate student work and for students to use for self-evaluation.

The Department has spearheaded a response to the Battelle report that has called for a focus on improving laboratory instruction in biology education. The Department has responded to this on many fronts. Mark Rosati, Philip Pepe, and Anna Marti-Subirana rewrote the course competencies of BIO 181, 182, and 205 to include lab competencies and shepherded them through the curriculum process. The Department has upgraded its lab equipment and delivery across the curriculum. It helped to fund and uses lecture and lab

classrooms with internet connections, data projectors and teaching computer stations. The Biology Department is now requesting the purchase of student response systems for use in both lecture and lab classrooms. These systems will promote student involvement and provide the faculty with a tool to measure student understanding and act quickly to student deficiencies.

The Department has been increasing the number of on line and hybrid course sections and developing new web-based delivery methods for non-majors, majors and health professionals. Ana Marti-Subirana is currently hybridizing classes for biology majors and Phil Pepe is proposing the development of new online classes for non-majors.

Chair Mark Rosati has established a partnership with the Phoenix Union Bioscience High School. Such agreement entails the participation of Biology faculty (Anna Marti-Subirana and Phil Pepe) in the school's Bioscience curriculum process, which will include lecture and lab course content and material development. Such strategy will be mutually beneficial and may potentially direct students into Bioscience courses offered at Phoenix College — either high school teachers seeking training or students choosing Biosciences as their career option. Anna Marti-Subirana will offer BIO 107 "Introduction to Biotechnology" in the Spring of 2009. This course offering will increase the number of non-majors transferable courses and may potentially increase interest in Bioscience among the general, non-major student audience, which can translate into a larger number on students majoring in Biology and entering Bioscience careers.

The Department has developed new occupational courses and programs in geospatial technology and environmental science. It has acquired and incorporated software for teaching Geospatial Technology and is now requesting equipment for teaching lab skills in Environmental Sciences. A Geospatial Technology Certificate program is in place and will be certifying its first graduates this summer. In 2007 the Geospatial Technology courses were transferred to the ENV prefix consolidating these new programs. The Department will begin offering the ENV230 and ENV280 courses during the 07-08 academic year. Dr. Phil Pepe is collaborating on the development of an ENV 101 course for non-majors and hopes to offer it through the AZ Science Center starting in Fall 07.

The creation of the new ENV prefix was initiated by Dr. Phil Pepe and was approved by the District Curriculum Committee in 2006. In 2006 the Governing Board approved ENV230 and ENV280 course proposals which have strong lab and field components and are directly transferable to NAU. The need for ENV arises from Environmental Science (ENV) program requirements at NAU. MCCD has a new A.S. degree in Environmental Science (ENV) that transfers to the NAU undergraduate ENV program. A 2+2 articulation of the proposed ENV program at MCCD with the NAU ENV Bachelors Program was planned and NAU has expressed the desire to house upper division NAU courses at SMCC and offer the Bachelor's degree in Phoenix. Dr. Marshall Logvin (SMCC) and Dr Phil Pepe have submitted a grant request for \$300,000 to the USDA to provide financial support to ENV students. If successful, the grant will build a 2+2+2 pipeline helping the ACE program provide support to High School students recruited to complete an ENV-AS degree at PC or SMC and reward the best students who transfer into the NAU ENV-Bachelor's degree program.

2. Authored by Anna Marti-Subriana, Ph.D and Philip Pepe, Ph.D.

Describe those things that are not going well for the program at the present time. Comment on issues or areas of concern which may thwart the progress or effectiveness of the program

The Biology faculty have been very successful in obtaining Proposition 301, district (MCLI) and college Teaching and Learning grants that have contributed to the development and implementation of the Bioscience and Geospatial Technology programs. Teachers for these programs have been hired, curriculum has been fully developed, and equipment and software are in place. Having been recently launched, these programs still enroll only a few students. Even though both programs have experienced a small yet steady increase and they need to be promoted. Program promotion represents an investment of resources and time that, unfortunately, fully loaded or occasionally overloaded, residential faculty simply do not have available. Allotting enough faculty time for program promotion is crucial to the survival and growth of these programs. With appropriate time on their hands, faculty could take advantage of institutional resources designed for student recruitment, such as advisement, public relations, and advertisement. This would help develop relationships with high schools, industries, and professional societies that may evolve into fruitful partnerships. Undertaking such strategies seems central for ensuring the constant funneling of students into the programs.

3. Authored by Philip Pepe, Ph.D.

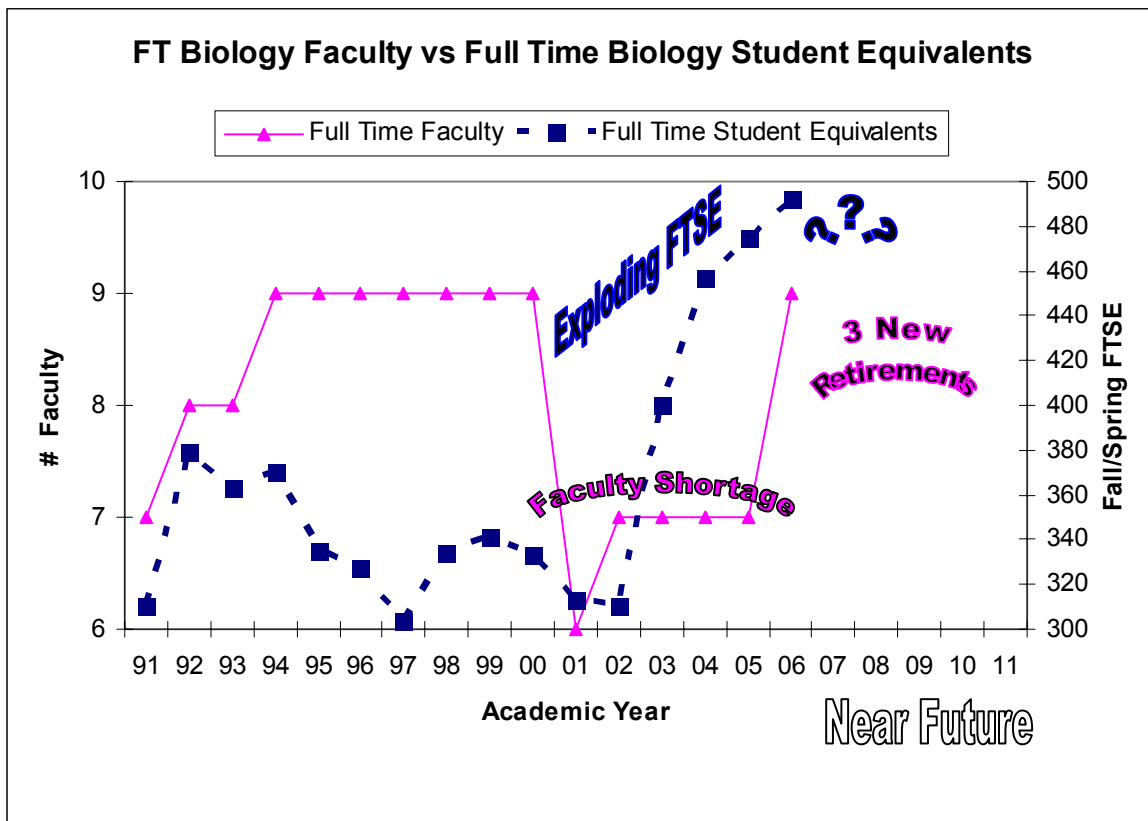
Describe strengths and challenges for faculty/staff appropriate to the program's current status or future development. Indicate any immediate and projected staffing needs/requests.

Staffing has been one of the biggest challenges to the Biology Department following a series of retirements starting in the year 2000. We have been operating with a shortage of full-time faculty ever since. It took the Department until 2006 to get back to full-time faculty staffing levels that we operated with throughout the 1990's.

Biology currently has the third largest FTSE at PC. Biology has one of the highest student headcounts at PC and the largest average class size (32) on campus. It has consistently had courses placing within the top 10-20 largest courses on campus. Since the year 2000 the Department's Fall/Spring FTSE has grown by 178 (an amount equivalent to the current FTSE of the Chemistry and Physics Departments combined).

The Department has requested 4 new full time faculty lines in the 07-08 hiring cycle and has clearly demonstrated the need for them. The first two would be replacements for retired and retiring Anatomy and Physiology faculty. The third and fourth would cover growth in the headcount of majors and non-majors.

Phoenix College finds itself in a de-facto hiring freeze due to over-staffing and FTSE declines in departments other than Biology. This will adversely affect the ability of the Biology Department to grow or even maintain its FTTE for years to come. Three of the current 9 full time faculty in the Department will have over 80 points on the retirement schedule by August 08 and all three of them are discussing retirement plans. The possible loss of 33% of the current full time faculty coupled with the inability to hire replacements makes it increasingly probable that the Biology Department will not be able to meet increasing student demand. This is likely to effect future FTSE and derail plans for expansion (see graph below).



4. Authored by Philip Pepe, Ph.D.

Based on this self-study, what is your three year plan to improve/transform the program? Include goals, responsible party, timeline, resource implications, etc.

Goals	Responsible Party	Timeline	Resource Implications
Retirements:	Philip Tate Philip Pepe Minyon Bond	2008-2010	<ul style="list-style-type: none"> Requires 3 FT Faculty Hires
Maintain & Grow FTSE:	All FT Faculty	2008-2010	<ul style="list-style-type: none"> Requires 2 FT Faculty Hires
Hiring: <ul style="list-style-type: none"> 3 FT Faculty to replace retirements 2 FT Faculty in response to FTSE growth 	Mark Rosati Hiring Committee	2008-2011	<ul style="list-style-type: none"> 5 FT Faculty Lines FT Faculty Time
New Course Development: <ul style="list-style-type: none"> BIO107 BIO100 Online ENV101 ENV230 ENV280 	Anna Marti-Subrianna Mark Rosati Philip Pepe Elena Ortiz John Schampel Remy Autz	2008-2010	<ul style="list-style-type: none"> Special Contracts Overload Pay Capital Dollars
Program Development: <ul style="list-style-type: none"> ENV (includes GST) Bioscience 	Philip Pepe Elena Ortiz John Schampel Remy Autz Anna Marti-Subrianna Robin Cotter	2008-2010	<ul style="list-style-type: none"> Special Contracts Capital Dollars Grant Dollars
New Course Assignments: <ul style="list-style-type: none"> BIO107 BIO100 Online BIO181 BIO182 ENV101 ENV119 ENV230 ENV280 	Anna Marti-Subrianna Robin Cotter Mark Rosati Philip Pepe Elena Ortiz John Schampel Remy Autz	2008-2011	<ul style="list-style-type: none"> Special Contracts Grant Dollars
Technology Improvements: <ul style="list-style-type: none"> Student Response Systems Classroom Media Stations Environmental Science lab & field equipment 	All FT Faculty	2008-2010	<ul style="list-style-type: none"> Capital Dollars Grant Dollars
Assessment: <ul style="list-style-type: none"> Implementing NCAA Program Assessment Rubrics & Surveys 	All FT Faculty	2008-2010	<ul style="list-style-type: none"> Special Contracts Grant Dollars Committee Assignments

			<ul style="list-style-type: none"> • FT Faculty Time
Partnerships: <ul style="list-style-type: none"> • Science Alliance • Bio-Industry Task Force • AZ Science Center • Bioscience High School • Faculty Learning Communities • BIO-IC • ENV-IC • 2+2 Partners 	All FT Faculty	2008-2010	<ul style="list-style-type: none"> • Special Contracts • Grant Dollars • Committee Assignments
Funding: <ul style="list-style-type: none"> • Title V Participation • USDA IMES Grant • SARAH Grant 	Anna Marti-Subrianna Robin Cotter Mark Rosati Patricia Finkenstadt Philip Pepe Elena Ortiz John Schampel Remy Autz	2008-2011	<ul style="list-style-type: none"> • Special Contracts • Grant Dollars
Grant Writing: <ul style="list-style-type: none"> • Prop 301 Grant • NSF ICLI Grant • Learning Grants • Teaching and Learning Grants 	Mark Rosati Philip Pepe Elena Ortiz	2008-2009	<ul style="list-style-type: none"> • Special Contracts
Student Support: <ul style="list-style-type: none"> • Advising • Mentoring • Tutoring • Recruiting • Advertising 	All FT Faculty	2008-2011	<ul style="list-style-type: none"> • Special Contracts • Grant Dollars • Committee Assignments