

Oklahoma City Community College

Program Review Self Study Year

Division:

Program Name

Prepared by:

1. Program Curriculum

Program Name

Science 040

Options:

1)Biology
2)Chemistry
3)Physics

I. Program Requirements

Minimum Required Hours

61

| Major Courses | | |
|-----------------|--|--------------|
| Prefix & Number | Course Title | Credit Hours |
| BIO2234 | HUMAN PHYSIOLOGY | 4 |
| BIO2215/2114 | GENERAL ZOOLOGY* -OR- GENERAL BOTANY* | 4-5 |
| BIO2125/2324 | MICROBIOLOGY* -OR- INVERTEBRATE ZOOLOGY* | 4-5 |
| PHYS1114 | COLLEGE PHYSICS I - OR | 4 |
| CHEM1215 | GENERAL CHEMISTRY II | 5 |
| AHP1013 | MEDICAL TERMINOLOGY | 3 |
| CHEM1115 | GENERAL CHEMISTRY I | 5 |
| CHEM1215 | GENERAL CHEMISTRY II | 5 |
| CHEM2122 | ORGANIC CHEMISTRY LAB | 2 |
| CHEM2114 | ORGANIC CHEMISTRY I | 4 |
| CHEM2124 | ORGANIC CHEMISTRY II | 4 |
| | | |
| PHYS2014 | ENGINEERING PHYSICS I | 4 |
| PHYS2114 | ENGINEERING PHYSICS II | 4 |
| MATH2314 | CALCULUS AND ANALYTIC GEOMETRY III | 4 |
| | | |

| Support Courses | | |
|-----------------|--|--------------|
| Prefix & Number | Course Title | Credit Hours |
| CS1103 | INTRODUCTION TO COMPUTERS AND APPLICATIONS | 3 |
| CHEM1215 | GENERAL CHEMISTRY II -OR- FOREIGN LANGUAGE | 5 |
| BIO2255 | -OR- HUMAN ANATOMY | 5 |
| BIO1023 | INTRODUCTORY NUTRITION | 3 |
| CHEM2990 | CHEMISTRY RESEARCH INTERNSHIP | 1-3 |
| PHYS1114/1214 | COLLEGE PHYSICS I -OR- II | 4 |
| BIO2234/2324 | COMPARATIVE VERTEBRATE ANATOMY -OR- HUMAN PHYSIOLOGY | 4 |
| BIO2125 | MICROBIOLOGY | 4 |
| ECON2213/2123 | PRINCIPLES OF MACROECONOMIC -OR- MICROECONOMICS | 3 |
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| Life Skills Courses | | |
|---------------------|-----------------------------|--------------|
| Prefix & Number | Course Title | Credit Hours |
| SCL1001 | SUCCESS IN COLLEGE AND LIFE | 1 |
| | | |

2. General description of review process and participants assisting with and conducting the review.

a. Program faculty assess annually student learning and program outcomes for their program. Every five years these assessments are evaluated globally. A program review document contains general college information from Advising, Recruitment and Admission and Institutional Effectiveness and program specific assessments of strengths and weakness of the reviewed program and program plans for the future.

b. A list of the student learning outcomes

After completing programs in Science students will:

Recognize the role of genetics and the environment in the evolutionary process (Biology concentration).

Apply concepts, principles, and techniques to the classification scheme of organisms (Biology concentration).

Apply concepts, principles, and techniques of chemistry to solve chemically oriented problems (Chemistry concentration).

Identify and apply standard chemical laboratory techniques to acquire and analyze empirical data that can be used to solve chemical problems (Chemistry concentration).

Develop and support conclusions drawn from an analysis of data; and students will be able to follow written laboratory procedures to safely and correctly complete a laboratory experiment.

Analyze problems drawn from the physical sciences, biological sciences, mathematics, and recognize the appropriate principles involved, synthesize solution strategies, and apply concepts and techniques from program courses (physics, chemistry, mathematics) to solve the problems.

Use standard laboratory techniques to acquire and analyze experimental data (Physics).

Develop and report conclusions drawn from an analysis of laboratory experiments (Physics).

c. A list of program outcomes for the program

Students who take biology, chemistry, physic major classes at OCCC will have acceptance rates into professional programs comparable to students from other 2-

year schools. Pre-pharmacy students will be well prepared for the standardized Pharmacy College Admissions Test (PCAT).

The acceptance rates for health professions schools will be compared for students from OCCC and other 2-year schools. There will be no significant difference in acceptance rates between students from OCCC and other 2-year schools.

Students will be successful in subsequent biology, chemistry, physics baccalaureate programs and/or professional programs at transfer institutions. The degree/certificate completion percentage at transfer institutions for students who take science major classes at OCCC will be similar to the degree/completion percentage of all transfer students entering the transfer institution at that level.

- d. Well defined the criteria for measurement and how the criteria were used in the program.

Students in program courses BIO 2114, General Botany; BIO 2125, Microbiology; BIO 2215, General Zoology; and BIO 2404, Comparative Vertebrate Anatomy will be administered questions from previous GRE exams. These questions will be course dependent, and related to the classification scheme specific to that particular course. Eighty percent of the students should score 70% or higher on these questions. Assessment will also be administered through course specific examinations written by the coordinator of each course to include genetics and the environment in the evolutionary process specific to the specific course content.

Students will be able to apply concepts, principles, and techniques of chemistry to solve chemically oriented problems. Students in all program courses - CHEM 1115, CHEM 1215, CHEM 2114, and CHEM 2124 - as well as in CHEM 1123 will be given exit assessments covering important concepts, principles, and calculation techniques covered in each of those courses or course sequences. Eighty percent of students should score 70% or higher on the exit assessment in all program courses.

Students will be able to identify and apply standard chemical laboratory techniques to acquire and analyze empirical data that can be used to solve chemical problems. Students in CHEM 2122 will be given a chemical problem that can be solved by applying standard lab techniques used earlier in the semester. The students will develop a detailed procedure. After an initial evaluation of the student's plan to insure the safety and workability of the plan, the students will carry out their written procedures, solve the problem, and write a conclusion that is well supported by data. At least 80% of the students will be able to identify and carry out appropriate techniques without redirection from the instructor. At least 80% of the students will solve the problem correctly. (Note: This assessment tool will be used to collect data for both outcome 2 and outcome 3.)

Students will be able to develop and report conclusions drawn from an analysis of laboratory experiments. Students in CHEM 2122 will be given a chemical problem that can be solved by applying standard lab techniques used earlier in the

semester. The students will develop a detailed procedure. After an initial evaluation of the student's plan to insure the safety and workability of the plan, the students will carry out their written procedures, solve the problem, and write a conclusion that is well supported by data. At least 80% of the students will solve the problem correctly. The conclusion paragraph will be evaluated using a faculty developed rubric. At least 80% of the students will be rated as competent or higher in writing well supported conclusions according to the rubric. (Note: This assessment tool will be used to collect data for both outcome 2 and outcome 3.). Students in CHEM 1215 will be able to correctly identify an unknown compound and write a conclusion that is well supported by data. At least 80% of students will be able to correctly identify their unknown compound. The conclusion paragraph will be evaluated using a faculty-developed rubric. At least 80% of the students will be rated as competent or higher in writing well supported conclusions according to the rubric.

Students who take chemistry major classes at OCCC will have an acceptance rate into professional programs comparable to students from other 2-year schools. The acceptance rates for medical school, pharmacy school, and dental school will be compared for students from OCCC and other 2-year schools. The percentage of students from OCCC who are accepted will be equal to or greater than those accepted from other 2-year colleges; Students who take chemistry major classes at OCCC will be successful in their subsequent chemistry classes at transfer institutions. The grade point average for program completers at OCCC will be equal to or greater than the average GPA for students in comparable programs at the transfer institutions; Pre-pharmacy students will be well prepared for the standardized Pharmacy College Admissions Test (PCAT). Students who take the PCAT will be asked to provide an unofficial copy of their PCAT scores to the chemistry faculty. Alternative ways of obtaining copies of the test will be explored if few students volunteer to share their scores. Students who take the PCAT should rank in the 50th percentile or better on the chemistry portion of the PCAT.

Students will analyze problems drawn from the physical sciences and mathematics, recognize the appropriate principles involved, synthesize solution strategies, and apply concepts and techniques from program courses (physics, chemistry, mathematics) to solve the problems:

This is done via analysis of comprehensive final exams in the majors physics courses (PHYS 2014 and 2114). Individual success is indicated by scores of 80% or better on each test, as program credit is only given for course grades of 'B' or higher. Course success is indicated by 70% of students achieving 80% or better on each test.

Students will apply standard laboratory techniques to acquire and analyze experimental data:

Each course coordinator will identify a particular laboratory experiment that falls after the midterm of the course. Student reports will be evaluated based upon departmentally determined criteria for acquisition and analysis of the data as outlined in the laboratory manuals. Success is indicated by a score of 80% or

better by 70% of students on the Experimental Method and Data Analysis sections of the reports.

Students will develop and report conclusions drawn from an analysis of laboratory experiments. PHYS 2014 ---Each course coordinator will identify a particular laboratory experiment that falls after the midterm of the course. Student reports will be evaluated based on departmentally determined criteria for drawing conclusions from the data as outlined in the laboratory manuals. Success will be indicated with a score of 80% or better by 70% of students completing the experiment on the Conclusions sections of the reports.

- e. The evaluation, results and recommendations based on the criteria used.

1) Science with Biology Concentration:

Outcome 1, In the Spring semester of 2009 the assessment for Outcome 1 of Plan Year 2009 was carried out. This assessment was given to one section of General Botany, nine sections of Microbiology, five sections of General Zoology, and one section of Comparative Vertebrate Anatomy as indicated by the outcome strategy. This assessment was accomplished through course specific examinations written by the coordinator of each course to include genetics and the environment in the evolutionary process specific to the specific course content. Results are presented in Table 1, Biology Results for the Evolutionary Process (Appendix); and **Outcome 2**, In the Spring semester of 2009 the assessment for Outcome 1 of Plan Year 2009 was carried out. This assessment was given to one section of General Botany, nine sections of Microbiology, five sections of General Zoology, and one section of Comparative Vertebrate Anatomy as indicated by the outcome strategy. This assessment was accomplished through course specific examinations written by the coordinator of each course to include classification scheme specific to the course content. Results are presented in Table 2, Biology Results for the Classification Scheme (Appendix).

Recommendations - Students did not meet the criteria for success for either outcome tested in the Spring of 2009 (Tables 3 and 4, Appendix). However, an improvement is noted for Zoology, possibly reflecting the updated objectives enacted in the Fall, 2008. Unfortunately a drop in success was noted for both Botany and Microbiology. Possibly the drop in Botany is due to sample variation as only 9 students were assessed. Microbiology's drop may reflect an increase in the numbers of sections that were assessed this year as opposed to just a few sections in previous years. Therefore it is essential that all instructors of Microbiology be made aware that an emphasis of both evolutionary and classification concepts be presented to their students.

2) Science With Chemistry Concentration:

Outcome 1. Ability to solve chemistry problems- Students in all sections of the four program courses were assessed at the end of each semester using departmental final exams that were graded using a standard key and rubric. The

annual results for each program course are summarized in Table 1. A somewhat more detailed discussion of the assessment results is given in the Appendix;
Outcome 2. Ability to apply lab techniques - Student learning outcome 2 was assessed each semester using data collected from a laboratory practical exam given in the Organic Chemistry lab. Detailed annual results are reported in Table 2. The % students meeting the criterion since separating the Organic course sequence into separate lecture and lab courses were compared to results obtained previously; and

Outcome 3. Developing and reporting conclusions - The third outcome was assessed each semester using data from a laboratory practical exam given in the Organic Chemistry lab. Annual results are summarized in Table 2. Direct comparison of the results obtained in previous years to those obtained since the lecture and lab were separated into separate lecture and lab courses is difficult due to changes that were made in the criteria for success for this outcome.

Recommendations - Continue repeated exposure to key concepts in all program courses through homework, quizzes, and exams; continue using Mastering Chemistry or a similar on-line, tutorial system in the General Chemistry sequence to increase the time students spend working problems; increase the point value of all comprehensive final exams to 100 points; expand the content of General Chemistry final exams to more completely assess key course objectives; minimize use of adjunct faculty to teach advanced courses such as CHEM 2114 and CHEM 2124.

Beginning in FY2011, a supervised data analysis and conclusion writing exercise will be incorporated into all General Chemistry labs; beginning in Spring 2011, a supervised data analysis exercise will be incorporated into CHEM 2122 (Organic lab); monitor performance on formal lab reports and/or lab practical exams in CHEM 1215 and CHEM 2122 to determine if the ability to analyze data and write well-supported conclusions increases as a result of the supervised data analysis/conclusion writing exercise; provide additional training on analyzing data and writing conclusions for new and adjunct faculty who teach laboratories; continue offering group labs only; and continue to emphasize the importance of safety to both students and faculty throughout the semester.

3) Science with Physics Concentration:

Outcome 1. Results

PHYS 2014 --- 16% of students taking the comprehensive final test scored at least 80%.

PHYS 2114 --- 50% of students taking the comprehensive final test scored at least 80%.

Recommendations - During the next semester, the faculty teaching these courses will meet to compare and review final exam questions as well as course content, coverage, and emphasis with an aim toward improving the scores (particularly in PHYS 2014).

Outcome 2. Results

PHYS 2014 --- 75% of students scored above 80% on Laboratory 4, chosen for its detailed experimental methods as well as thorough error analysis.

PHYS 2114 --- 100% of students scored above 80% on Laboratory 3, chosen for the requirement of students to analyze data gathered in the electron mass lab and derive the mass of the electron from the slope of the data obtained.

Recommendations - The results indicate (and the coordinator also feels) that this is a sound measure of laboratory technique and analysis. The PHYS 2014 experiment trains students in fitting non-linear data using logarithm fits, and the PHYS 2114 experiment involves measuring a minute quantity indirectly using relationships derived in class.

Outcome 3. Results

Develop and report conclusions drawn from an analysis of laboratory experiments

PHYS 2014 --- 70% of students scored above 80% on Laboratory 5, chosen for the reliance on the analysis of fundamental energy principles to form a reasonable conclusion.

PHYS 2114 --- 70% of students scored above 80% on Laboratory 6, chosen because the principles involved in the analysis and conclusions of the microwave data spanned much of the latter 2 units of study in the course.

Recommendations - The results for this outcome are satisfactory. Keep doing what we are doing.

Output 1. Results

Normalized gain $\langle g \rangle$ in standardized tests for the two sections:

PHYS 2014 --- 38%

PHYS 2114 --- 37%

Recommendations - Since these results are similar to gains reported by peer courses delivered at 4-year universities, and the results are reported to be good indicators of future success, they reinforce the notion that our students are ready for future study that builds upon our foundation.

3. **Research and evaluation must be conducted on a continuing, systematic basis as an integral part of the program. All aspects of the program must be evaluated and the results used to improve services to students. There must be evidence that the program is reaching its stated student learning outcomes/program outcomes. The review should address each of the following areas. The program:**

- a. is central to the institution's mission:

OCCC provides the people of Oklahoma and our community with broad access to certificates of mastery, associate degrees, community education, and cultural programs of exceptional quality, empowering our students to achieve their educational goals and our community to thrive in an increasingly global society. Science degrees (chemistry, biology, physics and various pre-health career options) are clearly necessary to provide skilled professionals in fields that are critical to meeting the needs of our region's employers and aging population.

b. meets stakeholder expectations:

OCCC programs provide our community with broad equitable access to a college education. OCCC students are prepared to succeed in college and are able to achieve their individual educational aspirations. OCCC graduates succeed at four-year institutions and/or in their careers. OCCC has a rich history of enriching our community both economically and socially through our educational and cultural programs.

c. produces graduates and former students who are successful on transferring:

The most recent report with detailed transfer information concerns the 2006 transfer cohort at the University of Oklahoma. That report indicates that there were 110 OCCC students (who transferred in as juniors or seniors) in various programs at OU. Their average GPA at OU was 2.71. This compares favorably to the GPA of junior and senior UCO transfers to OU (22 students, 2.74 GPA) and to all other Oklahoma four year institution transfer students (65 students, 2.85 GPA). OU "native student" GPA was not reported. It should be noted that over 18% of transfer students at OU report OCCC as the "last institution attended".

This is a college wide number, however it is indicative of the students produced by OCCC. We have strong relationships with OU, UCO, and OUHSC. Since the last program review the College has granted 354 A.S. degrees in Science. Between FY06 and FY 10 the number of science degrees has increased by 12.7%. In FY 10 Fifty-one degrees were granted to biological sciences majors, twenty - five in chemistry related fields, and four were in physics. The new pre-allied health concentration of biology (first offered in FY 07) had nineteen graduates in FY10. This indicates that this course of study is attractive to students in our area.

d. contains instruction relevant to the curricular requirements at transfer institutions and in line with student interests and abilities

Programs of Study

OCCC offers two types of associate degree programs: transfer and technical/occupational. In addition, a number of certificates of mastery are offered in technical and occupational fields of study.

University Parallel/Transfer Programs

OCCC offers a broad range of transfer programs for students planning to continue on at a four-year college or university. Students may enroll in freshman and sophomore courses which lead to a baccalaureate degree in practically any field of study. Upon completion of specified degree requirements, the student is awarded an Associate in Arts or Associate in Science. These degrees require the completion of a minimum of 60 semester credit hours. Of the 60 semester credit hours, a minimum of 37 must satisfy the general education core requirements (see Degree Requirements). The remaining approved courses will be related to the student's major or courses which directly support that major.

Requirements and Articulation assures that the general education core (37 credit hours) of the Associate in Arts or Associate in Science degree at OCCC will apply directly toward the lower division general education requirements at any state university in Oklahoma.

Policy Statement on Undergraduate Degree Requirements and Articulation

In accordance with the Oklahoma State Regents for Higher Education Policy Statement on Undergraduate Degree Requirements and Articulation, a student who completes an Associate in Arts or an Associate in Science degree at OCCC “may transfer into a Bachelor of Arts or a Bachelor of Science degree program at any senior institution of the State System and be assured of completing his or her program in sequential fashion.”The Policy Statement on Undergraduate Degree

In addition, students are advised to secure the official catalog of the university to which they plan to transfer. Each university's official catalog provides pertinent information about admission policies and academic programs. That information is essential to the student's successful transfer to that university. Students should also consult a faculty advisor in their major at OCCC. With approval, the associate degree program may be modified to meet a student's needs depending on the intended transfer college or university.

Students are encouraged to visit the “Transfer Center” on the Oklahoma State Regents for Higher Education web site at <http://www.okhighered.org/studentcenter/transfer-stdnts>. This site will assist a student in determining which course or courses will transfer to another Oklahoma college or university.

Transfer guides showing course-by-course articulation between OCCC and a number of state universities are available in Office of Academic Advising. By using the appropriate transfer guide, the student can be assured that courses in the student's major will transfer directly toward the bachelor's degree.

OCCC has established specific curriculum patterns for transfer programs leading to the Associate in Arts (A.A.) or Associate in Science (A.S.) degrees. The curriculum patterns listed below are presented in the next section of the Catalog.

e. Have systems to evaluate courses and faculty by students, administrators, and departmental personnel

Faculty Performance Review and Evaluation

Faculty will be evaluated on the basis of the established standards of performance and objectives established in the person's contract and any subsequent memorandums of agreement established for the position/person. Faculty are defined as employees who primarily perform teaching and instruction-related duties and who are employed on the basis of a written contract setting forth the duties to be performed and the compensation to be paid. The performance appraisal for each faculty member will be conducted by the Division Dean or Director as appropriate. In preparation for the review, the employee will provide relevant information to the Division Dean or Director as appropriate at least two working days prior to the evaluation conference. The results of the subsequent performance appraisal conference will be documented on a rating sheet signed by both the employee and the Division Dean and/or Director as appropriate.

Course and Faculty Evaluation

The Student Input on Instruction form is a means of gathering student perceptions of instruction at the college. The results are intended for use by you and your dean in identifying ways to improve instruction. A copy of the form is in the appendix of this document. The forms and supportive instructions will be distributed for you to administer during the 8th, 9th, or 10th week of 16-week courses or the 5th or 6th week of eight-week courses. Prior to administering the instrument, you should:

1. Plan class time to help ensure that time is available for completing the forms.
2. Where desirable, prepare up to three (3) questions, which are unique to the course or section for inclusion as the optional questions on the form. You should have multiple copies of these questions printed for use by the students.
3. Select a student to be responsible for administering and returning the forms and brief him or her about the process. It is best to keep the forms and instructions in your possession until the day you plan to administer them. Your cooperation in helping to ensure that the Student Input on Instruction forms are completed in a timely manner will go a long way to provide useful student input concerning your instructional methods.

- f. **Is staffed, administered, and supplied to provide for the development of competent students in all areas including citizenship and social conscience**

Service-Learning

Incorporating service-learning as a part of a course's curriculum is easy to do and can enhance students' ability to understand and apply course material. Service-learning can generally be used as a part of any course's learning objectives and tailored to desired learning outcomes. The Student Life Service-Learning Center partners with over 100 community agencies, so there is something for every course and interest area. Office of Student Life coordinates student involvement in service learning.

- g. **Has current, appropriate, useful, and sufficiently comprehensive instructional media and materials.**

Biology Collection - The Biological Sciences program is one of the college's largest science emphases. Enrollment is steadily increasing. Students in several health profession fields are required to take General Biology I. Because of this faculty anticipate biology enrollment will go up. All of the students are required to do a certain amount of online Library research. Call numbers for materials supporting the Biology program are:

QH 1-278.5 Natural history, incl. microscopy
301-705 Biology, incl. genetics, reproduction, life, ecology
573-671 Cytology
705 Economic biology
QK 1 - 989 Botany, incl. plant anatomy, plant physiology, plant ecology
QL 1 - 991 Zoology, incl. animal behavior & psychology, morphology, anatomy, embryology
QM 1- 695 Human anatomy
QP 1- 981 Physiology
QR 1-500 Microbiology
TD 1-949 Environmental protection & pollution
TX 341 - 641 Nutrition

The Biological Sciences Coordinator and the librarian reviewed the Library's biology collection. This is a good basic collection needing some improvement. Brenda recommended some titles for the general collection, and she promised to encourage other professors to order more materials for the collection. Faculty are considering requiring students to do formal lab write-ups which would mean library use and literature research. The Library subscribes to the following professional and general print periodicals that support the biological sciences area of the Science Program:

American Biology Teacher; American Forests; American Journal of Botany; American Midland Naturalist; Audubon; BioScience; Discover; Environment; Environmental Science & Technology; Horticulture; Human Biology; Issues in Science & Technology; JAMA: Journal of the American Medical Association; Journal of College Science Teaching; Journal of Heredity; Journal of Mammology; Lancet; Morbidity & Mortality; National Parks; National Wildlife; Natural History; Nature; New England Journal of Medicine; Nutrition Today; Popular Science; Science; Science News; Scientific American; Smithsonian

Chemistry Collection - Enrollment in chemistry has increased significantly over the past five years with the biggest surge in enrollment coming in the Fall 2009 semester. Organic lab students are required to use Library reference materials such as the *CRC Handbook for Chemistry and Physics*. The availability of computers in the library supports the online chemistry course for non-majors and provides access options for students completing online homework assignments in General Chemistry I and II. Areas of the collection which support the chemistry program are as follows:

QD 1-999 Chemistry, esp. analytical, inorganic, physical & theoretical chemistry
QP 501-801 Animal biochemistry

This is a good basic collection which needs improvement. The Chemistry Program Coordinator and the librarian went through the Library collection. Some titles were weeded and others recommended for purchase. The AV collection, including several pre-lab videos and chemistry demonstration videos, is meeting course needs. Some faculty use the journals for professional development. The Library subscribes to the following technical and general print periodicals that support the chemistry area of the Science Program:

American Scientist; Chemical & Engineering News; Environmental Science & Technology; Issues in Science & Technology; Journal of Chemical Education; Journal of College Science Teaching; Nature; Popular Science; Science; Science News; Scientific American

Physics/Physical Sciences (including Astronomy and Earth Sciences)

Collection - Enrollment in Physics/Physical Science courses is steadily increasing. This fall (2010) enrollment is expected to be up about 14% versus last fall. Students enrolled in a number of physics/physical sciences courses use the Library. For example, in PHYS 1014 students are required to write two research papers; each one requires at least one print source. PHYS 1114 students watch required videos and some pre-lab videos. PHYS 1214 students do a presentation on a project that requires at least one or two sources from the Library. Call numbers for materials supporting Physics and Physical Sciences:

QC Physics, especially weights & measures, descriptive & experimental mechanics, acoustics, sound, heat, optics, light, radiation physics, electricity & magnetism, nuclear & particle physics, atomic energy

QB Astronomy

QE Geology

G Atlases, maps

GB Physical geography, geomorphology, hydrology

GC Oceanography

TD 172-196, 8878-894 Technology & pollution

Materials supporting the physics/physical sciences curriculum get a substantial amount of use. This includes the areas of physics, astronomy, geology, oceanography and environmental issues. The Library also maintains a small collection of Oklahoma topographic maps and atlases. The reference collection relating to physics and physical sciences is small but it is adequate. The Library subscribes to the following professional and general print periodicals that support the Physics/Physical Science areas of the Science program:

*American Scientist; Astronomy Environment; Environmental Science & Technology; Issues in Science & Technology; Journal of College Science Teaching; Nature; Oklahoma Geology Notes
Physics Education; Popular Science; Science; Science News; Scientific American; Sky & Telescope
Smithsonian; Weatherwise*

Overall Evaluation of the Library's Support of the Science Program

The library has 76 computers for student use --all giving access to many online article databases, and more than half set up with DVD players. In addition to the print journals and periodicals supporting astronomy, biology, chemistry, earth science, and physics that the library holds, several hundred additional biology, chemistry, and physics journals and their articles can be accessed via the Library's Ebscohost online article database. This collection supports all areas of the Science curriculum well.

The Library exists first and foremost to support the College's curriculum, students and faculty. Program support is provided in the form of research materials and equipment. It is also provided in the form of instruction, both to groups and individually to students as they attempt to identify and find what they need. Since the previous program review, the Library has employed an Electronic Services/Reference Librarian to help strengthen student awareness of and skill in using Library online databases and other resources. Several online video tutorials have been created in addition to the online Research Paper Help module. These can be found from the Library front page or directly from the Library YouTube channel. Also, the Library is in the process of reevaluating e-book resources. As of fall 2009 the products on the market were disappointingly weak in lower level undergraduate books.

The Library has developed new ways for students to request assistance through the "Ask a Librarian" link, i.e. chat and text. Since many faculty members use the ANGEL online course management system to teach online or as a tool for regular classes, and provide students course information through that portal, the Library is going where the students are. The Library has created simple, new resources (widgets) for faculty to insert into their ANGEL course materials, making it convenient for students to search the article databases, Library catalog or other resources-- without exiting the course software.

Many students enroll in the one credit hour Success in College and Life course, in which they receive instruction in doing academic research. Librarians staffing the Library Assistance desk answer questions and provide one-on-one instruction, as well as teaching research skills to classes in a variety of subject areas. Instruction sessions are adjusted to faculty members' assignments and needs. Librarians are committed to providing the right resources and helping students and faculty use them well. The Library has a strong budget and responds to faculty requests or suggestions about useful resources. In sum, the librarians will continue to update and build the Library's collections of material related to biology, chemistry, and physics.

- h. Provides adequate resources and adequate and appropriate faculty whose qualifications (including educational background, related experience, and service contributions related to the program) support the objectives and curriculum of the program.**

Classroom Space, Laboratory Space, and Supply Budgets

The number of Science Program Majors has increased 28% since 2007, from 1117 students to 1429 students in 2010. This growth, combined with the overall increase in students taking science courses as support for other majors, has impacted the Biology and Physical Sciences courses significantly.

The increase in students has required that a greater number of Biology sections be taught by adjunct faculty or by full-time faculty that are already teaching above the recommended load.

Classroom space has become very limited, requiring creative scheduling during the late afternoons and with sections that span Friday through Saturday.

Due to changes in the prerequisites for the Nursing Program, we have experienced tremendous growth in two chemistry courses: CHEM 1123, Survey of General, Organic, and Biological Chemistry, and CHEM 1131, Laboratory for Survey of General, Organic, and Biochemistry. In FY 2010 there were 621 students enrolled in 17 sections. In contrast, the average yearly enrollment in this course was only 89 students in 3 sections per year (FY 2006 - FY 2007). In FY 2010 there were 522 students in 28 sections of CHEM 1131. The average yearly enrollment in this lab class was 44 in 2 sections per year in FY 2006 - FY 2007.

The growth in these courses and the growth of the College in general has made it difficult to schedule classes at times students tend to prefer due to shortages of classroom space. Finding space for chemistry pre-lab discussions has also been problematic. One solution has been to start using biology lab space for chemistry pre-lab discussions. However, this solution puts strain on Biological Science Center staff since they are required to break down experimental set-ups or lab practical exams before the chemistry students use the space. The increased number of chemistry lab sections has put a strain on the supply budget for the chemistry labs and increased hazardous waste disposal costs.

Science Program Personnel

The Science Program has a Director, eleven full time Biology faculty, five full time Chemistry faculty, one faculty member with duties split between Chemistry and Biology, one faculty member with duties in Chemistry and Biotechnology, and four full time Physics faculty. The Director of the Science Program and several of the Science Program faculty have Ph.D.s in their respective disciplines. The faculty have a wide variety of experience, ranging from purely academic backgrounds to those with years of industry experience in addition to their academic credentials. Additional personnel in the Science Program include supervisors of the Physical Science Center and Biological Science Center, four Biology lab assistants, one Biotechnology lab assistant, three Physical Science (physics and chemistry) lab assistants, a coordinator for biotechnology outreach, and an outreach coordinator for Clinical Research.

In Fall 2010 48% of biology credit hours were taught by full time faculty. The remaining 52% were taught by adjunct faculty. In the area of chemistry 59% of credit hours were taught by full time faculty and 41% by adjunct faculty. In physics, 42% of credit hours were taught by full time faculty and 58% by adjunct faculty. Credit hours were used since full-time load is calculated in terms of credit hours rather than course sections, and adjunct pay is based on credit hours taught. This methodology may not accurately reflect some of the challenges in staffing in science programs. For instance in chemistry, adjuncts teach the vast majority of lab sections, which have relatively few credit hours. However, a shortage of personnel teaching lab sections would mean the cancelation of lecture sections even if professors were available for those sections.

Biological Science is also considering splitting the laboratory portion of a course from its' lecture component to utilize classroom and laboratory space more efficiently. This growth also impacts the Biology Lab Assistants as they try to compensate for the increased lab sections. A proposed solution to ensure that the quality of Biology laboratory courses is maintained is to hire another individual to work as an "assistant supervisor" in the Biology Science Center. This individual would assist by working the evening and Saturday hours. Thus, ensuring that materials are available in the labs and by also being available to answer questions from faculty that are teaching during these times.

The increased number of CHEM 1123 lecture and CHEM 1131 lab sections mentioned above has made staffing these added sections a challenge. Since qualified adjunct faculty are difficult to find, especially during daytime hours, the adjunct faculty that are available during the day are often asked to teach close to the maximum number of hours allowable and full time faculty often teach overload to help cover the sections.

The Physical Science Center is understaffed for the number of hours it is open and available to students. There are times when only one lab assistant is on duty. This makes it very difficult for the lab assistant to monitor independent physics labs, deal with students wanting to make appointments or work on computers, and monitor the three chemistry laboratory spaces. Maintaining Physical Science Center hours and services is difficult if there is an illness among the Physical Science Center staff.

The Physical Science Center could benefit from a combined full time tutor/student tutor supervisor with a background suitable to tutor the whole range of chemistry and physics courses at OCCC. The student tutors we currently utilize are often here for only a year and then they move on. This means that tutor quality can vary considerably from year to year and is strongly dependent upon the applicant pool. A full time tutor/tutor supervisor could provide training to the student tutors to improve consistency and increase the number of hours during which students could find assistance with their chemistry and physics homework.

The following credentials for the faculty of the **Biology Department** and the one faculty member with a joint appointment in Biology and Chemistry show the depth and range of their experience, their commitment to professional development activities, and their community involvement.

Brenda G. Breeding, Professor of Biology

Primary Departmental Responsibilities

Program Coordinator- Biological Sciences
BIO 1023 - Introductory Nutrition (Course Coordinator)
BIO 2125 - Microbiology
BIO 2102 - Clinical Anatomy (Course Coordinator)
MATH 2013 - Introduction to Statistics (Adjunct Professor)
Advisor - OUHSC Transfer Students

College Responsibilities

Benefits Committee
Assessment Committee
Physical Therapy Assistant Advisory Committee
Biotechnology Advisory Committee

Educational Background

2008 - M.P.H., Epidemiology, University of Oklahoma, Health Sciences Center, OKC.

1988 - M.S., Microbiology, University of Montana, Missoula.

1983 - B.A., Biology, Western State College of Colorado, Gunnison.

Professional Experience

1991 - Present Professor of Biology, Oklahoma City Community College

1990 - 1991 Adjunct Professor of MLT, Arapahoe Community College

1988 - 1990 Microbiologist, Borden, Inc.

1987 - 1988 Educational Supply Technician, University of Montana

Professional Development (Last Five Years)

M.P.H., Epidemiology, OUHSC, Spring, 2005 - Spring, 2008

Additional courses in Biostatistics, OUHSC, Spring, 2005 - Fall, 2008.

Professional Organizations

Who's Who in American Education

Human Anatomy and Physiology Society

Institute of Food Technology

Civic Organizations

Oklahoma Community Orchestra

Roger D. Choate, Professor of Biology

Primary Departmental Responsibilities

Course Coordinator:

BIO 1314 Human Anatomy and Physiology

Teach:

BIO 1023 Introduction to Nutrition

BIO 1114 General Biology

BIO 1314 Human Anatomy and Physiology I

BIO 1414 Human Anatomy and Physiology II

BIO 2203 Cell Biology

BIO 2215 General Zoology

BIO 2234 Human Physiology

BIO 2324 Comparative Vertebrate Anatomy

College Responsibilities

On campus:

Professor of Biology
Curriculum Committee - member (2009-2011)
Mentor for New Adjuncts (2005-2010)
Pathways Middle College Advisory Board (2004-present)
Biology Faculty Search Committee Chair (2006, 2007)
Benefits Committee - member (2005-2008)
Biology Program Review - principle writer (2005)

Off campus:

Oklahoma State Representative - National Association of Biology Teachers

Educational Background

Master of Education (1993) -University of Central Oklahoma, Edmond, OK
Bachelor of Science in Education (1989) - Central State University, Edmond, OK

Professional Experience

2002 - Present Professor of Biology, Oklahoma City Community College
1993 - 2002 Science Department Chair/Life Sciences Teacher, Bethany Public Schools
1993 - 2002 Adjunct Instructor, Oklahoma City Community College
1992 - 1996 Adjunct Professor, Education Department, Oklahoma City University
1990 - 1993 Naturalist Instructor, Oklahoma City Zoological Park

Honors

Lothar Hornuff Award - University of Central Oklahoma
Member of Kappa Delta Pi Education Honor Society
Outstanding Faculty Member - Science and Math Division - 2006
NISOD Award - Science and Math Division - for excellence in science teaching - 2006

Professional Conferences Attended in the Last Five Years

NSF/Phi Theta Kappa Grant Writing Meetings (2005) - San Antonio, TX
Bioinformatics Seminar and Symposium (2005) - OKCCC
McGraw-Hill Anatomy & Physiology Multimedia Symposium (2008) - Dubuque, IA

Professional Organizations

Oklahoma Academy of Science
National Association of Biology Teachers
Who's Who Among America's Teachers

Community Service

2003 - Present Trustee, Board of Trustees - Jones City, OK

Mark D Hensley, Professor of Biology

Primary Departmental Responsibilities

Teach:

BIO 1414 Human Anatomy and Physiology II

BIO 2234 Human Physiology

College Responsibilities

Professor of Biology

Faculty Sponsor - Health Professions Club (2010-2011)

Educational Background

MS in Cell and Molecular Biology (2010) - University of Pennsylvania, Philadelphia, PA

BS in Molecular Biology (2006) - University of Denver, Denver, CO

BA in Music (2006) - University of Denver, Denver, CO

AS in Science (2000) - Otero Junior College, La Junta, CO

Professional Experience

2010 - Present Professor of Biology, Oklahoma City Community College

2006 - 2010 Graduate Student Researcher, University of Pennsylvania

2005 - 2006 Adjunct Laboratory Instructor, Otero Junior College

2005 - 2006 Science & Math Tutor, Otero Junior College

2000 - 2005 Undergraduate Researcher, University of Denver

2003 Summer Cancer Research Intern, University of Colorado

1999 - 2000 Science & Math Tutor, Otero Junior College

Honors

2008 - 2010 NIH T32 Research Training Grant

Professional Conferences Attended in the Last Five Years

American Society of Gene Therapy Annual Conference (2008) - Boston, MA

American Society of Gene Therapy Annual Conference (2007) - Seattle, WA

NY Academy of Science Oligonucleotide Therapeutics Conference (2006) - New York, NY

Julian G. Hilliard, Professor of Biology**Primary Departmental Responsibilities**

Cadaver Anatomy Lab Supervisor
BIO 2255 - Human Anatomy (Course Coordinator)
BIO 2215 - Introductory Zoology
BIO 1204 - History of Life on Earth (Course Coordinator)
BIO 1114 - General Biology
Adviser to Diversified Studies majors

College Responsibilities

Biology Laboratory Advisory Committee (Chair)

Educational Background

2000 - M.S, Zoology (Paleontology), University of Oklahoma, Norman.
1994 - B.S., Biological Sciences, Southwestern OK State University, Weatherford.

Professional Experience

2002 - Present Professor of Biology, Oklahoma City Community College
2000 - 2002 Adjunct Professor of Biology, University of Central Oklahoma
2000 - 2002 Biologist, Oklahoma Department of Wildlife Conservation
1998 - 2000 Graduate Teaching Assistant, University of Oklahoma

Professional Development (Last Five Years)

INBRE Faculty Externship, Stephenson Biotechnology Center, OU - Summer 2008.

Professional Organizations

Southwest Association of Naturalists
Society of Vertebrate Paleontology

Carl F. Hirtzel, Professor of Biology**Primary Departmental Responsibilities**

Course Coordination:

BIO 2234 - Human Physiology

Teach:

BIO 1314 - Anatomy & Physiology I

BIO 1414 - Anatomy & Physiology II
BIO 2102 - Clinical Anatomy
BIO 2234 - Human Physiology

College Responsibilities

College Committees:
Student Retention Committee

Educational Background

M.S.Ed., Central State University, Edmond, OK (1977)
D.M.D., University of Oregon College of Dentistry, Portland, OR (1971)

Professional Experience

2004-Present Professor of Biology, OKCCC
1990-2004 Professor of Biology, Rose State College, Midwest City, OK
1993-1994 Adjunct Professor, Southern Nazarene University, Bethany, OK
1987-2004 Adjunct Instructor, OKCCC
1985-1988 Adjunct Instructor, Oklahoma State University - OKC, OKC, OK
1978-1982 Private Practice of Pediatric Dentistry, Eugene, OR
1976-1978 Chief Department of Pediatric Dentistry, Oklahoma Children's Memorial Hospital, OKC, OK
1975-1976 Clinical Instructor, University of Southern California, Los Angeles, CA

Professional Organizations and Activities

Oklahoma Academy of Science
National Science Teachers Association
American Dental Association
American Society of Dentistry for Children
Human Anatomy and Physiology Society

Stephen A. Kash, Professor of Biology

Primary Departmental Responsibilities

Teach:
BIO1314 Human Anatomy and Physiology I
BIO1414 Human Anatomy and Physiology II
BIO2234 Human Physiology

College Responsibilities

BIO1414 Human Anatomy & Physiology II Course Coordinator
Institutional Committee: OCCC Honors Council

Educational Background

1981 M.S., Biology, Eastern New Mexico University, Portales NM
1976 B.A., Natural Sciences and Mathematics, Bloomsburg University,
Bloomsburg, PA

Professional Experience

2005-Present Professor, Oklahoma City Community College
1990-2005 Adjunct Professor, Oklahoma City Community College
1986-1989 Adjunct Professor, Oklahoma State University, OKC
1984-1986 Instructor of Life Sciences, Eastern New Mexico University
1984-1986 Curator of Fishes, Natural History Museum, Eastern New Mexico
University
1984-1986 Director, Electron Microscopy Laboratory, Eastern New Mexico
University

Awards

Outstanding Graduate Student, Department of Life Sciences, Eastern New Mexico
University
Beta Beta Beta Biological Honor Society-Epsilon Xi Chapter Honor Society of Phi
Kappa Phi.
Outstanding Adjunct Faculty Member-Science and Math Division, Oklahoma City
Community College, 2002/2003.
Outstanding Faculty Member-Science and Math Division, Oklahoma City
Community College, 2009/2010.
NISOD Award-Science and Math Division, Oklahoma City Community College,
2009/2010 for excellence in science teaching.

Kimberly D. Kyker, Professor of Biology/Chemistry

Primary Departmental Responsibilities

CHEM 1123 - Survey of General, Organic, and Biochemistry
CHEM 1131 - Laboratory for Survey of General, Organic, and
Biochemistry

College Responsibilities

Division of Science and Mathematics Strategic Planning Committee
Institutional Review Board
Health Professions Club Co-Sponsor
Advisor to Clinical Research Technician students

Educational Background

1995 - M.S., University of Oklahoma Health Sciences Center
1989 - B.S., Zoology, University of Oklahoma

Professional Experience

2010 - Present Professor of Biology/Chemistry, Oklahoma City Community College
2008 - 2010 Academic Coordinator, Clinical Research Program, Oklahoma City
Community College
2007-2008 Adjunct Professor of Biology, Oklahoma City Community College
2007 Co-founder, Dormatarg Biotechnology Inc., Oklahoma City, OK
2004 - 2008 Research Associate, University of Oklahoma Health Sciences Center
2000 - 2004 Research Assistant, University of Oklahoma Health Sciences Center
1999 - 2000 Research Assistant, University of Oklahoma Health Sciences Center
1996 - 1999 Adjunct Professor of Biology and Chemistry, Oklahoma City
Community College

Professional Development (Last Five Years)

Designed Fall Clinical Research Symposium
International Conference on Online Learning
International Bio Conference
Miscellaneous on-campus development sessions

Professional Organizations

American Association of Cancer Research

Civic Organizations

Neighborhood Services Organization

John W. McMurray, Professor of Biology

Primary Departmental Responsibilities

BIO 1114 - General Biology
BIO 2114 - General Botany
BIO 2125 - Microbiology

BIO 2203 - Cell Biology
BIO 2215 - General Zoology
BIO 2404 - Ecology and Environmental Science
BINFO 1011 - Introduction to Bioinformatics
BINFO 2013 - Bioinformatics Tools and Databases
BIOT 1011 - Introduction to Biotechnology
BIOT 1022 - Media and Solution Preparation
BIOT 2843 - Advanced Nucleic Acid Techniques
Student Advising

College Responsibilities

Biology Laboratory Committee

Educational Background

1994 - 2003 Ph.D., Integrative Biology, University of California, Berkeley, California
1991 - 1993 Department of Botany, Duke University, Durham, North Carolina
1988 - 1991 B.A., Plant Biology, Southern Illinois University, Carbondale, Illinois
1986 - 1988 A.S, Life Science, College of Lake County, Grayslake, Illinois

Professional Experience

2005 - Present Professor of Biology, Oklahoma City Community College
2004 - 2004 Lecturer, Department of Biology, Merritt Community College, Oakland, California
2002 - 2004 Lecturer, Department of Biology, California State University, Hayward, California
1994-2004 Graduate Student Instructor/Lecturer, Department of Integrative Biology, University of California, Berkeley, California
1991 - 1993 Teaching Assistant, Botany Department, Duke University, Durham, North Carolina
1991 - 1991 Teaching Assistant, Department of Plant Biology, Southern Illinois University, Carbondale, Illinois

Professional Development (Last Five Years)

2005 Oklahoma INBRE Faculty Externship, University of Oklahoma Health Sciences Center, High-throughput DNA Sequencing
2006 Oklahoma INBRE Faculty Externship, University of Oklahoma, Microarrays
2010 Oklahoma INBRE Faculty Externship, University of Oklahoma, Molecular Biology
2010 Microarray Workshop, Oklahoma State University, Stillwater, Oklahoma

Professional Development (Last Five Years)

2005 - 2010 Oklahoma City Community College coursework in Computer Science and Graphic Communications (GCOM-2773, CS-2113, CS-1153, CS-1103 and CS-1143)

Review Panels (Last Five Years)

2006 National Science Foundation - CCLI Program

Raul Ramirez, Professor of Biology

Primary Departmental Responsibilities

Course Coordinator:

BIO 1114 General Biology

Teach:

BIO 1023 Introductory Nutrition

BIO 1113 General Biology (online)

BIO 1114 General Biology (in-class and online)

BIO 1314 Anatomy and Physiology I

BIO 2215 Zoology

College Responsibilities

Professor of Biology

Online Learning Committee

Coordinator of General Biology

Teach Concurrent Biology Courses Off-Campus at local High Schools

Educational Background

2005 M.S., Biological Sciences, Southern Illinois University Edwardsville, Edwardsville, IL

2001 B.S., Zoology, University of Oklahoma, Norman, OK

1995-1996 General studies, Oklahoma State University, Stillwater, OK

Professional Experience

2006- Present Professor of Biology, Oklahoma City Community College

2005-Present Adjunct Professor, Oklahoma Christian University

2005-2006 Adjunct Professor, Oklahoma City Community College

2004-2005 Educational Assistant, St. Louis Community College Florissant Valley

2003-2005 Graduate Teaching/Research Assistant, Southern Illinois University

Edwardsville

2002- 2003 Animal/Laboratory Technician, University of Oklahoma Health Science Center

2000-2002 Research Associate, Sam Noble Oklahoma Museum of Natural History
2000 Stream Fisheries Technician, Kansas Department of Wildlife and Parks

Professional Societies

Southwestern Association of Naturalist
American Society of Ichthyologist and Herpetologist

George M. Risinger, Jr. Ph. D., Professor of Biology

Primary Departmental Responsibilities

Teach:

BIO 1113 General Biology (online)
BIO 1114 General Biology (in-class and online)
BIO 2125 Microbiology

College Responsibilities

New full time faculty Fall 2010, therefore not on any committees as of yet

Educational Background

2008 Ph.D., Cell Biology, University of Oklahoma - Health Sciences Center, Oklahoma City, OK
2001 B.S., Microbiology, Oklahoma State University, Stillwater, OK

Professional Experience

2010-Present Professor, Oklahoma City Community College, Oklahoma City, OK
2009-2010 Adjunct Professor, Oklahoma City Community College, Oklahoma City, OK
2008-2010 Post-doctoral Research Fellow, University of Oklahoma - Health Sciences Center, Oklahoma City, OK
2008-2009 Preparing Future Faculty Program, University of Oklahoma - Health Sciences Center, Oklahoma City, OK

Professional Societies

2008-Present American Association of Anatomists
2009-Present National Postdoctoral Association

Ronald K. Scribner, Professor of Biology

Primary Departmental Responsibilities

Course Coordination:

BIO 2125 Microbiology
BIOT 2352 - Immunology

Teach:

BIO 2125 - Microbiology
BIO 1114 - General Biology
BIOT 2352 - Immunology

Member:

Biotechnology Program Advisory Board
Nursing Program Advisory Committee

College Responsibilities

College Committees:

Academic Scholarship Committee
Biological Sciences Laboratory Advisory Committee

Research Activities:

Faculty Liaison, Oklahoma Partners for Biological Sciences, Howard Hughes
Medical Institute Grant

Outreach Activities:

Several presentations about organ transplantation experience.
Sponsor of Jaronek - Scribner scholarship

Educational Background

ABD, Microbiology - University of Oklahoma
M.S. Microbiology - Long Island University
B.S. Microbiology - Oklahoma State University

Professional Experience

1989-Present Professor of Biology, OCCC
1986 -1989 Adjunct Professor of Biology, OCCC
1987-1989 Microbiologist, Clinical Biopathology Laboratories, Oklahoma City
1980-1987 Research Supervisor, Division of Pediatric Infectious Diseases,
Oklahoma University Health Sciences Center, Oklahoma City

1973-1976 Clinical Microbiologist, Kingsbrook Jewish Medical Center, Brooklyn, NY

Professional Organizations and Activities

American Society for Microbiology, Member

American Society of Clinical Pathologists - Registered Microbiologist

Southwest Association of Clinical Microbiology - Member

Oklahoma Academy of Sciences, Member

Consultant to "The Medical Letter"

Who's Who in America

Who's Who in the South and Southwest

Who's Who in Medicine and Health

Anthony J. Stancampiano Ph.D., Professor of Biology

Primary Departmental Responsibilities

Course Coordinator:

BIO 2004- Special Topics in Ecology

BIO 2215- General Zoology

BIO 2304(3)- Ecology and Environmental Issues

BIO 2324- Comparative Vertebrate Anatomy

Teach:

BIO 1114- General Biology

BIO 1514- Microbiology of Infectious Disease

BIO 1314- Anatomy and Physiology I

BIO 2004- Special Topics in Ecology

BIO 2114- General Botany

BIO 2125- Microbiology

BIO 2215- General Zoology

BIO 2304(3)- Ecology and Environmental Issues

BIO 2324- Comparative Vertebrate Anatomy

Supervise:

BIO 2255- Human Anatomy, Oversee cadavers for State Anatomical Board

College Responsibilities

Departmental Service:

Chairman 2002-2005

Committees:

Curriculum Committee
State Transfer Equivalency Committee
Traffic Appeals Committee

Outreach:

MSP Geek Smart Grant, Oklahoma City Public Schools, Oklahoma City University,
Content Coordinator. 2008-2009

Off Campus Activities:

Teaching responsibilities include: Human Anatomy with cadaver dissection,
Microbiology, Animal Biology, General Biology for Majors, and General
Biology for non-majors
Mammal Coordinator for Oklahoma BioBlitz, 2001-Present
MSP Geek Smart Grant, Oklahoma City Public Schools, Oklahoma City
University, Content Coordinator. 2008-2009

Educational Background

Ph.D., University of Oklahoma, 1999
M.S., University of Central Oklahoma, 1991
B.S., University of Central Oklahoma, 1986

Professional Experience

Professor of Biology, Oklahoma City Community College, 1995-Present
Adjunct Instructor, University of Central Oklahoma, 1999-Present
Graduate Faculty, University of Oklahoma Health Sciences Center,
2005-2007
Graduate Faculty, University of Central Oklahoma, 2010-2013
Adjunct Instructor, University of Oklahoma, 2004-Present
Research Assistant, Oklahoma Biological Survey, 1989-1995

Professional Conferences Attended in the Last Five Years

Community College Conference - Oklahoma City, OK

The following are members of the **Chemistry** faculty as well as one faculty member who teaches chemistry courses and directs the Biotechnology Program. As with the Biology faculty, their credentials show the depth and range of their experience (including experience industry), their commitment

to professional development activities, and their community involvement.

Bruce R. Bailey, Professor of Chemistry

Primary Departmental Responsibilities

CHEM 1115 - General Chemistry I
CHEM 1215 - General Chemistry II
CHEM 2114 - Organic Chemistry I
CHEM 2125 - Organic Chemistry II (Course Coordinator)

College Responsibilities

Faculty advisor for Chemistry, Pre-Medicine, Pre-Dentistry, and Pre-Pharmacy students

Educational Background

1984 - Post-Doctoral work, University of Illinois at Chicago
1983 - Ph.D., Organic Chemistry, Oklahoma State University
1979 - B.S., Chemistry, Cameron University

Professional Experience

2008 - Present Professor of Chemistry, Oklahoma City Community College
2005 - 2007 Temporary Instructor, Cameron University, Lawton, OK
2002 - 2005 Adjunct Instructor, Oklahoma City Community College
2004 - 2005 Adjunct Instructor, University of Central Oklahoma
1991 - 2001 Senior Chemist/Senior Research Staff/Staff Scientist, Nalco Chemical Company, Naperville, IL
1991 Consultant, Stuart-Ironsides, Willowbrook, IL
1984 - 1991 Process Chemist/Senior Research Chemist, Akzo-Nobel, McCook, IL

Professional Development (Last Five Years)

2005-present Attended various seminars and training class that have been offered during the fall and spring prep and planning weeks.
2005-present Attended several Oklahoma penta-sectional meeting of ACS.
2005-present Attended several local ACS meetings.

Professional Organizations

1980's- present American Chemical Society

Kristy M. Bailey, Professor of Chemistry

Primary Departmental Responsibilities

CHEM 1115 - General Chemistry I (Course Coordinator)
CHEM 1215 - General Chemistry II (Course Coordinator)
CHEM 2115/2114 - Organic Chemistry I (Course Coordinator)
CHEM 2122 - Organic Chemistry Laboratory (Course Coordinator)

College Responsibilities

Academic Outcomes Assessment Committee
Science Outcome "Sub-group" of the General Education Committee
Hiring committees as assigned
Faculty advisor for Chemistry, Pre-Medicine, Pre-Dentistry, and Pre-Pharmacy students

Educational Background

2001 - K-9 Teaching Certification, DePaul University
1983 - Ph.D., Organic Chemistry, Oklahoma State University
1978 - B.S., Chemistry, Cameron University

Professional Experience

2001 - Present Professor of Chemistry, Oklahoma City Community College
2001 Adjunct Instructor, Waubensee Community College, Sugar Grove, IL
2000 Student Teacher, J.B. Nelson Elementary, Batavia, IL
1999 - 2000 Substitute Teacher, Batavia Public Schools
1998 Presenter, Science is Fun, Batavia and St. Charles, IL Public Schools
1983 - 1999 Research Scientist/Senior Chemist/Technical Director, Nalco Chemical Company, Naperville, IL

Professional Development (Last Five Years)

Pentasectional Meeting of the American Chemical Society (ACS)
Local ACS meetings
Miscellaneous on-campus development sessions

Courtney L. Dodd, Professor of Chemistry

Primary Departmental Responsibilities

CHEM 1103 - Chemistry Around Us (online, non-majors)
CHEM 1115 - General Chemistry I (Course Coordinator)
CHEM 1215 - General Chemistry II (Course Coordinator)
CHEM 2115/2114 - Organic Chemistry I
CHEM 2122 - Organic Chemistry Laboratory

College Responsibilities

Curriculum Committee
Hiring committees as assigned
Chairman of the Physical Science Lab Advisory Committee
Faculty advisor for Chemistry, Pre-Medicine, Pre-Dentistry, and
Pre-Pharmacy students

Educational Background

1978 - Ph.D., Theoretical Physical Chemistry, Oklahoma State
University
1975 - B.S., Biochemistry, Oklahoma State University

Professional Experience

2004 - Present Professor of Chemistry, Oklahoma City
Community College
2005, 2006, 2008, 2010 (Summers only) Adjunct Professor of
Chemistry, University of Oklahoma
2004 Adjunct Professor of Chemistry, University of Central
Oklahoma
2003 - 2004 Adjunct Professor of Chemistry, Rose State
College
2001 - 2003 Operations Engineering Consultant, Celestica,
Inc., Oklahoma City, OK
1981 - 2001 Engineer/Technical Staff, Lucent Technologies
(AT&T, Western Electric)

Professional Development (Last Five Years)

Miscellaneous on-campus development sessions

OCCC Representative to the Course Equivalency Project in
2009

**Fabiola Janiak-Spens, Professor of Biotechnology and
Chemistry, Director of Biotechnology Program**

Primary Departmental Responsibilities

BIOT 2823 - Biotechnology Laboratory I
BIOT 2933 - Biotechnology Laboratory II
BIOT 2942 - Biomanufacturing
BIOT 2921 - Cell Tissue Culture
BIOT 1011 - Survey of Biotechnology
CHEM 1115 - General Chemistry I
CHEM 1123 - Survey of General, Organic, and Biochemistry

College Responsibilities

Director of Biotechnology Program
Faculty advisor for Biotechnology, Chemistry, Pre-Medicine,
Pre-Dentistry, and Pre-Pharmacy students
Committee member: college hiring committees as assigned,
IRB committee

Educational Background

1991 Ph.D., Biochemistry, University of Oklahoma
1986 M.S., Chemistry, Technische Universität Berlin, Germany
1985 M.S., Chemistry, University of Oklahoma

Professional Experience

2007 - Present Professor of Biotechnology and Chemistry/Director of
Biotechnology, Oklahoma City Community College
1996 - 2007 Postdoctoral Research Associate under Dr. Ann West, University of
Oklahoma
1995-1996 Visiting Assistant Professor of Chemistry, University of Oklahoma
1993 - 1995 Postdoctoral Research Associate under Dr. Gregory Reinhart,
University of Oklahoma
1991 - 1993 Postdoctoral Research Associate under Dr. David Andrews, McMaster
University, Hamilton, Ontario, Canada

Professional Development (Last Five Years)

2007-Present Miscellaneous on-campus development
sessions
2010 Cold Spring Harbor workshop
2009 Bio-Link Summers Fellow conference
2008 Bio-Link Regional conference
2008 NSF-ATE Principle Investigators Conference

Professional Organizations

American Chemical Society - member

Oklahoma Science Teacher Association - member

Civic Organizations

Sierra Club - member

Parent Teacher Association - member

Steven K. Shore, Professor of Chemistry

Primary Departmental Responsibilities

Program Coordinator - Physical Sciences

CHEM 1115 - General Chemistry I

CHEM 1215 - General Chemistry II

CHEM 1123 - Survey of General, Organic, and Biochemistry
(Course Coordinator)

CHEM 1131 - Laboratory for Survey of General, Organic, and
Biochemistry (Course Coordinator)

CHEM 2125 - Organic Chemistry II

College Responsibilities

Academic Outcomes Assessment Committee (Co-Chair)

Achieving the Dream Gateway Success Team (Co-Chair)

HLC Criterion 4 Reaccreditation Committee

Hiring committees as assigned

Faculty advisor for Chemistry, Pre-Medicine, Pre-Dentistry, and Pre-
Pharmacy students

Educational Background

1991 - Ph.D., Chemistry, University of Oklahoma

1984 - M.S., Chemistry, University of Oklahoma

1982 - B.S., Chemistry, University of Oklahoma

Professional Experience

1994 - Present Professor of Chemistry, Oklahoma City Community
College

1994, 1995 (Summers only) Visiting Assistant Professor, University of
Oklahoma

1993 Weekend Demonstrator, Omniplex Science Museum

1990-1993 Adjunct Instructor, Oklahoma City Community College

Professional Development (Last Five Years)

McGraw-Hill General Chemistry Symposium, Dubuque, IA, October 2010
Higher Learning Commission Annual Meeting, Chicago, IL, April 2009
Cooperative Learning Workshop, Oklahoma City Community College, May 2009
Miscellaneous on-campus development sessions

Professional Organizations

American Chemical Society

Changjiang Zhu, Professor of Chemistry

Primary Departmental Responsibilities

CHEM 1115 - General Chemistry I
CHEM 1215 - General Chemistry II

College Responsibilities

Faculty advisor for Chemistry, Pre-Medicine, Pre-Dentistry, and Pre-Pharmacy students

Educational Background

1995 - Ph.D., Chemistry, University of Idaho
1982 - B.S., Chemistry, Wuhan University, Peoples Republic of China

Professional Experience

2006 - Present Professor of Chemistry, Oklahoma City Community College
2003 - 2006 Research Chemist, Battelle Eastern Science and Technology Center, Aberdeen, MD
1999 - 2003 Program Scientist, Jung's Research and Development Corporation, Gaithersburg, MD
1997 - 1998 Contractor, National Institute of Standards and Technology, Gaithersburg, MD
1995 - 1997 Guest Researcher, National Institute of Standards and Technology, Gaithersburg, MD
1988 - 1989 Visiting Scholar, Shoreline Community College, Seattle, WA
1985 - 1988 Lecturer/Laboratory Supervisor, Department of Environmental Protection and Civil Construction, Jiangnan University, Wuhan, Peoples Republic of China
1982 - 1985 Research Assistant, Testing Center of Hubei Agricultural Academy, Wuhan, Peoples Republic of China

Professional Development (Last Five Years)

Attended miscellaneous on-campus development activities.

The following are members of the **Physics** faculty. As with the Biology and Chemistry faculty, their credentials show the depth and range of their experience (including experience industry), their commitment to professional development activities, and their community involvement. One physics faculty member is a registered professional engineer and therefore also teaches a number of courses for the Engineering Program.

Gary Houlette, Professor of Physics

Primary Departmental Responsibilities

ENGR 2133 - Rigid Body Mechanics
ENGR 2143 - Strength of Materials
ENGR 2201 - Special Projects
ENGR 2523 - Dynamics
GEOL 1114/PHYS 1034 - General Geology (Course Coordinator)
GEOL 1064/PHYS 1064 - Earth Science (Course Coordinator)
PHYS 1114 - College Physics I
PHYS 2014 - Engineering Physics I
PHYS 2114 - Engineering Physics II

College Responsibilities

Advisor for physics and engineering students

Educational Background

1982 - M.C.E., Civil Engineering, Oklahoma State University
- B.S.C.E., Civil Engineering, Oklahoma State University
1977 - A.A., Oklahoma City Community College

Professional Experience

1986 - Present Professor of Physics, Oklahoma City Community College
1991, 1993 Director for NSF grant promoting meteorology education
Academic Advisor for "Earth Revealed," a national telecourse in geology

Professional Development (Last Five Years)

ESRI National meeting , July 2007

Arc Users State Meeting, Sept. 2007
Mineral Collecting Trip, Utah May 2009
Dimensions 2010, GSI and GPS, Nov. 2010

Professional Organizations

Registered Professional Engineer, State of Oklahoma
Who's Who Among America's Teachers

Civic Organizations

School Board Member, Wannette Public Schools, 1999 - 2006
Wanette Lions Club

Steven D. Kamm, Professor of Physics

Primary Departmental Responsibilities

PHYS 1013 - Physical Science (w/o lab) (Course Coordinator)
PHYS 1014 - Physical Science (w/ lab) (Course Coordinator)
PHYS 1114 - College Physics I (w/ lab) (Course Coordinator)
PHYS 1214 - College Physics II (w/ lab) (Course Coordinator)

College Responsibilities

Curriculum Committee
Global Education Committee
Hiring Committees as assigned
Faculty Sponsor: OCCC Health Professions Club
Faculty Advisor: Physics, Pre-Allied Health, and Diversified
Studies

Educational Background

1976 - 1980 Graduate work toward Ph.D. in Science Education, University of
Oklahoma
1972 - 1975 Coursework in Physics, Biology, and Electronics, Oklahoma State
University and Oklahoma City Community College
1971 M.Sc., Ergonomics, University of London
1966 Qualifications for Bioenvironmental Engineer, USAF School of Aerospace
Medicine
1966 B.S., Engineering, UCLA

Professional Experience

1972 - Present Professor of Physics, Oklahoma City

Community College

1982 - 1983 Fulbright Exchange Teacher, Gwynedd Technical College, U.K.

1988 - 1989 Fulbright Exchange Teacher, Saffron Waldon High School, U.K.

1992 - 1993 Fulbright Exchange Teacher, Sheffield College, South Yorkshire, U.K.

1966 - 1970 Bioenvironmental Engineering Officer, United States Air Force

Professional Development (Last Five Years)

2005 - 2010 Miscellaneous on-campus faculty development sessions

2005 - 2010 Student Leadership workshops

2005 Master Advisor Workshop

2005 AOK Regional Meeting of American Association of Physics Teachers

2006 IX Pan-American Conference on Teaching Physics, San Jose, Costa Rica

2009 Faculty Exchange Program, Technical University of Hermosillo, Sonora, Mexico

Professional Organizations

American Association of Physics Teachers (Past Executive Council - AOK Section)

Oklahoma Association of Community College and Junior Colleges (Past Chairman - Physics)

Central Oklahoma Alliance of Physics Teachers (Past Chairman)

Tau Beta Pi - Engineering Honor Society

Oklahoma State Science Fair, Judge

Civic Organizations

Oklahoma Historical Society

National Geographic Society

Smithsonian Institution

The American Legion

Sons of Union Veterans

Michael Low, Professor of Physics

Primary Departmental Responsibilities

PHYS 1114 - College Physics I

PHYS 2014 - Engineering Physics I
PHYS 2114 - Engineering Physics II

College Responsibilities

Participating in new faculty training.

Educational Background

2008 - M.S., Physics, Oregon State University
2003 - B.S., Physics/Mathematics, University of Nevada Reno
2001 - A.S., General Science, Truckee Meadows Community College, Reno, NV

Professional Experience

2010 - Present Professor of Physics, Oklahoma City Community College
2009 - 2010 Instructor of Physical Science and Math, North Central Missouri College
2003 - 2004 Math Teaching Assistant, Truckee Meadows Community College, Reno, NV
1999 - 2004 Private Tutor, Reno, NV
1999 - 2002 Tutor, The Learning Hub, Truckee Meadows Community College, Reno, NV
1999 - 2002 Tutor, The Writing Center, Truckee Meadows Community College, Reno, NV

Professional Development (Last Five Years)

2010 Miscellaneous on-campus development sessions.

Tad Thurston, Professor of Physics

Primary Departmental Responsibilities

ASTR/PHYS 1504 - General Astronomy (Course Coordinator)
ASTR/PHYS 1514 - General Astronomy with Lab (Course Coordinator)
PHYS 2014 - Engineering Physics I (Course Coordinator)
PHYS 2114 - Engineering Physics II (Course Coordinator)
PHYS 2223 -- Modern Physics (Course Coordinator)

College Responsibilities

President, Faculty Association

Faculty advisor for Physics and Engineering students
Hiring committees as assigned
Information Technology Advisory Committee
Outcomes Assessment Committee (physics)
Ralph Gamel Scholarship Committee
Faculty Association Scholarship Committee

Educational Background

1998 - Ph.D., Physics, University of Oklahoma
1995 - M.S., Physics, University of Oklahoma
1990 - B.S., Astrophysics, University of Oklahoma

Professional Experience

2004 - Present Professor of Physics, Oklahoma City Community College
2000 - 2003 Software Engineer, Weather Decisions Technologies, Norman, OK
1997 - 2000 Research Scientist, National Severe Storms Laboratory, Norman, OK
1997 Physicist, Federal Aviation Administration, Oklahoma City, OK
1996 - 1997 Software Engineer, Hughes Aircraft

Professional Development (Last Five Years)

American Association of Physics Teachers Conferences, 2006-2010
ASP Cosmos in the Classroom Conference, 2007, 2010
American Astrophysics Conference, 2007

Professional Organizations

American Association of Physics Teachers
American Computing Machinery
ACM/SIGGRAPH

- 4. Evidence should be presented that shows a systematic review of the curriculum is conducted regularly. This review should indicate how the general education competencies are being met:**

General Education Assessment Plan

Objective:

To assess and recommend actions for the general education component of Oklahoma City Community College's curriculum.

Strategy:

The General Education Committee will create six interdisciplinary teams with members from multiple divisions. Each team will consist of five members with two members specifically teaching in one of the General Education Core Areas. Also, at least one team member will be a representative of the General Education Committee.

Twice a year these teams will evaluate one hundred artifacts from students having attained at least 36 hours of General Education Courses from OCCC. During each Spring Semester, the reports from each team will be shared at the meeting of the whole General Education Committee and dispersed to faculty within each division. Specifically, during the Fall Semester, each team in charge of a specific Student Learning Outcome area will make curriculum recommendations to the General Education Committee. Reports, recommendations, and actions created from the General Education Assessment Process will be stored on the General Education Committee Website. Faculty members on each team will be compensated each semester.

Method:

Developed rubrics will provide common criteria for assessing "artifacts" gathered from various courses. Artifacts may include but are not limited to recorded performances, PowerPoint Presentations, essays, lab reports, research projects, service-learning projects, or any assignment preexisting in a faculty's course. However, the artifacts should adhere to the specific objectives of the Student Learning Outcomes established by the General Education component of OCCC's curriculum.

Nevertheless, the underlying principle of this method is (1) to reduce the intrusive nature of assessment within faculty courses, (2) to create a real environment of student performances within a classroom setting instead of a contrived environment of a forced examination (i.e. CAAP exams not counting for a classroom grade), and (3) to collect

Data Collection:

The Office of Institutional Effectiveness will identify each semester students completing at least 36 credit hours in General Education Courses. From this list, they will identify a random sampling of students enrolled in courses, which faculty have included “artifacts” relating to the Student Learning Outcomes measured each semester.

For example, if an outcome in Math is measured, then the following courses beyond a Math Prefix could also be used: Introduction to Logic, Business Statistics, Behavioral Statistics, Chemistry, Physics, Accounting, Physical Science, or other General Education Courses involving Math and including the objectives for the Math Student Learning Outcome. Likewise, data collection could be attained from an outcome in Writing from any course involving writing, including a scientific lab report, as long as it adheres to the objectives of the Writing Student Learning Outcome for the General Education curriculum.

The premise behind this kind of data collection (1) allows for an interdisciplinary approach to the General Education curriculum; (2) creates a shared vision of faculty collaboration beyond the microcosm of specific divisions; (3) allows for a more accurate depiction of student learning as they progress from one General Education Course to the next; and (4) creates a shared approach to improve student learning and success by reiterating General Education Skills from multiple courses.

The General Education Core

General Education at Oklahoma City Community College is an integral component of each student's experience. Every student receiving an Associate Degree (AAS, AA, or AS) must complete at least one course from each of the following areas, indicating a general understanding of that area.

I. Human Heritage, Culture, Values, and Beliefs

Students will demonstrate an understanding of the ideas, values, and beliefs that have shaped global communities. Specifically, students should be able to

Demonstrate understanding of basic world geography; Demonstrate familiarity with major cultural issues of selected global communities; Demonstrate knowledge of significant historical events and figures of selected global communities; and Demonstrate an understanding of ethical concerns of selected global communities.

II. Communication and Symbols

A. Students will demonstrate effective writing and public speaking skills.

For writing, students should be able to

Generate a clear, specific, and arguable thesis or dominant idea; Formulate evidence and examples to support the topic idea; Construct a logical pattern of paragraph development; and Demonstrate consistent use of correct and appropriate spelling, grammar, and word choice.

For public speaking skills, students should be able to

Demonstrate the effective use of an introduction, body, and conclusion of a formal speech; Demonstrate an audience-centered purpose that adapts to the audience, occasion, and time limit of the speech; Deliver the speech with effective eye contact relative to the use of presentational aids (when applicable) and the audience; Vary the tone of voice appropriate to the content of the speech and context of the audience; and Demonstrate appropriate attire, gestures, good posture, and meaningful body movement.

III. Social, Political, and Economic Institutions

Students will demonstrate an understanding of the function of major social institutions. Specifically, students should be able to

Analyze how political systems impact society; Analyze how economic systems impact society; Analyze how religion serves to shape the norms of a society; Analyze how education interacts with cultural values and norms; and Analyze how shifts in social institutions impact the family.

IV. Relationships in Nature and Science

Students will demonstrate critical thinking by using scientific methodology. Specifically, students should be able to

Analyze a set of data or qualitative observations using previously learned tools; Draw reasoned conclusions based on the results of the analysis; and Support conclusions logically and communicate them effectively.

Program Response to General Education Assessment Data

General Education requirements represent just over sixty percent of each Associate of Science or Associate of Arts degree, making the careful assessment of these broad competencies OCCC considers essential for all graduates very important. Provide Evidence that shows a systematic review of the curriculum is conducted regularly. This review should indicate how the general education competencies are being met.

General education in science is very broad since the State requirement of 7 hours of science (including a laboratory course) can be met by many different courses and combination of courses at OCCC. There are 12 physical science and 10 biological sciences courses to choose from that fulfil the requirements. The specific content students are exposed to depends on their choice of material. Clearly someone taking General Chemistry I and Zoology will have a different experience that someone who takes General Astronomy with Lab and Nutrition.

Curriculum is continually reviewed and revised in these courses. The process of revision is augmented by the 'textbook' cycle. In general science texts are updated on a three year cycle (although two years is also possible). Although the learning outcomes of our courses are independent of textbook the need to more or less continuously review texts naturally leads to discussions of content. Curriculum is also reviewed and changed in response to the changing needs of the institutions to which our students transfer. We actively monitor changes in physics, chemistry, pre-med, pre-dentistry, pre-pharmacy, nursing, biology, and various health profession programs. Since many of our general education courses also serve as introductory courses for majors the reviews of program and general education curriculum are linked. Evidence of this process can be seen by current textbook selection and supplemental material selection for courses and continuous revision of syllabi.

Given the varied nature of material that could be used to satisfy science related general education outcomes faculty sought "commonality" among the various courses. Not surprisingly this turns out to be the use of the scientific method to think analytically about problems, experiments and situations. This is outcome IV listed above. Faculty from Health Professions have contributed artifacts in addition to those provided by science faculty.

The General Education report for Outcome IV for 2009-2010 follows:
Owing to the wide variety of intent (and types) of assignments considered as artifacts we rated artifacts based on a three point scale based on the language of the outcome, "The student will demonstrate critical thinking by using scientific methodology". The ratings are:

- 1) Not acceptable
- 2) Acceptable - used the portion (or portions) of the scientific method that were appropriate for the analyses of the material in the artifact.

- 3) Excellent - includes a discussion that summarizes the overall quality, applicability or methodological process of scientific methodology for that particular type of artifact.

We had a total of 71 artifacts. Ratings were as follows

- 1) 11
 - 2) 41
 - 3) 16
- Artifact not applicable - 3

This indicates that 84% of the artifacts were either acceptable or excellent.

5. Provide a summary of how concerns and recommendations identified in the last program review were addressed.

1) Science with Biology Concentration:

a. Physical Maintenance of Laboratories, Classroom, and Adjunct Office Space. Water leakage and mold growth into laboratories, classrooms, and Science Adjunct Office may potentially affect instruction. With the addition of the SEM Center we anticipate this issue will be alleviated. We plan to conduct meetings should with physical plant personnel to document water leakage and mold growth and discuss solutions.

In resolution, the addition of the SEM center has alleviated the problems associated with the Biology Science Adjunct Office and the classroom/laboratory spaces on the 2nd floor. However, mold issues still prevail on the first floor, especially in the microbiology and cadaver labs. This concern will continue to be expressed in the program review.

b. Increasing numbers of students for current spaces for instruction. Student enrollment in biology courses has increased at a high rate. However, it is possible that we will outgrow our current spaces for instruction. We anticipate, with the addition of the SEM Center this issue will be alleviated. New classrooms and laboratory spaces, as well as a Biological Sciences Center will be equipped with state of the art spaces for academic instruction.

In 2007, the SEM Main Building project was completed. The Biology Science Center has increased in space from approximately 1500 to 5000 square feet, including a 1100 square foot storage room.

c. A high number of adjunct instructors are teaching biology course sections. A majority of our biology courses are assigned to adjunct staff. Adjunct instructors make up over 50% of our teaching staff. While we are glad that the course offering request has increased, a full time faculty member should be added to our staff to assist with this situation. Also, it is important that the adjunct teachers employ the same philosophy of competency-based education as the full time instructors.

No new full-time biology professors have been hired since the last review.

We would like to emphasize the philosophy of competency-based education to adjunct instructors at the adjunct orientation meetings prior to the first week of instruction. Faculty mentors who work with new adjuncts should show them how competency-based instruction applies the course they teach.

To assist with these concerns, faculty mentors are provided for all new adjunct faculty members. However, this system is not as effective as hoped. Therefore this concern will continue to be expressed in the program review.

d. An increase in biology credit hours. Biology credit hours have been increasing at a high rate, but the addition of new full-time biology faculty is not proceeding at the same rate. We request consideration in hiring new full-time biology faculty in proportion with the increase in biological enrollment and credit hour numbers.

Since the last program review, the number of full-time faculty members has remained the same. However, the number of program majors students enrolled in Biology classes has increased from 1117 in FY 2005 to 1429 in FY 2010, a 28% increase. Therefore, this concern will continue to be expressed in the program review.

e. High turn over rate among biology lab assistants. Biology lab assistants usually remain employed for less than one year once they are hired.

The biological science center staffing plan was redone in FY 07, increasing the number the forty-hour per week employees (with benefits) from 2 to 6. That number has been maintained the same to FY 2011.

The hourly salary range has increased from a range of \$9.40 - \$15.69 in FY 2006 to a range of \$10.96 - \$17.57 in FY 2011. However, lab assistant turnover is still high. Possibly a different marketing strategy directed toward the universities may attract individuals that would be interested in holding this position for a greater length of time.

f. More spaces are required for instruction. Not enough classrooms and labs are available to accommodate students who want to enroll. The SEM Center will provide us with more space when it is completed.

The completion of the SEM Center increased our laboratory space from 7 lab rooms to 11 lab rooms. We will outgrow facilities (labs and classrooms) again in the next two to three years at the current rate of enrollment growth. Therefore, this concern will continue to be expressed in the program review.

g. Increasing cost of supplies and equipment. To cope with the increasing cost

of supplies and equipment, instituted lab fees should be directed to the appropriate program and not into the general fund. These fees should be in addition to the normal budget, and not subtracted from it.

Provide for lab fees that will be directly given to the program to help defray supply and equipment costs. This concern shall remain.

h. Increase in compensation for adjunct teaching is needed. The compensation for adjunct teaching is less than area four year institutions, creating difficulty in locating and retaining a competent pool of adjuncts. Increase adjunct compensation to a rate that is more competitive with area four year institutions.

The rate of adjunct pay has increased since 2005 from \$590 to \$640 per credit hour. This compares to \$680 MS/\$890 PhD per credit hour for individuals teaching at the University of Central Oklahoma.

i. Use an integrated approach to Science and Math. Science students do not regularly see the connections that need to be made between disciplines (math, biology, chemistry, physics) and miss or do not perceive the overall scope of many concepts, theories, and applications. Faculty need to weave these other disciplines into their lectures.

In order to accomplish this there needs to be better communication between departments, administrative support in the form of release time to create more interdisciplinary curricula, and faculty training that will lead to better connectivity and less isolated disciplines. A concerted effort has been made to incorporate more math and chemistry concepts into all biology courses. A greater emphasis is also being made to include writing into the biology courses. This "concern" also seems to be cyclical in importance. Therefore, at the present time, this "concern" is not as significant as it once was or as it will be in the future.

2) Science With Chemistry Concentration:

a. Limits to growth - need for more chemistry lab space and more lab assistants. During the summer of 2007, Room 1A1 was renovated to become a chemistry lab. Initially it was used for General Chemistry II labs and Principles of Chemistry labs. With the increase in the number of Principles of Laboratory sections (recently renamed Laboratory for Survey of General, Organic, and Biochemistry), 1A1 has become a lab space dedicated to the Laboratory for Survey of General, Organic, and Biochemistry course. The General Chemistry II labs now share lab space with the Organic Chemistry Laboratory course. Given the addition of the new lab space, the number of lab assistants working in the Physical Science Center is inadequate. Since there are times when only one lab assistant is on duty, it makes it very difficult for them to monitor independent physics labs, deal with students walking in to the Physical Science Center to make appointments or work on computers, and monitor three chemistry laboratory spaces.

- b. Need for more full time faculty.** One additional chemistry faculty position was created beginning FY 2007. However, given the increase in the number of chemistry CHEM 1123 and CHEM 1131 sections offered due to changes in the Nursing Program's admission requirements in 2008, another faculty member is warranted. In Fall 2005 we had three sections of CHEM 1123 with a total enrollment of 65 students and one section of CHEM 1131 with 27 students. In Fall 2009 we had seven sections of CHEM 1123 with total enrollment of 260 students (300% increase) and ten sections of CHEM 1131 with a total enrollment of 209 students (670% increase). Total enrollment in FY 2010 in CHEM 1123 was 621 students making it our second highest enrollment chemistry course after CHEM 1115 (904 students in FY 2010).
- c. IP lab supervision.** Independently-paced (IP) chemistry lab sections were eliminated at the end of FY 2007. Starting in FY 2008, all General Chemistry I and II labs became group labs to improve supervision of lab students. Safety has improved significantly since the change. During a safety audit in 2006, there were 1.53 safety violations per IP lab student versus 0.59 violations per group lab student. In a similar audit in 2010, the per student violation rate had dropped to 0.29. Although there are probably other contributing factors beyond increased lab supervision, the success rate (students completing the course with a "C" or better) has also increased somewhat in General Chemistry I since the elimination of the IP labs (an average of 62.6% from 07FA to 10SP versus an average of 60.3% from 05SU to 07SU).
- d. Difficulty finding qualified adjuncts.** This continues to be a concern, especially during the day when the number of people with qualifications to teach chemistry and physics is lower. This causes us to rely on a few adjuncts willing to work close to the maximum number of hours allowable and faculty willing to work overloads. Moreover, qualifications on paper do not necessarily translate to success in the classroom. During our program review period assessment data shows students taught by full-time faculty outperform those taught by adjunct faculty with an average of 74.8% of students in sections taught by full-time faculty meeting the criterion for this outcome versus 69.6% for students in sections taught by adjunct faculty. This difference is even more apparent if the year that two new faculty began teaching CHEM 1115 is excluded (78.9% for FT vs. 69.6% for adjuncts). Since all sections of CHEM 1115 use the same syllabus, assignments (such as MasteringChemistry), grading criteria, and lecture schedule, the difference does not appear to be caused by differences in emphasis or content. Most of our adjunct faculty have taught this course for several years so lack of experience should not have caused the observed difference. The differences between full time and adjunct faculty can be more pronounced in more advanced courses. In CHEM 2114, 64.1% of students in sections taught by full time faculty made 70% or better on the comprehensive final while only 32.8% of students in adjunct sections performed at the same level.

- e. **Heavy workloads for full time faculty.** This continues to be a problem. As mentioned above, it is caused in part by a shortage of qualified adjunct faculty, especially during the day. It is also a consequence of how lab contact hours are calculated at OCCC. The *American Chemical Society's Guidelines for Chemistry in Two-Year College Programs* (2009), recommends a maximum of 15 total contact hours per week for a full time faculty member. A chemistry faculty member with three general chemistry lectures and two lab sections at OCCC would have a 15.5 credit hour workload. However, since the American Chemical Society's guidelines consider lab hours and lecture hours to be the same, the 15.5 credit hour workload would come it at over 17 total contact hours. The American Chemical Society's guidelines also recommend no more than 450 student contact hours (number of students multiplied by contact hours per week). A typical student contact hour load for an OCCC chemistry faculty member can be well over 2000 hours.
- f. **Large class size.** This continues to be a problem, especially in the wake of the tremendous surge in enrollment experienced in the Fall 2009 semester. Having full sections of 40 students each and, often, pressure to allow additional students into sections through overrides contribute to the very high student contact hour load of chemistry faculty.
- g. **Need for new instruments.** We were very fortunate to receive a GC-MS instrument that was ready for use in the organic lab beginning in the Spring 2007 semester. However, we are still lacking a nuclear magnetic resonance (NMR) spectrometer.
- h. **Transfer problems.** While the chemistry program and the College of Veterinary Medicine at Oklahoma State University still do not accept either our Organic Chemistry I or Organic Chemistry II classes as equivalent in content to their 3000 level organic courses (they accept no 2000 level organic courses - even from OSU-OKC), the chemical engineering program and College of Osteopathic Medicine do accept our organic sequence. The relationship with the University of Central Oklahoma has improved somewhat and they are currently accepting our organic courses. However UCO has recently decided not to accept our organic chemistry laboratory.
- i. **Lack of pre-lab rooms.** With classroom space at a premium, this continues to be a challenge. We are having to utilize biology lab space for chemistry pre-lab discussions. This involves logistical problems for the Biological Science Center staff.
- j. **Inadequate balance access.** Moving the balance area for General Chemistry I labs to the area that was once used for independently-paced lab students has allowed for less crowding and much better supervision of the beginning students in General Chemistry I labs.
- k. **Need for organic balance room.** The area once shared by General Chemistry

I, II, and organic students is now used only by the General Chemistry II and organic lab students.

- l. **Large advising loads.** This continues to be a challenge with some full time chemistry faculty each having over 200 listed advisees.
- m. **Prerequisite changes.** The course sequences for the chemistry emphasis, especially in the pre-pharmacy pattern, were changed with approval by the Curriculum Committee in the Spring 2008 semester in response to prerequisite changes at the OU Health Sciences Center College of Pharmacy that were slated to begin in Fall 2008. The prerequisite changes at the College of Pharmacy have since been relaxed. Many courses are now listed as giving preference for admission rather than being required for admission. The course sequences for the chemistry emphasis have been changed again with the approval of the Curriculum Committee in the Fall 2010 semester.
- n. **Finding qualified tutors.** This continues to be a challenge. Some of the students who apply are not necessarily the best students.
- o. **Principles of Lab Chemistry revisions.** The lab manual for Principles of Laboratory Chemistry (now called Laboratory for Survey of General, Organic, and Biochemistry) underwent much needed revisions and updates in 2008. The lab manual has continued to evolve since then.
- p. **Crowded organic lab.** We have reduced the number of students permitted in section of organic chemistry, limiting enrollment to twenty-four rather than the twenty-eight we had allowed previously. However, according to the *American Chemical Society's Guidelines for Chemistry in Two-Year College Programs* (2009), the limit should be twenty students in organic chemistry sections.
- q. **Tracking after transfer.** Tracking students after they transfer continues to be a challenge. There is no efficient way to track the success of our students at transfer institutions.

3) Science with Physics Concentration:

Here are the responses to the concerns from the 2005 review from the Physics faculty:

- a. **Lack of assistant for inventory control and equipment maintenance.** We still have no lab assistant whose exclusive role is to maintain physics equipment and control inventory for lab equipment. While equipment maintenance is no longer a priority since it is usually less trouble to simply replace broken equipment, inventory control work is being picked up by the supervisor of the Physical Science Center and lab staff in general.
- b. **Need for lab assistant training.** New lab assistants are asked do all the

physics labs so that they can become familiar with them. The training they receive for the engineering physics labs probably needs to be more extensive due to the complexity of the equipment and data analysis for some of these labs.

- c. **Lack of full time faculty for physics and engineering courses.** We had the majors courses (PHYS 2014, PHYS 2114) taught only by full time faculty during the past academic year, which the physics faculty feel is a positive step forward. This, however, has come at the expense of having fewer 1000-level physics classes covered by full time faculty.
- d. **Lack of communication with math faculty.** This has improved; productive collaborations took place, for instance, during the curriculum change from four 3-hour calculus classes to three 4-hour classes to line them up more congruently with the concurrent physics classes. Also, a pilot paired offering of PHYS 2014 (Engineering Physics 1) and Calculus 2 were offered for two semesters in which the physics and mathematics professors worked together on reordering topics to maximize resonance between the courses.
- e. **Lack of an introductory meteorology course.** We still do not have an introductory meteorology and no full time faculty member currently on staff has the expertise to develop or teach this course, although a “severe weather” for non-majors course was developed by an adjunct.
- f. **No mandated assessment of mathematical readiness for engineering physics courses.** We rely on the readiness as indicated by successful completion of the mathematics prerequisites.
- g. **Misplaced program assessment.** This continues to be a problem since the number of students majoring in Science with a Physics emphasis is so small. Little information is obtained for the time spent assessing these physics students.
- h. **Library collection.** Some classic physics titles were requested by the physics faculty to be added to the library collection.
- i. **Engineering Physics syllabi need review.**
- j. **Physics labs need review.** This was primarily a concern with the engineering physics labs. Some new experiments have been developed and tested on students, and some existing experiments have been revised to match newer objectives or changes in laboratory equipment.

6. Describe the strengths of the program identified through this review.

- a. **Quality faculty.** Science faculty at OCCC are a diverse group who share a common interest in promoting student learning, providing quality instruction

and insuring high levels of student performance. While science courses are taught by adjunct faculty, every attempt is made to insure they hold high qualifications and support the goals of the department.

The physics faculty include: a physics generalist interested in practical applications of physics concepts in everyday life, an astrophysicist who teaches astronomy and the higher-level physics courses employing cooperative learning techniques, a registered civil engineer who teaches geology as well as physics and who coordinates with the Pre-Engineering program, and an engineering/physics generalist interested in medical applications of physics. In addition, the Dean of Science and Mathematics is also an astrophysicist who understands and strongly supports the efforts of physics faculty.

Among the chemistry faculty are two organic chemists, two biochemists, a physical chemist, and an analytical chemist. Therefore most of the major areas of specialty within chemistry are represented. Three of the chemistry faculty also have several years of industry experience, allowing these faculty to highlight real world applications in the classroom and provide advice to students interested in chemistry based upon their firsthand knowledge of industry.

The biology faculty have specialized in many fields of the biological sciences, including anatomy, botany, microbiology, paleontology, physiology, and zoology. They represent individuals who come from research, private industry, and private practice, and are able to incorporate these experiences into the classroom setting. Many of the faculty also teach in other departments or other educational institutions, thus enabling them to obtain different perspectives on the education process.

b. **Designed curricula.** Unlike many institutions where faculty simply teach the textbook, faculty at OCCC have conscientiously designed the courses and curriculum. Courses are developed by first determining what knowledge and skills students are expected to acquire. Competencies or learning objectives are specified based on content significance, prerequisites for future subjects and courses, and importance to the careers students are pursuing. These objectives are then sequenced, and course materials are developed. Textbooks are selected which most closely match the course design. Finally, assessments are developed which match the specified learning objectives. All sections of each course use the same set of objectives, insuring students in every section receive an equivalent education regardless of teaching methods utilized by individual instructors.

c. **Strong, on-going assessment in chemistry.** The Chemistry faculty have recognized the value of assessment as a tool for improving student learning and therefore take assessment very seriously. The Chemistry faculty are committed to assessing student learning outcomes, looking for ways to

improve the degree to which students master the skills the Chemistry faculty see as important, and reassessing skills again to make sure changes had the intended effect.

- d. **Classroom technology.** All classrooms at OCCC are equipped with computers and projectors that allow instructors to present multimedia materials and access the Internet in the classroom. The general classroom environment is also very positive. The use of tables rather than individual desks allows students more room to work. The white boards in the classrooms are generally more visible and involve less dust than chalk boards.
- e. **Lab facilities.** With the exception of problems with the flow control valves for the hoods in some of the chemistry labs (a problem that is currently being addressed), the condition of the laboratory facilities for chemistry and physics are excellent. The laboratory facilities in biology are superb. All of the sciences have access to a well-equipped biotechnology lab. The biology department also provides a student dissection cadaver lab, a fairly unique opportunity for community college students.
- f. **Schedule and format options.** Both basic and more advanced science courses are offered in the morning, afternoon, and evening. Many of the basic science courses are offered in an 8-week or 16-week format. General Biology and Physical Science are offered as intersession courses. Several biology classes and some general education physical science classes are offered on campus and online. The variety of time offerings and formats for science courses helps serve students with diverse scheduling needs.
- g. **Field trips.** Local field trips are provided for students to further study the concepts of geology, paleontology, and ecology. Extensive field trips are available to students through special topics courses that focus on the ecology of the Gulf Coast and the ecology of the Greater Yellowstone area. Students are also encouraged to attend local seminars and conferences dealing with the sciences and the health professions. Having faculty willing to take the time for field trips greatly enhances student experiences in the sciences, far beyond what would be possible in a classroom setting.
- h. **Science Centers.** Two Science Centers, one for biology and one for the physical sciences, provide extensive services to students. Individually paced labs, free tutoring, testing, and review activities are available in the Science Centers.
- i. **Active Health Professions Club.** The Health Professions Club always has a large number of student members and is always among the most active clubs on campus. The Health Professions Club sponsors field trips to the OU Health Sciences Center, brings in speakers, and holds workshops on interviewing for professional schools among many other activities and service projects. The activities of the Health Professions Club greatly enrich the

college experience of its members.

- j. **Engineering Center.** The Engineering Center, although designed primarily for engineering students, provides an environment that encourages learning and collaboration for physics students as well as engineering students. Most of the physics faculty offices are inside the Engineering Center.
- k. **Specialized curriculum patterns within each discipline.** Whether a student is interested in Allied Health professions, Biology, Chemistry, Pre-Dentistry, Pre-Medicine, Pre-Nursing, Pre-Pharmacy, or Physics, program faculty have designed suggested curricular patterns for students to follow that meet the transfer requirements for further study in these areas. Even students who self-advise should have a reasonable idea of what courses they need if they follow one of the published curriculum patterns.
- l. **Expanded course offerings.** Since the last program review, a new course, PHYS 2223, Modern Physics, has been added to help students following the Physics curriculum pattern who plan on transferring to a four-year college or university for further study in physics. Since the last program review, fourteen sections of CHEM 1123 and twenty-six sections of CHEM 1131 have been added to accommodate the needs of the Nursing Program.
- m. **Opportunities through INBRE.** Since Oklahoma City Community College participates in a grant administered through the OU Health Sciences Center (The IDEa Network for Biomedical Research Excellence), Oklahoma City Community College students have the opportunity to experience biomedical research at major research institutions. In addition, faculty also have the opportunity for development opportunities through INBRE externships.
- n. **Faculty advising.** A very large number of students taking science courses have one of the professional medical specialties as a career goal: medicine, pharmacy, dentistry, nursing, and all of the allied health professions. These academic majors are housed in the Division of Science and Mathematics. While the College employs a number of dedicated general Academic Advisors, these general advisors cannot possibly remain current on employment trends, advanced programs available at transfer institutions, program admission requirements, etc. Consequently, science faculty members have taken on the responsibility of serving as Faculty Advisors for students selecting these majors. Science faculty also remain in contact with faculty and staff at various educational and medical institutions to insure programs offered at OCCC meet the needs of students pursuing careers in the various fields of medicine.

7. Describe the concerns regarding the program that have been identified through this review.

1) Science with Biology Concentration:

1. Students participating in Individually Paced labs are not as successful as those

students participating in Group labs.

Table 1. Comparison of the success of students enrolled in Group Labs vs. students enrolled in Individually Paced Labs.

| | <u>Group Lab</u> | <u>Individually Paced</u> |
|-------------------------|------------------|---------------------------|
| BIO 1114 | | |
| Successful* | 1816 | 484 |
| Not Successful** | 343 | 117 |
| Withdrawn | 451 | 168 |
| <hr/> | | |
| Total | 2610 | 769 |

Percent Successful/Total 70% 63%

(The percent successful is significantly different comparing the group lab to the individually paced lab. P-value < .001)

| | <u>Group Lab</u> | <u>Individually Paced</u> |
|-------------------------|------------------|---------------------------|
| BIO 1314 | | |
| Successful* | 1314 | 455 |
| Not Successful** | 288 | 180 |
| Withdrawn | 585 | 219 |
| <hr/> | | |
| Total | 2187 | 854 |

Percent Successful/Total 60% 53%

(The percent successful is significantly different comparing the group lab to the individually paced lab. P-value < .001)

| | <u>Group Lab</u> | <u>Individually Paced</u> |
|-------------------------|------------------|---------------------------|
| BIO 1414 | | |
| Successful* | 926 | 291 |
| Not Successful** | 140 | 47 |
| Withdrawn | 213 | 89 |
| <hr/> | | |
| Total | 1279 | 427 |

Percent Successful/Total 72% 68%

(Although the group lab does not differ significantly from the individually paced lab, a difference is still noted. P-value = .0926)

Successful*: Students completing the course with a final grade of A, B, or C.

Not Successful**: Students completing the course with a final grade of D or F.

2. Not enough classrooms and labs are available to accommodate students who want to enroll. Since the last review, the Biology Department has gained 4 additional laboratory rooms, but lecture space in the SEM center has not increased as much as needed. During the same time period, enrollment in Biology courses has increased approximately 11%.

3. Fifty- two of the BIO credit hours are taught by adjunct instructors. It is important that the adjunct teachers be qualified, prepared, and employ the same philosophy of competency-based education as the full time instructors.

4. The addition of new full-time biology faculty is not proceeding at the same rate as the increase in students enrolling in Biology courses. During the past five years, the Biology department has maintained 11.5 full time faculty, despite the rise in student enrollment.

5. To cope with the increasing cost of supplies and equipment, instituted lab fees should be directed to the appropriate program and not into the general fund. These fees should be in addition to the normal budget, and not subtracted from it.

6. Respiratory safety concerns continue as a result of water leakage and mold growth in laboratories and classrooms on the first floor. Respiratory safety concerns are also present in laboratories on the second floor due to improper ventilation.

7. Students taking online Biology courses are not as successful in subsequent biology courses.

8. OCCC may not be attracting as high of caliber of student as is possible.

9. Additional equipment is necessary to ensure the growth of the Biology department for future years.

2)Science With Chemistry Concentration:

Concerns from Physics and Chemistry faculty

Classroom space. We are at capacity at popular times and many less popular times. Many of the new sections of CHEM 1123 that were added to meet the demands of the Nursing Program were scheduled at awkward times because those were the only times when open classrooms could be found (3:30 p.m. to 4:50 p.m. is especially difficult for parents who need to pick kids up from school, for example). Finding rooms for two pre-lab discussion periods for the Spring 2010 semester required wedging the pre-lab discussions into biology lab spaces. The use of one of the spaces will require Biological Science Center staff to break

down experiment set-ups during lunch hour and replace them once the pre-lab discussion is over.

Transfer issues. While some progress has been made with transfer of our organic chemistry lecture sequence to the University of Central Oklahoma (UCO), UCO does not accept our organic chemistry lab course. While Oklahoma State University's College of Engineering accepts our organic chemistry sequence, Oklahoma State University's Department of Chemistry still does not. The Physics Department at the University of Oklahoma is accepting our Engineering Physics courses, but because their engineering courses are five hour courses with a lab component while our courses are four hour courses with a lab component, transfer students are sometime required to take a junior-level physics lab course to make up for the deficiency in hours.

Outcomes assessment in physics. In physics there are some national assessment standards to apply in order to evaluate outputs, and information from final exams with which to evaluate learning outcomes, but these are applied to both students emphasizing physics within the Science program as well as engineers and other non-program students. This makes evaluating the program for majors difficult and makes the amount of work involved for assessment seem unproductive. When the criteria are applied just to the program students, the numbers are often so small that the meaning and validity of the results are questionable.

Availability of output data. Data for tracking science student success at transfer institutions and admission to professional programs seems impossible to obtain.

Availability of qualified adjuncts. We rely heavily on just a few adjuncts to teach close to the maximum allowable hours. While every attempt is made to ensure that highly qualified individuals are hired, qualifications on paper do not always translate into success in the classroom. Assessment data indicates that students taught by full-time faculty outperform those taught by adjunct faculty. During the review period an average of 74.8% of students met the performance criterion on the departmental final in sections taught by full-time faculty versus 69.6% for students in sections taught by adjunct faculty. This difference is even more apparent if the year that two new full time faculty began teaching CHEM 1115 is excluded (the difference then becomes 78.9% for FT vs. 69.6% for adjuncts). Since all sections of CHEM 1115 use the same syllabus, assignments (such as MasteringChemistry), grading criteria, and lecture schedule, the difference does not appear to be caused by differences in emphasis or content. Most of our adjunct faculty have taught this course for several years so lack of experience should not have caused the observed difference. Differences in adjunct versus full time performance can be even more pronounced in higher level courses. For instance in CHEM 2114, Organic Chemistry I, an average of 64.1% met the performance criterion on the departmental final from Spring 2009 through FY 2010 in sections taught by full time instructors. In contrast, only an average of 32.8% of students in adjunct sections met the performance criterion on the final exam.

Results of assessments in the organic lab show similar disparities between adjunct and full time instructors.

Physical Science Center staffing. We are short-staffed in the Physical Science Center. Physics faculty have long felt that a lab assistant with a strong background in physics was needed to help with material inventory control and equipment repair. While equipment repair is no longer a real concern (it's probably cheaper to just replace broken equipment), inventory control is still lacking. More importantly, there are times when only one lab assistant can be scheduled to work, making it difficult for the assistant on duty to attend to the needs of chemistry labs going on in three different rooms, supervise IP physics labs, schedule labs for students who come in to the Physical Science Center, address questions regarding computers, and have time for any kind of break. If one lab assistant has to call in sick, there are times when we will have to close the Physical Science Center, causing rescheduling of IP physics labs. Also, a lab assistant on duty alone cannot prepare chemicals or refill bottles in labs to make sure early morning labs are adequately stocked due to safety concerns in case of an accident.

Need for enhanced tutoring services. The Physical Science Center currently relies upon student tutors exclusively. The student tutors we currently utilize are often here for only a year and then they move on. This means that tutor quality can vary considerably from year to year and is strongly dependent upon the applicant pool.

Laboratory space/capacity issues. We are very near capacity in the Chem I lab, 1C1. The only reason we can offer the number of sections of CHEM 1115 that we do is that we offer labs at awful times (7:30 a.m. - 10:00 a.m.; 8:00 p.m. - 10:30 p.m.) that students still sign up for (out of lack of better options).

Need for an NMR spectrometer. Chemistry has been fortunate in receiving excellent major equipment items that now include a gas chromatograph, a combined gas chromatograph-mass spectrometer, and an infrared spectrometer. Due to prohibitive cost, the one major instrument missing from the organic chemistry lab is a nuclear magnetic resonance (NMR) spectrometer (~\$100,000 for a refurbished instrument). The lack of an NMR spectrometer is a weakness 4-year colleges and universities can point to as evidence that organic lab experience at OCCC is not equivalent to the lab experience at their institutions.

Need for a bigger instrument room. If we do acquire an NMR spectrometer, we will need a bigger space to accommodate all of our instruments or a dedicated space just for the NMR spectrometer.

Chemistry supply budget. The chemistry supply budget has not increased in the last five years despite the addition of twenty-six additional lab sections CHEM 1131 plus an additional section of CHEM 0110.

Unresponsiveness of Human Resources. Faculty and program directors

involved in posting positions and hiring lab assistants or tutors are often frustrated by how long it takes Human Resources to process requests to get jobs posted or to process paperwork needed to appoint new hires. Often there is no communication when background searches are completed. Delays of several weeks are not uncommon for position postings, leading to unfilled positions that can impact services to students and creating uncertainty for potential candidates awaiting the job postings.

8. Develop a list of recommendations for action that addresses each of the identified concerns and identify planned actions to implement recommendations.

1) Science with Biology Concentration:

1. Eliminate “Individually Paced” labs. Two solutions are suggested. First, divide the lecture section into TWO laboratory sections that will be taught by the lecture professor. And/or second, separate the lecture section from the lab section, giving the student several choices as to the time they participate in lab. Lab personnel would need to be available to answer any last minute questions from the instructor regarding equipment and materials. Therefore, creating an additional Laboratory Supervisor position would help to ensure that a supervisor is available during the day, the evening, and Saturday classes.

2. Separation of the laboratory portion of the course from its' lecture portion would allow better utilization of space. This would help to eliminate under utilized laboratory space during periods of the day. Creative scheduling of classrooms to better utilize lecture rooms during the mid-afternoon and Friday's. If the laboratory portion of the course is separated from the lecture portion, new adjunct faculty could be utilized to teach the laboratory portion of the course. This may enable new adjuncts to become accustomed to OCCC's method of competency based education prior to their teaching in a lecture. It also helps to ensure that the person is capable of teaching.

3. All potential new adjunct faculty's applications should be made available to the Department Chairperson of the Sciences, for review. Not just the applications that Human Resources determines is acceptable for review.

4. Hire new full-time biology faculty in proportion with the increase in biological enrollment and credit hour numbers.

5. Meetings should be conducted with physical plant personnel to document water leakage and mold growth and discuss solutions. Ventilation hoods and exhaust fans need to be installed in the following laboratories: 2A1, 2A3, and 2B1

6. Restructure 100% online courses and designate online courses as “hybrid” courses where a portion of the course must be completed on campus. Tests must

be taken on campus or in a testing center that can verify the student's identity. Labs may need to be arranged so that they meet at designated times on campus.

7. The attraction of the "higher-end" student may be facilitated by performing a market analysis to understand what the potential student and/or their parents want from a local college. Thereby OCCC could possibly develop courses and programs to entice the higher end student. Other options may include scholarship monies available to those students that transfer to OU or UCO after completing a degree at OCCC. Or encouraging concurrent enrollment of high school students on OCCC's campus to encourage the attendance at OCCC once high school is completed.

8. Faculty offices would benefit greatly with new computers as the current computers have been in use for at least five years. Laboratory equipment would be necessary if we decide to offer a laboratory component to BIO 2203, Cell Biology. An overall increase in materials will be needed if student enrollment continues to grow.

Recommendations from Chemistry based on assessment results:

- Continue repeated exposure to key concepts in all program courses through homework, quizzes, and exams.
- Continue using Mastering Chemistry or a similar on-line, tutorial system in the General Chemistry sequence to increase the time students spend working problems.
- Increase the point value of all comprehensive final exams to 100 points.
- Expand the content of General Chemistry final exams to more completely assess key course objectives.
- Minimize use of adjunct faculty to teach advanced courses such as CHEM 2114 and CHEM 2124.
- Beginning in FY2011, a supervised data analysis and conclusion writing exercise will be incorporated into all General Chemistry labs.
- Beginning in Spring 2011, a supervised data analysis exercise will be incorporated into CHEM 2122 (Organic lab).
- Monitor performance on formal lab reports and/or lab practical exams in CHEM 1215 and CHEM 2122 to determine if the ability to analyze data and write well-supported conclusions increases as a result of the supervised data analysis/conclusion writing exercise.
- Provide additional training on analyzing data and writing conclusions for new and adjunct faculty who teach laboratories.
- Continue offering group labs only.
- Continue to emphasize the importance of safety to both students and faculty throughout the semester.

Recommendations from Chemistry and Physics areas of the Science Program to address identified concerns:

Classroom space. Short term: Any new construction on campus needs to include space that can be used for classrooms. Longer term: Consider construction of a separate Science Building that includes new classrooms, offices, and lab spaces.

Transfer issues. Some state institutions will probably never accept some of our courses. Unless the State Regents step in to ensure transferability of comparable courses, the best we can do is to make sure students leave OCCC with suitable skills to demonstrate that there is no need to unduly punish our students because they come from a community college.

Outcomes assessment in physics. Some of the suggestions from the Academic Outcomes Assessment Committee should be implemented to see if better assessment data can be produced for the physics emphasis students.

Availability of output data. Make the Oklahoma State Regents for Higher Education aware that output data, such as the success of science students after transferring to science programs at other institutions, is incredibly difficult to obtain without a statewide database accessible by Institutional Effectiveness.

Availability of qualified adjuncts. During daytime hours, it will continue to be difficult to find qualified adjuncts since many people with advanced degrees in chemistry and physics often work during the day. In chemistry, where labs and lectures can be taught by separate instructors, new adjuncts should be assigned to the lab sections as much as is practical to see how they handle teaching the labs before having them move to teaching lecture sections. The Department Director, in conjunction with Human Resources, should exert a continuing effort to increase the pool of qualified adjunct instructors.

Need for full time faculty. Add a chemistry faculty position and either a combined engineering/physics position or separate engineering and physics faculty.

Lab assistants working alone. There should be either two lab assistants and a lab assistant and the Physical Science Center supervisor on duty at all times. This may be accomplished in one of the following ways or an appropriate combination of these options: 1) optimize the scheduling of lab assistants so they are not required to start work at 7:00 a.m. on days the first lab is at 10:00 a.m., 2) reduce hours during which the Physical Science Center is open, and 3) increase staff.

Need for lab assistant training. In addition to having lab assistants work through all the physics labs, the Physical Science Center supervisor should provide additional training for some of the more complicated physics labs, involving full time faculty in the training as needed.

Need for enhanced tutoring services. Hire a combined full time tutor/student tutor supervisor with a background suitable to tutor the whole range of chemistry and physics courses at OCCC. A full time tutor/tutor supervisor could provide training to the student tutors to improve consistency and increase the number of hours during which students could find assistance with their chemistry and physics homework.

Laboratory space/capacity issues. It may be time to revisit the idea of a Saturday group lab for CHEM 1115. We could also explore using 1B1 for CHEM 1115 labs during times when 1B1 is currently unoccupied. This would allow us to run two General Chemistry I labs concurrently. This would, however, require additional equipment and additional chemical prep. Requiring two sets of chemicals for the CHEM 1115 labs would increase the need for storage space which is also at a premium. Longer term: begin planning for the location of a new Science Building with additional lab, office, and classroom space.

Need for an NMR spectrometer. Find a charitable foundation willing to donate money or obtain a grant for the purchase of an NMR spectrometer.

Need for a bigger instrument room. If we obtain an NMR spectrometer, remove the wall between the current balance room and the current instrument room, rearranging the cabinetry to allow for the addition of a large instrument. Alternatively use the area adjacent to 1B1 currently used for storage as a dedicated NMR instrument room. Alternate storage would have to be located for the material currently stored in this space in this scenario.

Chemistry supply budget. Increase the supply budget for chemicals and budget for waste disposal to compensate for the increased number of sections of chemistry being offered now.

Unresponsiveness of Human Resources. Ask the Dean's Council and the Vice-President for Academic Affairs to encourage the President's Cabinet to find the needed action to increase responsiveness of Human Resources and their communications with program directors and to reduce paperwork turn-around times.

Heavy workloads for full time faculty in chemistry. When possible, reduce the maximum lecture size in general chemistry classes to 36 students.

Large class size in chemistry. When possible, reduce the maximum lecture size in general chemistry classes to 36 students.

Large advising loads. Lists of advisees should be purged of students who have graduated or who have not enrolled in 18 months to give faculty a more accurate picture of their advising load. Hiring more faculty would spread out the advising

load.

II. Institutional Requirements

1. Provide factual and accurate documentation which demonstrates acceptable standards of ethics in recruiting and advertising activities.

All materials provided to students are thoroughly reviewed by appropriate personnel to ensure they are factual and accurate. In addition, appropriate personnel review all recruiting and advertising activities to ensure they meet acceptable standards of ethics. Prospective students may access information about the college and its programs through the Office of Recruitment and Admissions.

Services provided by this office include campus tours, community and high school outreach, information sessions, scholarship programs and corporate recruiting. College information is provided to students through traditional means such as class schedules, catalogs, student handbooks, Recruiters Manual, and new student orientation as well as through the College website.

2. Provide recruitment and admission policies and practices reflecting that the program is available to qualified applicants and that qualified applicants will be admitted regardless of sex, race, ethnic background, religious preference, disability or any disadvantage.

Recruitment practices and activities are planned and reviewed by appropriate personnel to ensure the institution's vision, mission, and ENDS are met. Every effort is made to ensure that all qualified prospective students are contacted and provided with opportunities to be informed about College programs, services and courses and are provided with the opportunity to apply for admission to the College.

Students entering Oklahoma City Community College as a Regular Degree Seeking Student will meet the following admissions requirements:

- graduated from high school or earned a GED;
- completed the ACT, SAT or a similar acceptable battery of tests; and
- completed all high school curricular requirements.

Students who do not meet the above criteria may be admitted under one of seven Special Admission Categories outlined in the Catalog. All students who meet the above requirements or who fall into one of the special admissions categories are admitted without regard to sex, race, ethnic background, disability or disadvantage.

3. Provide documentation that an organized, coordinated program of guidance and counseling exists. The program should foster maximum development of individual potential by providing institution-wide assistance in the choices, decisions, and adjustments that individuals must make to move through a program.

Faculty from each program work very closely with the Student Development Center staff. Each student is encouraged to have a counselor from Student Development as well as a faculty advisor.

Degree sheets are available in the Student Development Center as well as in faculty advisors' offices. Students may also access degree requirements and complete an up-to-date degree audit online. Faculty advisors work closely with Student Development Counselors to minimize the number of hours unable to be counted when a student transfers to a four-year institution.

The general philosophy and objectives of the Student Development Center include informational, relational and conceptual processing of educational planning and student goal achievement, including degree completion, articulation or personal development and apply to all students.

The functions of Student Development are stated in the College's Policies and Procedures Manuals and in the Catalog for the benefit of all students, faculty, and staff. Student Development objectives are also outlined in the above mentioned documents.

Counselors follow guidelines listed below in working with students. After admission to the College, a student is evaluated for placement. After the evaluation is complete, the student meets with a counselor to determine enrollment. Course selections are based on test scores, anticipated program and required courses, workload, possible transfer and past academic history. If the student expresses indecision over goals, especially for career or program choice, they explore them with a counselor in Student Development.

When a student indicates a desire to pursue a specific program, they are referred to the appropriate faculty advisor or program director. An individual strategy is built for each student, designating courses to be enrolled in for each semester.

Counselors in the office of Student Development are available to discuss career objectives and degree programs with each student. The staff of Student Development assists all students with educational planning, career decisions, and occupational choices. Further assistance is available in conjunction with the Discover Program and the other resources of the Career Counselor.

Academic Advisement (faculty handbook)

In the course of interacting with students, it is the responsibility of faculty members to serve as academic advisors. In addition, faculty give advice on a broad range of topics and issues. The kinds of advice offered by faculty can be categorized in the following way.*

* It is important to underscore that this listing is intended to be suggestive rather than exhaustive or prescriptive.

Program Requirements

It is important for students to meet with an advisement professional to establish a Student Academic Plan (SAP). Returning students who are familiar with their degree requirements and those not seeking a degree or certificate may self advise.

Students are also encouraged to work concurrently with their faculty advisor in the academic discipline of their degree choice. A faculty advisor can help ensure that major specific educational objectives are met in an efficient, orderly fashion. If you have questions on course selection, entry-level skills required or general academic information contact Office of Academic Advising. With respect to program requirements, faculty advisement may address such things as degree planning (timing and sequencing of courses), identifying the appropriate catalog (degree plan to follow), selecting support electives, and meeting special requirements for a program or student (e.g., clinical performance, immunization, CPR).

Transfer Concerns

Relative to transfer concerns, faculty advisement may include such things as providing information on programs at area transfer institutions, information on out of state/state institutions, and transfer procedures to those institutions. It may also include evaluation of course content of major courses being transferred in for a particular major.

Career Information

Providing career information may include information about employment opportunities with various levels of education and responding to questions regarding how to select a path to follow within the field.

Referral

Referral may be done when faculty advice is sought on such matters as financial aid, transportation problems, problems with transcripts, formal degree checks, personal problems requiring counseling, graduation procedures, or any issue that the faculty member determines can be best served by others.

4. **Provide documentation that reflects accurate and complete cumulative records of educational accomplishment including:**
 - a. **The number of majors (head count and FTE) in the instructional program during each of the last three years and projections for the next two years.**

The following is for all science majors
Fall 07: Headcount 1117; Credit Hours 10711
Fall 08: Headcount 1156; Credit Hours 11331
Fall 09: Headcount 1429; Credit Hours 14200
Fall 10: Headcount 1543; Credit Hours 15336 (based on 8% growth in overall enrollment in science)
Fall 11: Headcount 1589; Credit Hours 15796 (based on 3% overall growth in science)

- b. **the size of specialized (program major) classes, if any, identified as integral elements in the program during the last three years.**

NA

c. Instructional cost, including efficiencies and improved learner outcomes achieved through the use of any technology.

Oklahoma City Community College offers online courses (computer based/ Internet) which allow students the freedom from attending regularly scheduled course meeting times while still earning college credit. Online courses are similar to traditional, on campus courses in that they have a regular class schedule, assignment due dates, and the expectation of student interaction. OCCC has committed resources for the creation of specialized resources for online students with the goal of increasing student success. These resources include a customized section of the OCCC website to assist them as they progress in their academic studies via distance and an orientation to the College's Learning Management System. We are also in the early stages of implementing virtual tutoring in the Math and Communication labs to further customize and personalize online students' education. The cost of these initiatives and efforts totals \$17, 000.00. OCCC has also dedicated a specialized team of student technology support to provide assistance to students seven days a week as they work within the learning management team which costs the College \$120,034.00.

As of August, 2010, all classrooms on campus requested to be multimedia classrooms will be appropriately equipped with computers and projectors for instructors to incorporate into their courses. The cost incurred with this multi-year effort is \$1.22 Million. Instructors are beginning to utilize classroom response systems, slates, and SMARTBoards as part of their efforts to continue to increase student engagement with course content. The classroom technologies are part of a new effort on campus so the cost thus far has only been \$15,000.00. The Center for Learning and Teaching offers multiple learning opportunities for faculty related to strategies for incorporating technology into instruction effectively as well as the use of the College's LMS, ANGEL. Faculty members are also provided multiple opportunities to increase their learning through participation in webinars on identified topics relevant to faculty's professional development goals and objectives. Data will be collected in the upcoming months on the impact of these efforts to assist with the assessment of the expenditure of funds and direct further efforts.

d. The number of FTE faculty in specialized (program major) courses within the curriculum

| FY 2008 | FY 2009 | FY 2010 | |
|---------------|---------|---------|------|
| BIO-2001 | 0.1 | 0.0 | |
| BIO-2003 | 0.1 | | |
| BIO-2004 | 0.3 | 0.3 | 0.3 |
| BIO-2102 | 0.1 | 0.1 | 0.1 |
| BIO-2114 | 0.4 | 0.4 | 0.3 |
| BIO-2125 | 3.1 | 3.4 | 4.5 |
| BIO-2203 | 0.1 | 0.1 | 0.1 |
| BIO-2215 | 2.0 | 2.2 | 2.3 |
| BIO-2234 | 0.9 | 1.9 | 2.1 |
| BIO-2255 | 1.0 | 1.0 | 1.0 |
| BIO-2324 | 0.2 | 0.2 | 0.2 |
| BIO-2343 | 0.3 | 0.2 | 0.3 |
| BIO-2404 | 0.3 | 0.3 | 0.3 |
| CHEM-2114 | | 0.3 | 0.5 |
| CHEM-2115 | 1.5 | 0.5 | |
| CHEM-2124 | | | 0.4 |
| CHEM-2122 | | | 0.5 |
| CHEM-2125 | 0.8 | 0.8 | |
| PHYS-2014 | 0.5 | 0.7 | 0.7 |
| PHYS-2114 | 0.5 | 0.7 | 0.7 |
| PHYS-2223 | 0.1 | 0.1 | 0.1 |
| Science Total | 12.3 | 13.2 | 14.4 |

e. Projected job market for graduates in occupational programs during the next two years.

People with bachelor's and master's degrees are expected to have more opportunities in nonscientist jobs related to biology, in fields like sales, marketing, publishing, and research management. Non-Ph.D.s also may fill positions as science or engineering technicians or as medical health technologists and technicians. Some become high school biology teachers.

Biological scientists are less likely to lose their jobs during recessions than those in other occupations, because many are employed on long-term research projects. However, an economic downturn could influence the amount of money allocated to new research and development efforts, particularly in areas of risky or innovative research. An economic downturn also could limit the possibility of extension or renewal of existing projects.

New chemists at all levels may experience competition for jobs, particularly in declining chemical manufacturing industries. Pharmaceutical and biotechnology firms will continue to be a primary source of chemistry jobs, but graduates with a bachelor's degree in chemistry may also find science-related jobs in sales, marketing, and management. Some bachelor's degree holders become chemical technicians or technologists or high school chemistry teachers. In addition, they may qualify for assistant research positions at smaller research organizations.

Graduates with an advanced degree, particularly those with a Ph.D., are expected to enjoy somewhat better opportunities. Larger pharmaceutical and biotechnology firms provide openings for these workers at research laboratories, and many others work in colleges and universities. Furthermore, chemists with an advanced degree will continue to fill most senior research and upper management positions; however, similar to applicants in other occupations, chemist applicants face strong competition for the limited number of upper management jobs.

In addition to job openings resulting from employment growth, some job openings will result from the need to replace chemists and materials scientists who retire or otherwise leave the labor force.

During periods of economic recession, layoffs of chemists may occur --especially in the industrial chemicals industry. Layoffs are less likely in the pharmaceutical industry, where long development cycles generally overshadow short-term economic conditions. The traditional chemical industries, however, provide many raw materials to the automotive manufacturing and construction industries, both of which are vulnerable to temporary slowdowns during recessions.

In addition to job growth, the need to replace physicists and astronomers who retire or otherwise leave the occupation permanently will account for many job openings. In recent years the number of doctorates granted in physics has been somewhat greater than the number of job openings for traditional physics research positions in colleges and universities and in research centers. Recent increases in undergraduate physics enrollments may also lead to growth in enrollments in graduate physics programs, so that there may be an increase in the number of doctoral degrees granted that could intensify the competition for basic research positions. However, demand has grown in other related occupations for those with advanced training in physics. Prospects should be favorable for physicists in applied research, development, and related technical fields.

Opportunities should also be numerous for those with a master's degree, particularly graduates from programs preparing students for related work in applied research and development, product design, and manufacturing positions in private industry. Many of these positions, however, will have titles other than physicist, such as engineer or computer scientist. People with only a bachelor's degree in physics or astronomy are usually not qualified for physics or astronomy research jobs, but they may qualify for a wide range of positions related to engineering, mathematics, computer science, environmental science, and some nonscience

fields, such as finance. Those who meet State certification requirements can become high school physics teachers, an occupation in strong demand in many school districts. Some States require new teachers to obtain a master's degree in education within a certain time. (See the statement on [teachers --kindergarten, elementary, middle, and secondary](#) elsewhere in the *Handbook*.) Despite competition for traditional physics and astronomy research jobs, graduates with a physics or astronomy degree at any level will find their knowledge of science and mathematics useful for entry into many other occupations.

Despite their small numbers, astronomers can expect good job prospects in government and academia over the projection period. Since astronomers are particularly dependent upon government funding, Federal budgetary decisions will have a sizable influence on job prospects for astronomers.

Occupational Outlook Handbook, 2010-11 Edition (2010) online, retrieved from <http://www.bls.gov/oco/ocos047.htm>

f. The success of transfer students based on GPA comparisons.

The most recent report with detailed transfer information concerns the 2006 transfer cohort at the University of Oklahoma. That report indicates that there were 110 OCCC students (who transferred in as juniors or seniors) in various programs at OU. Their average GPA at OU was 2.71. This compares favorably to the GPA of junior and senior UCO transfers to OU (22 students, 2.74 GPA) and to all other Oklahoma four year institution transfer students (65 students, 2.85 GPA). OU "native student" GPA was not reported. It should be noted that over 18% of transfer students at OU report OCCC as the "last institution attended."

5. Provide documentation that a process exists to insure that cumulative records of educational accomplishment are securely and permanently maintained for every student, and transcripts are issued upon student request.

The Registrar's Office establishes an official record for each student admitted to the college. Cumulative academic records are maintained and archived in compliance with all federal and state requirements and in accordance with American Association of Collegiate Registrars and Admissions Officers (AACRAO) recommendations.

The College complies with the Federal Rights to Privacy Act of 1974, as amended, regarding record integrity, security, access, and the release of Directory Information. Transcripts are issued directly to the student upon request and at no charge.

6. Provide evidence that a formalized and effective process to address student complaints is in place and available to students.

The Student Handbook describes the student grievance procedure. The Student Handbook is published annually so that changes can be made to stay current with all state and federal policies and rules.

Also students may at any time submit questions or complaints in boxes located across campus. The Office of the Vice President for Enrollment and Student Services collects the input from these boxes and addresses the student's question or complaint. The results are given to the student, reviewed by The Leadership Council, published on a public bulletin board in the Main Building of campus, and published in the Student Services Annual Report.

7. Provide institutional recommendations as the result of the program review and planned actions to implement recommendations.

In general this review finds that the Science Program and its many options are in good shape at this time. Students who graduate from OCCC programs in science have little trouble with credit transfer to receiving institutions and are successful at those institutions. Science faculty and staff are highly qualified and dedicated to their professions. The completion of the second floor of the SEM Center in 2006 was critical in addressing the capacity issues noted in the previous program reviews (2005) for Biology, Chemistry and Physics. This review has identified several concerns that need to be addressed to ensure the continued success of our students

Recommendations and Plans:

New classrooms will be needed in the near future. We will once again be at capacity as far as classrooms are concerned in the near future (two to three years). This is not unanticipated. The addition to the SEM Center was meant to meet capacity needs until 2013 (assuming our historic rate of growth). OCCC experienced over 20% growth over the last two years. Science programs have grown at or above this rate. In the near term this need can be addressed through reallocation of existing classroom space and purposeful scheduling. This will entail moving some "prime time" sections to historically less desirable time slots (early morning or mid-afternoon for instance). Ultimately however this is only a delay tactic if OCCC continues to grow by 1 -3% per year on average. A dedicated classroom building with 20-30 additional instructional spaces is needed.

Laboratory materials and facilities need to be continually updated and improved. We will continue to use all resources at our disposal to accomplish this.

More full-time faculty should be hired. With the explosive enrollment growth experienced in the recent past (as a result of the overall College increase in enrollment as well as curricular changes in specific program areas) the number of credit hours taught by full time faculty has fallen below the 50% Institutional benchmark. For the Science program 49% of credit hours are taught by full-time

faculty, however this percentage is a bit deceiving in that it does not take into account the increased workload many full-time faculty have taken on. Only 43% of credit hours are taught by full-time faculty "in load". In other words 57% of credit hours are taught by faculty under adjunct contract. Part of the reason that many full-time faculty have taken on such heavy loads is that it is very difficult to find qualified and quality adjuncts in science. Indeed this lack of teaching capacity has already resulted in the Institution abandoning its historic policy of adding additional sections to meet the demands of increased enrollment. Without additional full-time faculty we will not be in a position to meet the needs of our community. As funding becomes available new faculty positions will be priority budgetary initiatives of the Division of Science and Mathematics.

Adjunct pay rates should increase at the same rate as full-time pay.

Independently Paced (IP) laboratory work should be carefully reviewed and eliminated if appropriate. In recent years IP lab methodology in chemistry classes was shown to decrease student success. Accordingly IP chemistry labs were discontinued. There is also evidence that IP lab students do not do as well as students in group labs in biological sciences. Eliminating IP labs in biological science courses should be pursued. Success rates in IP vs Group labs should be investigated in physics and general physical science as well.

Laboratory staffing should be studied. As things stand now we need to examine scheduling, operating hours and staffing efficiencies. Staffing levels may or may not be impacted if IP labs are discontinued since supervising these labs is the primary responsibility of lab assistants at the present time.

Given the scope of operations in our laboratories and lab centers we need to designate some staff as "senior lab assistants" and give them supervisory functions in the absence of the lab supervisor for their areas. This is true whether we continue to operate the science centers as we do now or move to an all group lab format. Senior Lab Assistant positions can be created with new funding or through re-allocation of funds.

The current, single, science degree should officially be replaced with degrees in biology, chemistry, and physics. This reflects the way OCCC has historically operated and will give the individual programs maximum flexibility. These programs would be presented to the curriculum committee and OSRHE in the fall of 2011.

Increases are needed in equipment/supply/material budgets. It is anticipated that, beginning in FY 12, science lab budgets will be tied directly to the lab fees collected from students. Historically the amount collected has been slightly higher than our budgets so it is anticipated that this will result in small increases in the budgets. This will also mean that increases in enrollment will automatically result in proportional increases in funds. The fee structure (\$15/enrollment) needs to be revisited.

As a result of increasing enrollments and possible changes in the delivery of

laboratory curriculum the current configurations of the Science Centers should be reviewed.

Science faculty and staff recommend that all online science courses contain some element that requires students to present proof of identity to an employee of OCCC or other institutions that are approved by OCCC. This can be accomplished by requiring on campus activities or proctored tests for all students.