

## **Program Review Committee Report**

**Fall 2015**

**Chemistry**

### **GOALS, OBJECTIVES, AND ACTIVITIES**

The mission the University of Arkansas at Monticello (UAM) shares with all universities is the commitment to search for truth and understanding through scholastic endeavor. The University seeks to enhance and share knowledge, to preserve and promote the intellectual content of society, and to educate people for critical thought. This serves as the basis for the goals of the programs housed in the School of Mathematical and Natural Sciences. The specific goals for the School of Mathematical and Natural Sciences are:

1. To provide academic programs which promote the development of professional scientists and mathematicians and provide opportunities for all students to enhance their understanding of the natural sciences and mathematics.
2. To prepare individuals for successful careers in industry and teaching and for graduate studies in science and mathematics
3. To provide curricula for pre-professional studies in dentistry, medicine, optometry, pharmacy, veterinary science, and allied health (physical therapy, radiological technology, respiratory therapy, medical technology, occupational therapy, and dental hygiene).
4. To provide technical and analytical courses to support studies in agriculture, forestry, nursing, education, pre-veterinary medicine, psychology, and wildlife management.
5. To serve the general education program through courses in biology, chemistry, earth science, mathematics, physics, and physical science that provide a basic background for a baccalaureate degree.

The main objective of the Chemistry Program is to offer Bachelor of Science degrees with a major or minor in Chemistry, or to contribute to a double major in Biology and Biochemistry. The program prepares graduates to continue their education in a variety of pre-professional and graduate programs, or for immediate employment in a number of industrial, business, or educational situations. Students are encouraged to consider post-graduate education

upon graduation. The most important objective of the School of Mathematical and Natural Sciences is to help students achieve their educational and career goals.

Faculty members have high expectations in the classroom in all chemistry courses, and they willingly work with students outside the classroom to help them rise to the level of expertise needed to be successful in their course work. They also work closely with students in activities outside the classroom to enhance their overall experience at UAM, and to help them mature into well-rounded students who are involved with their community. Some of these specific activities include Sigma Zeta Math and Science Honor Society, Southeast Arkansas Regional Science Fair (SEARSF), Arkansas Space Grant Consortium (ASGC), Medical Science Club, UAM Tutoring Center, UAM Research Program for Minority Students (UAM-RPMS), external scientific research, Arkansas Academy of Science and Arkansas Idea Network for Biomedical Research and Education (AR-INBRE).

An important goal in the Chemistry program is to provide support courses for other majors and for the General Education program. All majors are required to pass eight hours of science (including laboratories) at the 1000 level or higher, and all of our freshman-level courses are acceptable options for this requirement. CHEM 1023, Introductory Chemistry, and CHEM 1031, Introductory Chemistry Lab, are most often used to help fulfill this requirement. Some students choose CHEM 1103 General Chemistry I and CHEM 1121 General Chemistry I Lab to fulfill one of the lab science requirements. In addition, there are several majors and minors at UAM that require specific Chemistry courses beyond the general education requirement (Table 1).

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**Table 1—Chemistry Classes Required for Other Majors and Minors at UAM**

Agriculture (General Agriculture Option, Agri-Business Option, and Plant & Soil Science Option) – 2 courses
Agriculture (Animal Science Option) – 3 courses
Biology – 4 courses
Biology (Organismal Option) – 4 courses
Education (Middle Childhood, Science Concentration) – 1 course
Education (B.S. Health and PE, Non-Licensure) – 1 course
Education (Exercise Science Option) – 1 course
Forestry and Natural Resources – 1 course
General Studies (Chemistry Emphasis Area) – 2 courses
Land Surveying (Associate of Science or Bachelor of Science) – 1 course
Natural Science Major (All options) – 2 courses
Natural Science Major (Physical Science Option, with Chemistry emphasis) – 5 courses
Natural Science Minor (with Chemistry option) – 2 courses
Nursing – 1 course

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Graduates of the Chemistry program may advance to professional schools such as medical school, dental school, pharmacy school, and to other health-related programs. Some graduates enter graduate school, teaching programs, or positions in industry. Applicants to the University of Arkansas for Medical Sciences who come from rural areas (including all of southeastern Arkansas) are given extra consideration for acceptance to the medical school, and may receive partial or complete tuition relief. Graduates of the UAM Chemistry program are in demand by medical schools; 22 of the last 24 med-school applicants have been accepted during the last 10 years. In addition, the demand for UAM pre-pharmacy students is very high. There are two pharmacy schools in Arkansas (at UAMS and Harding), and many UAM graduates are accepted at both. As with pre-medicine students, the vast majority of UAM pre-pharmacy students are accepted to pharmacy school upon application. Over the past ten years, 33 out of 34 applicants from UAM have been accepted in pharmacy programs. School districts throughout the region regularly solicit the UAM School of Education and the Dean of Math and Sciences for possible applicants. Many graduates of the UAM Biology program have entered M.A.T. programs (including the one at UAM), and almost without exception have a job waiting upon completion of the program.

Demand for the Chemistry program has generally remained strong through the last ten years, with some fluctuation from year to year (Table 2). Since 2009, most of the pre-medicine

and pre-pharmacy students have chosen a double major in Biology and Biochemistry. Since some students are listed as pre-medicine or pre-pharmacy majors until they complete their degree in chemistry, it is a better measure to show the number graduating with a chemistry degree (Table 3). The Biochemistry Option of the B.S. Chemistry degree was started in 2009. Since that time, the program has grown tremendously.

Table 2.—Number of Chemistry Majors per Year

	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>
Total	14	16	14	12	11	18	14	18	25	28

Table 3.—Number of Chemistry Graduates by Year

<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>10 Yr Ave</u>	<u>3 Yr Ave</u>
2	1	2	4	4	6	5	6	11	12	5.3	9.7

In terms of the number of graduates, the most recent three-year average is near double the ten-year average. This is largely due to the popularity of the Biochemistry Option added in 2009. Course enrollments have paralleled that trend. Since 2005, when there was a large Introductory Chemistry class, total enrollment remained pretty level for the next several years. In the past few years there has been a clear trend of enrollment growth (Table 4).

**Table 4.--Enrollment in Chemistry Lecture Courses Offered Each Fall Semester**

	F05	F06	F07	F08	F09	F10	F11	F12	F13	F14
Totals	279	230	242	235	237	239	228	257	269	297

## CURRICULUM

Even though the UAM Chemistry department is not an American Chemical Society approved program, the curriculum is modeled after the ACS recommended program. UAM is one of few universities in Arkansas that uses ACS standardized final exams for many of its courses as a standard for assessment.

Chemistry faculty members continually review the curriculum in an effort to meet the needs of Chemistry majors and pre-professional students. This goal is achieved in a number of different ways. All Chemistry faculty members are encouraged and expected to participate in regular professional development to stay current in their respective fields of expertise. Faculty members are given time to attend professional meetings and workshops, and the School of Mathematical and Natural Sciences maintains a budget to pay the cost of attending these meetings. Besides the obvious benefit to individual faculty of professional renewal, meeting attendance allows faculty members to be exposed to the newest trends within the field, and allows them to network with instructors from other universities and to be exposed to new ideas for curriculum development.

The Chemistry Department at UAM is relatively small. Although there are disadvantages associated with small size, the Chemistry Department uses its size to the advantage of students. With the small number of faculty, all faculty are involved with curriculum changes and planning at all levels.

In addition, faculty members in Chemistry constantly monitor requirements for various post-graduate programs to ensure that the curriculum contains all required courses and all necessary material within those courses. In 2009, the Biochemistry Option of the B.S. Chemistry degree was added. It has been hugely successful. Since its addition, acceptance rates of the Biochemistry Option graduates into professional and graduate programs is near 100%. In 2012, a Pre-Veterinary curriculum was established by determining the requirements for every vet school in the region. Many UAM pre-vet students now opt for the Biology/Biochemistry double major.

As with all universities in the state of Arkansas, UAM is required by law to provide a curriculum which makes it possible for a student to enroll in a reasonable number of courses each semester and to fulfill all the requirements for a degree within four academic years.

Although pre-professional programs are excluded from these requirements, the department has arranged our schedule so that students can receive a traditional Chemistry degree with a minor, a Biochemistry Option Chemistry degree with a minor, or a Biology/Biochemistry double major in four academic years.

Students who arrive at UAM with a sufficient background in chemistry and mathematics are advised to take General Chemistry I and lab. Students that require remediation in mathematics or have not had a sufficient high school chemistry course are encouraged to take Introductory Chemistry lecture. Currently, this is done through academic advising; however, there has been some thought of setting a minimum ACT requirement for entry into General Chemistry. For the students that need to start in Introductory Chemistry, it is more difficult to complete either Chemistry degree within four academic years unless the student attends summer school. Likewise, students who transfer from other universities, or those who declare Chemistry or Biochemistry as a major after their first semester, may have difficulty completing a degree within four years. However, every effort is made to help these students catch up through aggressive advising, and enrollment in summer courses.

The Chemistry schedule operates on a two-year cycle. Most courses are offered at least once per academic year; however, the two semester physical chemistry sequence (CHEM 4704 Thermodynamics and CHEM 4714 Kinetics and Quantum Mechanics), Instrumental Analysis and some upper-level electives are available every other year.

The Bachelor of Science degree in Chemistry requires 120 hours, which includes 35 hours of General Education program, the Bachelor of Science identity requirement, 36-37 hours of major requirements and 21 hours of supportive requirements. A minor is also required for the Chemistry degree. Electives may be needed to reach 120 hours, depending upon the minor; most Chemistry majors who do not double major in Biochemistry minor in Mathematics or Physics, which can be completed in 9 or 10 additional hours, respectively above the required supportive requirements.

The Bachelor of Science degree in Chemistry, Biochemistry Option requires 120 hours, which includes 35 hours of General Education program, the Bachelor of Science identity requirement, 35-36 hours of major requirements, and 38 hours of supportive requirements. A minor is required; however, with so many biology hours included in the supportive requirements

a biology minor can be completed by taking either Botany and lab or Zoology and lab. A Natural Science minor can be completed by taking both Botany and Zoology with labs.

The Chemistry minor includes 20 hours of required courses, plus four hours of upper-level Chemistry electives, for a total of 24 hours.

#### **PROGRAM FACULTY (FULLTIME/ADJUNCT/PART-TIME)**

Chemistry faculty members continually review the curriculum and make appropriate adjustments. Whenever a curriculum change is needed, Chemistry faculty members discuss the changes and construct a proposal. Individual faculty members who wish to assemble new classes may also construct a proposal. Such proposals are reviewed by the entire Chemistry faculty before further submission. The proposal is reviewed by the Dean of Math and Sciences. When approved, the Dean submits the proposal to Academic Council, which is a group that includes the Deans of all units, the Registrar, and the Vice Chancellor of Academic Affairs. A review period of ten days begins at this point. This procedure ensures that all academic deans are aware of the consequences to their own programs before the new course is reviewed by the Curriculum and Standards (C&S) Committee of the Faculty Assembly. This ten-day review process usually affords sufficient time for minor issues to be resolved. The proposal is reviewed at an Academic Council, which meets approximately 8 times per semester. With Academic Council approval, the proposal is forwarded to the C&S Committee. The School of Mathematics and Natural Sciences representative then presents the proposal to the C&S Committee. Occasionally, the Dean or a faculty member will attend the meeting to answer any questions that may arise. With approval of the C&S Committee, the proposal is forwarded to the Faculty Assembly where it is brought to a vote. Once it has received the approval of the Assembly, the proposal is reviewed by the Chancellor, the Board of Trustees, and then the Arkansas Department of Higher Education. Once all approvals have been made, the proposal is sent back to the Registrar's Office for final operation and inclusion into the official catalog. If the proposal does not meet the approval of any of the required committees, it may be returned to the Department for review and revision. Note that the procedure for graduate-level courses is

identical, except that such proposals are submitted to the Graduate Council rather than the C&S Committee.

The School of Mathematical and Natural Sciences' Chemistry program consists of one quarter-time and five full-time faculty members. Dr. J. M. Bramlett, dean, serves as the quarter-time faculty member, which is the required course load for those serving as dean.

Faculty members include one professor/dean (J. M. Bramlett, Ph.D.), two associate professors (Jinming Huang, Ph.D. [Dr. Huang is currently away conducting research at Wake Forest University], and Jeff Taylor, Ph.D.), one assistant professor (Andrew Williams, Ph.D.), one instructor (Kelley Sayyar, M.S.) and one lab instructor (Susan Hatfield, M.S.). Because chemistry falls under the School of Mathematical and Natural Sciences, other faculty members provide their expertise as it relates to chemistry. All tenure-track faculty have terminal degrees. All faculty members have significant experience outside academia relating to their teaching fields, and all faculty members regularly undertake professional development and scholarly activities in order to maintain currency. All faculty members have also engaged in significant university and community service.

All new faculty in chemistry undergo the official university orientation process offered during the Faculty Development Week preceding the fall semester. New faculty also partake of follow-up workshops focused on topics such as academic advising. Faculty undergo an annual evaluation process that consists of an evaluation report reviewed by colleagues, and student course evaluations. Classroom evaluations are also part of this process. These various evaluations are reviewed by the dean to complete an annual performance review, which is then discussed with the faculty member and forwarded to the Provost.

Faculty, in chemistry, teach approximately 12-15 hours per semester. Credit hours per instructor vary based on rank and the needs of students. Opportunities to teach overloads and summer courses are also available.

## PROGRAM RESOURCES

Institutional support available for faculty development in teaching, research, and service include encouragement for faculty to develop special topic courses, financial incentives for the development of hybrid and online courses, technical support in instructional software, and access to “smart” classrooms in the Science Center. Additionally, competitive faculty research grants are available to faculty through the university. Almost every tenured faculty member in the Chemistry department has received one of these grants; several have won multiple grants. Finally, faculty members are encouraged to serve on university committees.

The Chemistry department has been very active in professional development activities. A large portion of the School of Mathematics and Natural Sciences faculty development money is used by the faculty members each year to attend professional meetings. Additional departmental funds are also used for faculty development. The report includes a table with 47 entries detailing professional development activities undertaken by the faculty over the past two years.

The Fred J. Taylor Library and Technology Center’s collections comprise over 500,000 books, bound periodicals, microforms, government documents, and serial subscriptions. Many items are now available through on-line full text database resources (e.g., ScienceDirect, SpringerLink). The total budget for the entire School of Mathematics and Natural Sciences is \$15,000 and is spent on books, e-books, journals, e-journals, and databases.

Campus resources for the department include “smart” rooms for instruction, a computer lab for students, a Tutor Center, printed and electronic resources in the library, and consultations with reference librarians. The UAM administration has also directly supported student and faculty research by providing matching funds for grants awarded by Arkansas INBRE. Over the last several years, an Infrared Spectrometry, a UV-Vis Spectrometer, a workstation for molecular modeling, and miscellaneous laboratory supplies for teaching labs and undergraduate research have been purchased with these AR-INBRE awards.

The following chart is a list of equipment purchases for the Chemistry department over the last three years. Note that this list does not include computers or audio-visual equipment for use in faculty offices, laboratories, or classrooms.

<b>Item Description</b>
Molecular Modeling workstation and software
Furnace
Oakton pH Meter
UV-Vis tabletop spectrophotometer
Water Distillation Unit (shared with Biology)
Oakton pH Meter
UV-Vis tabletop spectrophotometer
Nitric Oxide Analyzer (used)

## **INSTRUCTION VIA DISTANCE TECHNOLOGY**

The School of Math and Sciences strongly feels that face-to-face course instruction is far superior to on-line or even Compressed Interactive Video (CIV) courses. The department has purposely avoided offering chemistry courses using this medium. They have focused attention on providing top-notch face-to-face courses for students. Faculty members are not discouraged from developing on-line or hybrid courses; however, very little has been done in this area. No courses within the Department of Chemistry are currently offered by distance delivery. The following questions are answered based on University policies, but are not applicable to this program.

The UAM campus governance and academic approval processes are followed for any new course added to the curriculum. Any new degree program, regardless of the method of delivery (distance technology or not) must be reviewed by the faculty, approved by the academic unit dean, the Academic Council, Assembly, Chancellor, the University of Arkansas Board of Trustees, and the Arkansas Department of Higher Education Coordinating Board prior to implementation.

The UAM Office of Academic Computing is responsible for the management and maintenance of the learning management system server and must communicate with the Office of Academic Affairs regarding available space in classes and other administrative concerns.

Additionally, the Office of Academic Computing is responsible for providing technical assistance to the faculty who teach online courses.

University of Arkansas at Monticello faculty and students have access to infrastructure and technology that includes intranet, Blackboard, Compressed Interactive Video, broadband Internet, and access to the online catalog, electronic books, and journals available in the Fred J. Taylor Library and Technology Center, as well as web-based mediums. Regular funding is part of an ongoing process that includes technology upgrades, software licensing, and technical support. UAM recently completed an eight-year plan to provide a technology infrastructure that increased the University's academic competitiveness. This plan included Level One technology certification for all buildings on all three campuses.

The UAM Information Technology Department sets forth guidelines for the protection of personal information following information security policies regulated by the State of Arkansas security recommendations. These guidelines state that UAM can only collect personal information through a secure link and with prior approval from the individual involved. Personal information cannot be stored on the course management system by the students or faculty. The Office of Academic Computing regularly scans web sites for the presence of personal information.

Online students receive the same advising support as students taking courses on-campus. Advisors are available via published contact phone numbers and e-mail and are always ready to help students with preparation for registration. In regard to course registration, students who are registering for only online courses are directed to contact the UAM Office of Academic Affairs for support and assistance. For financial aid for distance education students, students may complete the Free Application for Federal Student Aid (FAFSA) online and can view their financial status via WeevilNet. UAM does not currently allow students to accept aid via WeevilNet; however, that is planned for the near future. Requested verification documents, loan requests, and award acceptance letters can be submitted via mail, e-mail or fax rather than through a personal visit. In regard to course withdrawal, students are directed to contact the institution's director of Academic Advising for support and assistance.

Online students may access library resources in the same fashion as other students. The Library website is linked on the main UAM homepage, and provides distance education students access to Subject Guides, Library Guides, the Library catalog, an extensive list of databases, and

a tool for searching magazines, newspapers, and journals for information. The Library webpage also provides contact

Support services are provided to students enrolled in distance technology courses primarily by the Office of Academic Computing. Faculty members also assist with issues with which they are familiar to help share resolutions. The Office of Academic Computing supports distance technology courses with training workshops on how to use Blackboard, online tutorials, e-mail forms for support, and by providing contact phone numbers for the Support Center, and a web option for Live Chat with support personnel. Blackboard training workshops are now required for all students using any form of distance education.

Institutional policy in regard to orientation for distance technology courses is as follows (from UAM Faculty Distance Education Handbook):

“Conduct an orientation (online) in each course at the beginning of each term to ensure each student understands the requirements of the course and can access the course. Advise students of the time and energy demands of the course as well as establishing clear limits on what the course is and is not.”

Each faculty member interprets this orientation process in a slightly different manner, but all complete the requirements to ensure students understand how to use the software, view the syllabus, utilize the calendar and discussion boards, and how to access other software features.

In addition, all students utilizing any form of distance education are required to undergo training through a mandatory e-mentoring course. UAM has developed a fully electronic version of the E-Mentoring program that is accessible at the students' convenience. Students learn the fundamental computer-related skills needed to succeed at UAM, including how to log on to WeevilNet (the student management system), how to access their UAM e-mail accounts, how to use Blackboard, and how to use electronic library resources.

In regard to faculty course load, again referring to the UAM Faculty Handbook: “The course load for fulltime faculty holding the rank of instructor is 15 semester credit hours. The course load for fulltime faculty holding the rank of Assistant Professor or above is 12 semester credit hours.”

Distance education courses are treated as part of faculty's standard workload. Thus, distance technology courses are viewed the same as classroom courses in the area of workload, credit hours taught, and compensation. Faculty members are given a special one-time incentive payment for development of each new on-line course that they teach.

In regard to ownership of intellectual property in the area of previously copyrighted materials, the UAM Distance Education faculty handbook sets forth the following guidelines for the use that all faculty must abide by: “Under Section 107 of the copyright law ([www.lcweb.loc.gov/copyright](http://www.lcweb.loc.gov/copyright)) passed in 1976, educators are given special exemptions from the law under the Fair Use Doctrine (<http://fairuse.stanford.edu>). Educators may use copyrighted works without first obtaining permission of the copyright holder, within limits. There are four criteria for determining whether copyrighted materials have been used legally under this doctrine: (1) Purpose and character of the use; (2) Nature of the materials used; (3) Amount and importance of the part used; and (4) Effect on the market of the use. This site ([www.cetus.org/fairindex.html](http://www.cetus.org/fairindex.html)) shows illustrations of the amounts of copyrighted work that may be used under the Fair Use Doctrine.

The Technology, Education and Copyright Harmonization Act (TEACH Act) passed in 2002 expands the Fair Use Doctrine to cover distance education. Generally, exemptions given for face-to-face instruction will apply to online instruction. Please visit the American Library Association website for more information.

## **MAJORS/DECLARED STUDENTS**

The number of Chemistry majors has gone up 50% over the last three years largely due to the growth of the Biochemistry option within the Chemistry Major. Students have been successful transitioning into professional and/or graduate programs by declaring the double major of Chemistry/Biochemistry.

The program has developed a multifaceted approach to recruitment, retention, and graduation. Recruitment involves visits to local middle and high schools, and training of students and faculty in the AP Chemistry exam. Events on the UAM campus are also part of the recruitment plan. Retention and graduation involves: e-Mentoring; First Four Weeks Program; First-Year Experience Program; help from Student Services; and, remediation. Academic advising and tutoring are also important facets of retention and graduation.

There were six graduates of the UAM Chemistry program in 2013, 11 in 2014, and 12 in 2015, or an average of 9.7 per year. This is up considerably from the 10-year average of 5.3. Eight of these graduates from the past three years are students that received early admission into medical school or pharmacy school and were allowed to transfer courses back to UAM in order to complete their chemistry degree.

## **PROGRAM ASSESSMENT**

The School of Mathematics and Natural Sciences uses four primary means for assessment of students as they work through the program and as an annual assessment of the program itself. First, students are evaluated by course examinations and projects. Secondly, several chemistry courses use the American Chemical Society standardized final exams. Even though many of the universities that utilize this exam are private, and highly exclusive in nature, UAM students have achieved an average score at or above national average on many of these exams. Currently, the ACS exams are being used in General Chemistry, Organic Chemistry, and Biochemistry.

Thirdly, junior and senior students often take a standardized exam involving chemistry, including the MCAT pre-medical examination, the PCAT pre-pharmacy exam, the DAT pre-dental exam, or the OAT pre-optometry exam. Each exam has one or more sections that are specific to chemistry, or include chemistry as a major component. Others may take the GRE, as a prelude to application to graduate school or veterinary school. Students are strongly encouraged to report results of these exams to the School of Math and Science, specifically so that the scores can be used to assess program effectiveness.

Fourthly, Chemistry Advanced Lab Techniques, CHEM 4742, has evolved into the capstone course required of all Chemistry majors that have not done undergraduate research and present their findings at a professional meeting. Students in the course must write a research paper and give an oral presentation, demonstrating knowledge and understanding in a specific area of chemistry. Some of these students also present their work at a state, regional, or national meeting.

Finally, the program is assessed by placement of the graduates. Most graduates are successful in finding positions. A large percentage of UAM Chemistry students who have

applied to medical schools and pharmacy schools over the last 10 years have been accepted (although not all made it on the first try). Every student who has applied for graduate school in the last ten years has been accepted. Some students have applied to MAT programs; again, the acceptance rate is very high. A few have gone into private business or industrial positions.

In addition to these methods of assessment, the Chemistry program undergoes an annual assessment reporting process whereby faculty assess the program on the basis of student learning outcomes and how they relate to the mission of the University, student performance and evaluation, and program efforts in the area of student retention. This report is submitted to the Provost each August. The assessment of the Chemistry program appears to be sufficient.

Advanced Lab Techniques has evolved into the capstone course for the chemistry majors. Topics that are fairly modern and specialized are covered in different segments of the course. The student must review literature related to that topic, write a research paper, and do a 10-15 minute presentation to their peers and faculty. Since this course is team taught with each faculty member teaching a different segment, the students will study a wide variety of topics and learn skills that will help them in a graduate program.

Teaching evaluation is one of the main components of the faculty evaluation process. Courses are evaluated through classroom observation by the Dean of the School of Mathematical and Natural Sciences and peer faculty, and by student evaluations. Student evaluations are an important means of feedback. Students are asked to evaluate themselves as a student, the instructor, and the course itself. Student evaluation of teaching is accomplished through a secure online survey operated by CourseEval. The evaluation is being transitioned to Blackboard during the 2015-2016 academic year, but the evaluation process will be the same.

There have been very few transfer students entering the program, and most of those have had very few courses in Chemistry above the general education core. All eligible courses follow the requirements of the Arkansas Course Transfer System, which sets standards for transfer of coursework in general education and some other courses between public universities in Arkansas.

The faculty works closely with all Chemistry majors to make sure they are advised into the proper courses for the pathway they have chosen. Over the past three years, 8 chemistry majors have been accepted into medical school, 12 have been accepted into pharmacy school,

one has been accepted into dental school, one has been accepted into veterinary school, 5 have been accepted into graduate school for chemistry or other sciences.

Each year, graduating seniors are invited to an exit interview with the Dean of the School of Mathematical and Natural Sciences. While the program noted that “many” students take the exit interview, it did not provide aggregate results, but a list of questions and the “most common responses” which were not quantified.

The School of Mathematical and Natural Sciences has not conducted any sort of employee satisfaction survey concerning graduates. However, constant contact with administrators and recruiters at professional schools indicates that UAM students are usually successful upon matriculation. Graduates of UAM are recruited strongly by medical schools such as UAMS and William Carey, and by pharmacy schools including UAMS, Harding, and UT-Memphis. The School of Math and Science works closely with school districts in the area, and its students are often hired as teachers of chemistry or other sciences. UAM students are widely praised by school administrators for their content knowledge.

Arkansas has an extremely strong demand for health-care professionals, including doctors and pharmacists. This area of the state has an exceptional high need for those professionals. The Chemistry faculty constantly monitors the requirements for medical and pharmacy schools (as well as dental, veterinary, graduate, and other post-baccalaureate programs) to ensure that the curriculum is properly aligned with these schools. The Dean and Chemistry faculty remain in constant contact with school districts in the area to ensure that demand for teachers is met. Various industries in southeastern Arkansas call and inquire about graduates anytime a position is open. The curriculum is broad enough, with two different degree tracks that graduates are well-prepared for entrance into a professional program in health care, an industrial laboratory, or education.

While a few students entered the private sector, data provided by the program for the last ten years indicates that the vast majority of Chemistry and Biochemistry students have continued their education at medical schools, dentistry schools, and, by far the most common, Pharmacy schools.

A major strength of the Chemistry program is the devotion of the faculty who are continually in search for better methods to serve the students. The faculty is extremely student-focused with virtually every activity conducted with student in mind; this student focus extends

to faculty research programs and service activities. Additionally, this attitude extends not just to Chemistry majors, but also to all students of the School of Math and Science, and to all students who take classes in the department. Another strength of the program is the strong relation with other science faculty. Their collegiality extends to Chemistry, Mathematics, Physics, and Earth Science faculty.

In 2009, the Biochemistry Option of the Chemistry degree was started. Since its inception, it has been highly successful. The addition of this major has greatly increased the number of majors and graduates and graduates from the group have near a 100% acceptance rate into professional programs and graduate school.

Another strength of the Chemistry program is the support received by the program from administrators and staff across the University. The Dean of the Math and Science is a chemistry faculty member that very much enjoys teaching. The Admissions department works closely with Chemistry to recruit top-notch students and to find scholarship or other financial aid for deserving students. Upper administration recognizes the quality and success of the program and has moved to support it.

The annual budget to support the School of Math and Sciences is \$10,000. While appreciated, this sum is not enough to support Math, Physics, Geology, Biology, and Chemistry equipment requests and purchases. Faculty members in Chemistry regularly apply and receive grants to support research and the purchase of equipment. Two years ago, a plan was implemented where part of the \$10,000 budget would be set aside in order to make larger purchases in the future.

The physical facilities are dilapidated and are too small to cope with growth in size and number of classes. Additionally, the physical facilities have limited storage space, resulting in creative storage of non-hazardous materials. The number of Chemistry faculty has been the same for the past several decades. With enrollment today twice as much as it was three to four decades ago, the decision to maintain the size of the Chemistry faculty has resulted in larger sections, even with more sections being taught. With the increase in students and the stagnant state of faculty positions for the division, faculty have little time for research or other scholarly activities. Science faculty are underpaid compared to faculty at similar institutions in the state and across the region, which has led to a decrease in morale and difficulty in hiring faculty when an opening becomes available. Finally, due to the present calculation of teaching loads, faculty

members receive no credit for one-on-one research training with students. The program has reached a point where most of the faculty members are unable to take additional students because they lack research space, equipment, and time.

The Department of Chemistry, its faculty, and its students have been consistently successful for the last decade. Faculty members continue to receive nominations and awards for teaching, student research results in awards and publication of results, and students continue to be accepted into post-graduate programs at an extremely high rate. Students involved in the Biochemistry option of the Chemistry degree have taken advantage of the new additions in the Biology upper level courses. Molecular Biology, Immunology, and Pharmacology are very popular electives for the Biochemistry Option students.

Planned program improvements include building a new Science Center contingent upon funding, building a new Botanical Research and Herbarium building that will house the UAM Sundell Herbarium, a new laboratory space, a library and conference room, and office space, and renovating portions of the Turner Neal Museum of Natural History. The funding for the Herbarium and renovation of the Museum of Natural History has already been secured. Improvement to equipment holdings will continue to be made via equipment grants from the Arkansas IDEA Network for Biomedical Research Excellence, a portion of the \$10,000 budget allotted to the School of Mathematics and Sciences, the UAM Centennial Fund and private donations.

#### **Institutional Program Review Committee**

Victoria Fox, School of Mathematical and Natural Sciences

Paul Francis, School of Agriculture

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Jeff Longing, School of Education

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