

# **Annual Assessment Report**

**2008-2009**

**School of Mathematical and Natural Sciences**

**August 8, 2009**

**Updated: May 17, 2009**

The assessment report is available through the School homepage at [http://www.uamont.edu/Math\\_and\\_Sciences/annualreports.htm](http://www.uamont.edu/Math_and_Sciences/annualreports.htm).

### **I. Learning Outcomes**

A student who graduates from UAM with a major administered by the School of Mathematical and Natural Sciences should:

1. Be able to clearly express mathematical and/or scientific ideas in oral and written communication;
2. Be able to demonstrate the ability to apply scientific and/or mathematical concepts to real world situations;
3. Have a core knowledge of the major discipline;
4. Be prepared for immediate employment in a scientific, technical, medical, or educational environment;
5. Be prepared to enter graduate or professional school in the appropriate area.

## II. Linkage of Learning Outcomes to the Mission of UAM

UAM MISSION STATEMENT	Unit Learning Outcomes
<p>The mission the University of Arkansas at Monticello shares with all universities is the commitment to search for truth, understanding through scholastic endeavor.</p>	
<p>The University seeks to enhance and share knowledge, to preserve and promote the intellectual content of society, and to educate people for critical thought.</p>	2, 3
<p>The University provides learning experiences that enable students to synthesize knowledge, communicate effectively, use knowledge and technology with intelligence and responsibility, and act creatively within their own and other cultures.</p>	1, 2
<p>The University strives for excellence in all its endeavors. Educational opportunities encompass the liberal arts, basic and applied sciences, selected professions, and vocational/technical preparation. These opportunities are founded in a strong program of general education and are fulfilled through contemporary disciplinary curricula, certification programs, and vocational/technical education or workforce training. The University assures opportunities in higher education for both traditional and non-traditional students and strives to provide an environment that fosters individual achievement and personal development.</p>	4, 5

### **III. Communication of Learning Outcomes to Prospective and Current Students**

The assessment report is available through the School homepage at [http://www.uamont.edu/Math\\_and\\_Sciences/annualreports.htm](http://www.uamont.edu/Math_and_Sciences/annualreports.htm).

One section of all School course syllabi is course objectives. These include the learning objectives as they relate to the specific course. Copies of three typical courses syllabi are included in Appendix II

The mission of the School as it appears in the Catalog is:

The mission of the School of Mathematical and Natural Sciences is to offer specialization in biology, chemistry, mathematics, and natural science and to provide opportunities for all students to enhance their understanding of science and mathematics. Curricula offered in the School prepare graduates for careers in industry and teaching, for graduate studies, and for admission to professional programs including allied health, dentistry, medicine, optometry, and pharmacy. This mission is fulfilled through the following goals:

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, 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, physical education, pre-veterinary medicine, psychology, and wildlife management.
5. To serve the General Education program through courses in astronomy, biology, chemistry, earth science, mathematics, physics, and physical science that provide a basic background for a baccalaureate degree.

#### IV. Evidence of How Students Have Achieved Learning Outcomes Goals.

Provide specific evidence of how your unit assesses whether students have achieved your unit's student learning outcomes. (Examples: pre/post tests, post tests, capstone courses, surveys, graduate rates, etc.) Address historical patterns or trends.

During the past year, a study was done on placement of chemistry graduates at UAM. Appendix IV is a list of chemistry graduates with name removed, by year and post graduate placement. These students have been very successful in the post baccalaureate endeavors, reflecting the quality of the chemistry program.

Biology, chemistry, and mathematics all have capstone courses. The courses all have a writing component as well as seminar. The students must gather information, produce an original review of literature and discussion. An oral presentation is then based on this paper. Some students use their work in the undergraduate research labs as the basis for their paper and seminar. Some also present their work at state, regional, and even national meetings. In the past year, three students presented their work at state, local, or national meetings. The following table indicates where the talks were given:

<u>Student Identifier</u>	<u>Major</u>	<u>Where Presented</u>
A	Biology	Idea Network of Biomedical Research Excellence (INBRE)
A	Biology	Arkansas Academy of Sciences
B	Pre-Med/Biology	Alpha Chi National Meeting
C	Chemistry	UA Undergrad Research Experience Conference

Graduates planning to attend professional or graduate school must take a national test, MCAT, OAT PCAT, or GRE. This provides information on the subject knowledge of the student compared to that of graduates of other schools. It is requested that students provide a copy of test scores in order to receive committee recommendations. Students that do not apply to these programs are not likely to take one of the exams listed above. This year, one student took the Optometry Admissions Test (OAT). The student performed exceptionally well, scoring a perfect score on the Organic Chemistry portion of the exam. The student was 60<sup>th</sup> percentile in Reading Comprehension, Biology, General Chemistry, Organic Chemistry, Physics, and Total Science. Quantitative Reasoning was the only segment of the exam in which the student scored below national average. Three pre-pharmacy students had scores reported back to UAMS. All three scored above 50<sup>th</sup> percentile nationally. Some did better in chemistry and quantitative reasoning, others did in Biology and Reading Comprehension. Two of the three were accepted to UAM, and also other schools. The third was lacking necessary pre-requisites and will be applying in 2010. As a whole, UAM students have a trend of doing very well in the Chemistry portion of the exam. These trends are probably due to the fact that the General Chemistry courses across the nation are all very similar in what is taught, and the test follows that material very closely. It does in fact indicate that our General Chemistry courses are doing a good job preparing students for this exam. One administrator at the UAMS College of Pharmacy says that the scores on the Chemistry section of the test usually reflect the amount of rigor in the General Chemistry sequence. A recent UAM student that took the Pharmacy College Admissions Test (PCAT) that took the General Chemistry sequence at a nearby two year school scored only 43<sup>rd</sup> percentile nationally. The addition of the Principles of Biology sequence has caused an improvement in the scores in this area over the past few years. Before the Principles sequence was implemented, scores typically ran 40-60 percentile in biology, but since the

implementation of the Principles sequence, scores are slightly higher, being in the 50-80 percentile range. This year, one student scored above 80<sup>th</sup> percentile in Biology, with the others scoring 66<sup>th</sup> and 76<sup>th</sup> percentile nationally. The Verbal portion of the exam tends to be boom or bust, depending on whether the student is a life-long reader. This year's group all scored near the 60<sup>th</sup> percentile on this portion of the exam. This portion of the exam is affected least by the amount of preparation put in prior to taking the exam. Three students took the Medical College Admissions Test (MCAT), and two students scored among the highest scores ever from UAM. One student scored exceptionally high in the Life Sciences area, while the other scored well in the Physical Sciences. Neither scored exceptionally well on the verbal portion of the exam, finish at or just below national average. The third student scored near national average on all sections except for Verbal Reasoning, in which the score was very low. Three students took the GRE exam over the past year. All three had near identical scores, performing near the national average on the quantitative areas, with scores near 33 percentile on the verbal sections of the examination. Some consideration is being given to requiring ALL graduates to take the GRE, or other nationally compared examination. See Appendix VI for scoring reports with names removed..

Several disciplines use a common final examination to evaluate the overall success of a course. Chemistry uses American Chemical Society developed tests in General Chemistry and Organic Chemistry. This year, the scores on the ACS Organic Chemistry final exam are exceptional. UAM students have an average score well above the national average, with this year's average being 59<sup>th</sup> percentile. On the ACS General Chemistry final exam, the students have not done as well. This year's average was 45<sup>th</sup> percentile, which is down slightly from 49<sup>th</sup> percentile scored last year.

Mathematics uses a locally developed common examinations for all sections of Introduction to Algebra, Intermediate Algebra, College Algebra, Survey of Mathematics, and Trigonometry. Item analysis of the final exams in the Mathematics courses are reviewed at the end of each semester, and recommendations are made for future semesters.

## **V. Measures of Student Performance**

Provide evidence of the measures of student performance that your unit collects and analyzes regularly (Examples: retention rates/pass rate for classes, teacher made tests, research papers, recitals, field experiences, etc.). Give specific examples of how analyses of student performance have been used to improve unit decisions.

Each of the multi-section mathematics courses has a course committee. The committee consists of the instructors for the course one of whom is designated as the course coordinator. The committee is in charge of the course. This consists of developing/revising the syllabus, reviewing and revising procedures for the course, exploring alternate delivery systems, developing the tests and final examination, and reviewing results to begin the process again for the next semester. At the end of each semester, the results from the final examinations are carefully reviewed. The concepts in which the students performed poorly are noted. These concepts are given more time and attention the following semester and the instructors discuss different approaches for teaching the concepts. Sometimes concepts are moved from College Algebra to Intermediate Algebra (or Intermediate to Introductory Algebra, etc.) depending on their relevance to the particular course. One example of this occurred in Spring 2006 with

graphing linear functions. This concept is very important for Intermediate Algebra and was not receiving due time. Therefore, graphing is now taught in Introductory Algebra and merely reviewed in Intermediate Algebra.

Students in all sections of Introduction to Algebra, Intermediate Algebra, Survey of Mathematics, College Algebra, and Trigonometry all take the same final examination for each course. This does not provide data for comparison to other schools but does provide an internal measure which assists the faculty in modifying the courses to improve student performance. The course committee analyzes the results and then strives to make changes which will improve student performance in the course. Normally these changes are at the “micro” level i.e. they involve small changes of emphasis within the specific course but the changes may impact the entire sequence of courses. This is an on-going process but the most major changes occur during the planning period prior to the start of fall classes. This offers an opportunity for the faculty to reflect upon the interrelationships of these courses. At this point it is not unusual for topics to be shifted from one course to another.

During the 2008-2009 academic year, there has been much discussion about the success rates in the Intro, Intermediate, and College Algebra courses. For comparison, the Early College High School courses and courses at Crossett and McGehee have not been included in this study because these programs have higher admissions standards than our on-campus courses. College Algebra had approximately a 51% pass rate (with a D or better) based on the number of initial enrollees. The fast track courses had a slightly better success rate at approximately 59% scoring a D or better. The Intermediate Algebra had approximately 25% scoring a C or better, with the fast track courses again being higher, at approximately 38%. Intro Algebra also had approximately a 25% pass rate, with the fast track courses being only slightly higher at 27 % scoring a C or better.

A grade of C is needed to progress to the next course for both Intermediate and Introductory Algebra. The fast track courses do have a slightly higher success rate than the normal term courses, but even those that are unsuccessful, do have a second attempt at the same course during the same semester, which allowed many to complete a math course during that term. These pass rates sound extremely low, but when comparing to pass rates of other Arkansas universities at the Arkansas Math Chairs conference, our numbers are very similar to those of other small 4-year institutions across the state. The schools that do have higher success rates do have higher ACT requirements to enter the course. For instance, Crowley’s Ridge Community College verbally reported a 75% pass rate for College Algebra; however, a minimum of 21 on the mathematics segment of the ACT is needed to enter that course. The UAM Mathematics faculty are still reviewing statistics and are considering a proposal to raise the standards to enter both College and Intermediate Algebra. They are also considering a proposal to form a new course, that is predominantly non-algebraic basic mathematics for the students scoring very low on the ACT mathematics exam.

Students completing both General Chemistry and Organic Chemistry are given nationally normed American Chemical Society (ACS) Examinations as final examinations. Scores on these exams indicate that our students are continuing to perform near the national average in General Chemistry, and well above that in Organic Chemistry. The item analysis from the final exams are reviewed periodically to identify trends on the most commonly missed questions. The individual faculty member uses this information to improve coverage in certain areas. In recent years, the laboratory exercises have been changed slightly to provide additional coverage for areas that were identified as a problem area on the

ACS Final Exam. The Spring 2006 Organic Chem II ACS final examination item analysis was reviewed. Many of the questions missed were at the end of the text in sections that were not covered adequately due to lack of time. During the 2008-2009 academic year, the Organic Chemistry I and II courses had their lab content significantly changed in order to include even more of the topics that was normally covered on the ACS Organic Chemistry final exam.

Biology, chemistry, and mathematics all have a capstone course requirement. Respectively these courses are BIOL 4741, Biology Seminar; CHEM 4611, Chemistry Seminar, or CHEM 4691, Senior Research; and MATH 4711, Mathematics Seminar. Students research a topic, synthesizing information from both the library and their own class and laboratory experiences. They then present their findings orally to their peers and the faculty. Students also submit a written paper. The Biology Seminar requirements are constantly being tweaked to improve the course. With much of the information coming from the internet, changes have been made in how the material is properly referenced and judged for validity. In 2008, Chemistry also added a course specifically designed to expose the graduates to specific topics that will be seen in industry and in graduate school, Advanced Techniques. This course also has a seminar component. This course was added because many of the students were not being exposed to specialized techniques on equipment not found at UAM. Also, many of the students were by-passing the seminar by doing senior research and then presenting a poster at a regional meeting.

Upper-level science courses frequently require extensive laboratory reports which demand that the students generate and organize data. They must then synthesize their results to form a reasonable conclusion and present these results in writing and/or verbally. This provides an excellent opportunity for the faculty to observe the students development and, if needed, suggest steps which will address any deficiencies.

Many students from the School of Mathematics and Natural Sciences make presentations at state, regional, or national meetings. Although this is common to the sciences, mathematics students have become more involved over the past few years, especially those planning to enter the teaching profession.

Several biology courses are very oriented to field experiences, two examples are BIOL 3434, Regional Flora, and BIOL 3524, Ornithology. In addition to learning field procedures and techniques, these trips make the same demands of the student with the additional burden of functioning in a natural environment which displays a level of variability not found in a textbook. As an example, the ornithology field trip provides students with hands on research experience. On this trip students have the opportunity to observe a working field study site in action. Here they are able to observe how ornithologists study and collect data on birds during the annual spring migration. The capture and release techniques used on these study sites also provide a unique opportunity for students to see birds in the hand rather than flying or in a tree. The research aspects along with an outstanding opportunity to identify numerous species that students would normally not see make this trip a highlight of the semester. For the second straight year, the number and length of field trips was increased. One summer course even involved an extended stay in the Canadian Rockies to study the plants, animals and geological features of that region. Other field trips include trips to the desert southwest, the Ouachita Research Station, the Seven Devils Swamp area, and the Warren Prairie.

## VI. Utilization of Information

Provide specific evidence of how your unit utilizes information, other than student performance, to determine necessary unit decisions. Describe how your unit analyzes and selects a course of action. Attach documentation that supports your determination. (Examples: senior surveys, alumni surveys, professional meetings, minutes from faculty or committee meetings, etc.)

The School attempts to gather the comments of students, graduates, alumni, employers, professional & graduate schools, and the general public. This is done through a variety of means which include interviews, surveys, comments, and conversations. In addition, the School attempts to be introspective and consider ways in which a student's total experience may be improved. A few specific examples of actions which were the result of these reviews are:

Students preparing for medical school were telling us that the increased amount of physics on the MCAT exam was causing them to score lower in the physical sciences area. Through academic advising, we are encouraging those students to take their physics earlier than they have in the past. We have also revived the University Physics I and II sequence to give those students a more in depth background. The laboratories were changed from two hours to three hours in order to give more hands-on practice. The time of course offerings have been changed to create fewer conflicts that will allow the physics to be taken during the sophomore year. This could have been a factor in the recent improvement in the MCAT scores in the physical sciences area.

Many students entering medical related fields were interested in a major in Chemistry that focused more on Biochemistry rather than the traditional curriculum. In the Spring 2009, approval was given to offer the B.S. in Chemistry, Biochemistry option. The major was designed so that many of the biology majors could easily double major in this area. There are already several students signing up for the major, and the first will graduate in May 2010. See Appendix V

A number of students that are attending an allied health program at Jefferson or UAMS have indicated the need for a medical terminology course. They have indicated that it would greatly help on the entrance examinations for these programs and also will help in the specific course work after accepted into the program. During the past year, the Math and Science faculty agreed that this course would be helpful not only to the allied health students, but also the BSN Nursing students. The course will go through Curriculum and Standards during the Fall 2009 semester with hopes of offering the course in Spring 2010 or Fall 2010.

Student course/faculty evaluations are administered every semester. Following the submission of grades, the results of these evaluations are given to the faculty. To insure student anonymity, all written comments are typed and these are reviewed by the dean and then sent to the faculty. These comments are frequently the most revealing and useful to the instructor. Inherently these comments do not lend themselves to an analytical summary. In addition to the written comments, students complete a 34 question multiple-choice form. Faculty receive a statistical summary of their students' responses. For some questions this is quite adequate but for others the lack of comparable data from other courses limits the instructor's ability to interpret this information. A specific example is question 34, "Overall rating of this course: (1) Excellent, (2) Very Good, (3) Good, (4) Fair, or (5) Poor." Clearly a response of 1 is favorable and of 5 is unfavorable. It is apparent that faculty evaluations by students appear to suffer from inflation. In order to gain a better

understanding of what separates good from average, the dean reviews all responses to this question and tabulates the mean result by faculty, discipline, and the entire School. Each instructor receives his/her mean scores by course, all courses, discipline, and School. The following is a compilation of these results over ten semesters:

	Fall 03	Fall 04	Fall 05	Fall 06	Fall 07
No.	624	736	763	1017	667
Excellent	257	300	304	454	250
Very Good	194	255	256	347	220
Good	120	125	137	163	135
Fair	39	39	56	41	51
Poor	14	17	10	12	11
Mean	1.97	1.94	1.97	2.56	2.05
High Mean	3.30	3.41	3.07	2.86	3.23
Low Mean	1.50	1.33	1.0	1.0	1.0

  

	Spring 04	Spring 05	Spring 06	Spring 07	Spring 08
No.	486	606	708	731	648
Excellent	210	262	304	320	292
Very Good	140	199	235	234	195
Good	96	108	128	127	116
Fair	24	31	34	39	30
Poor	16	6	7	11	15
Mean	2.00	1.88	1.88	1.89	1.89
High Mean	3.4	2.85	2.85	3	3.13
Low Mean	1	1.00	1	1.33	1.00

The past two years, a comparison was done between question 24, which is overall rating of the instructor to question 34, which is the overall rating of the course. In almost every class, the students perception of the overall rating of the instructor was better than the overall rating for the course.

This year, the Fall 2008 data was imported into a spreadsheet so that analysis could be done on each question. After reviewing the averages, it is clear that much of the student evaluation information is not very helpful. For instance, on the question that reads, "Speaks Clearly", it was determined that one instructor, who is not an American born English speaking faculty member, ranked better than 9 other faculty in the department, who are American born English speaking faculty members; however there has not been a single complaint on the other nine while there have been some complaints on the higher scoring faculty member. From this information, it is apparent that the students will give essentially the same ranking on every question, either good or bad, and don't necessarily read the questions carefully. Based on this, it is apparent that the student evaluation process could be simplified.

## VII. Future courses of action

Based on your answers to Questions V and VI regarding student learning outcomes, prioritize your unit's future course of action. Include plans for what will be done, by whom, to what extent, and how often.

The Principles of Biology course sequence is fairly new and will be reviewed and revised as needed. While several questions exist the course appears to be serving its purpose. The faculty are continuing to examine student success rates. A specific concern is the current prerequisite of a minimum composite ACT score of 20. This may need to be increased. Even though preliminary studies indicate that the typical successful student has at least a composite 22 on the ACT, further studies are needed before making this change.

Currently Anatomy and Physiology I and II are offered at all three campuses of UAM. The content and quality of some sections has been unsatisfactory. During the past year all instructors were to submit syllabi and tests to the course coordinator. Additional mentoring is planned for the year, in hopes that the faculty at Crossett and McGehee improve their expectations to match those of the on-campus instructors.

The School of Math and Sciences faculty are currently reviewing the recommended course scheduling order for each major. Changes will be made in pre-requisites and co-requisites to minimize repetition of material and to provide a better prepared student for the more rigorous courses. Several pre-requisite changes were made during the past year. Microbiology, Genetics, and Cell Biology pre-requisites have been changed to reflect the new order of teaching the courses, and also to remove unnecessary pre-requisites that were no longer relevant.

Student evaluations of faculty and courses will continue to be carefully reviewed and monitored. At times individual instructors may be advised to change their behavior or instructional techniques based upon these responses. The results for the entire School as measured by the responses to question 34 also serve as an indicator of student satisfaction. The review of the evaluations will also include question 24 in the future to give the instructors a more specific idea of their performance, separate from the overall course satisfaction. An unofficial proposal has been made to significantly reduce the number of questions on the student evaluation form. There are hopes that this is addressed during the upcoming academic year.

Several faculty have indicated they will use the "smart room" technology in order to better hold the student's attention in class. This may affect success rates in some of the remedial mathematics courses. Now that every room is equipped with a computer, digital projector, and document camera all faculty will have ability to modernize their lectures and demonstrations.

One faculty member in mathematics has written an Intermediate Algebra textbook/workbook. The text was used on a limited basis in the Spring 2008 term, and initial responses have been positive. Feedback has led to changes and improvements in that text, which will undergo major revision during the upcoming academic year.

**VIII. Specifically describe how your unit is making student learning accessible, including, if applicable, alternative modes of instruction (CIV, WebCT, weekend, Early College High School, etc). Address historical patterns and trends.**

The School of Math and Sciences continues to offer CIV offerings as needed to the Colleges of Technology campuses in Crossett and McGehee; however, the need for those courses are declining as those campuses are now able to support full time faculty members in those areas.

We currently offer one science course on-line. This is an Earth Science course, ESCI 1123/1131, Meteorology. The course includes a laboratory and is designed for the General Education student. This course has been very popular during the 2008-2009 academic year, even to the point of having to add another section of the lecture and lab.

A group of faculty members are planning to create an on-line or hybrid course in College Algebra, and if successful, even Intro and Intermediate Algebra. It will be approximately one year before this course is available. Other faculty are mildly considering other offerings, but firm plans aren't in place at this time.

The Early College High School continues to have high enrollments and high success rates with over 98% of the 116 students enrolled passing the course with a D or higher. Those faculty have been more receptive to working with University faculty during the past year, making the courses more equivalent to those offered on our campus. The AECHS faculty will be even more involved during the upcoming year as more meetings are planned to discuss course content, exams, and grading standards.

**IX. Specifically describe how your unit involves students directly in the assessment process.**

In addition to the summary of student responses on the student evaluation form, all student comments from the student evaluations are typed, reviewed by the School Dean, and discussed with the faculty.

The School surveys all graduating Math/Sci. students on their experiences at UAM. This is an open-ended survey essentially asking students to list what they liked and disliked about UAM. The results are fairly predictable. Many students have general complaints such as inadequate parking, lack of extracurricular activities, local laws on alcohol consumption, etc. The comments of direct interest to the School are praise or criticism of specific instructors, appreciation of small class size and the attention given them by particular faculty, and willingness of faculty to help them. The most frequent criticism is the infrequency with we offer some upper-level courses, particularly in mathematics and chemistry courses.

The School also periodically surveys graduates in a manner similar to the exit interviews of graduating students. The results are quite similar. The graduates are less harsh in the occasional criticisms of particular faculty and are even more enthusiastic in their praise of the general and specific efforts of the faculty. This is especially true of the students who have entered graduate and professional programs. They were happy with the small class sizes but again are critical of the scheduling of upper level courses.

Students are active in several School organizations, such as Sigma Zeta, the Pre-Med Club, and the Biology Club. Even though there is mainly social contact between the faculty and the students in these organizations,

this does allow the students to have informal discussions with faculty members on a variety of topics, including program issues. The students in the Pre-Med Club and Biology Club specifically make decisions on which schools are visited and to what locations the summer field courses are taken, respectively.

**X. Describe and provide evidence of the efforts your unit is making to retain students in your unit and/or at the University**

The faculty of the School of Math and Sciences have put more emphasis on advising students into courses based on skill level, as opposed to what are required for their degree. We feel this helps retention because it eliminates the early failures which discourage students and cause them to drop out. There are numerous examples, but here are two specific examples:

The faculty in Nursing have taken our recommendation and are now requesting the more poorly prepared students to take an introductory level biology course prior to Anatomy and Physiology. Hopefully, the better background will lead to more student success, and therefore higher retention.

Several students have been encouraged to take the placement exam in math before entering the courses that they are barely qualified for based on scores on the ACT math section. Some have chosen to take the lower level course. One student praised the advice, as he progressed through Intermediate Algebra with a good score. He said he would have entered College Algebra with hopes of a D had he not been advised to go back to Intermediate Algebra. Now he will enter College Algebra shooting for an A or B.

Students that are working many hours per week are being advised to take a slightly lighter load, and to delay their graduation date by a year or so. Many students that are working many hours and taking large class loads become overwhelmed and allow their effort in courses to decrease. Hopefully, this approach will lead to better student performance, and increased retention.

Letters have been sent and calls have been made to several students that have completed a significant portion of their degree and then dropped out. Options are reviewed to see if prior biology and chemistry majors are closer to a Natural Science or the Bachelor of General Studies degree. Currently there are four former drop outs making plans to complete their degree. Others are strongly considering the possibility. See Appendix III for a copy of a letter sent to a student.

The faculty of the School of Mathematics and Natural Sciences are encouraging our majors to be connected to the University outside the classroom:

The Biology Club, the Pre-Med Club, and the Math and Physics Club are involved with several activities, including tailgating prior to every home football game. Several students are also involved with Alpha Chi and Sigma Zeta honor societies. Many are involved with MBSF, the Wesley Foundation, Baptist Collegiate Ministries and other religious organizations.

The School and its faculty are making efforts to help the students financially:

By supplying positions and encouraging our students to obtain work-study jobs on campus in order to have a stronger tie to the University.

By writing grants to provide opportunities for our students to be involved in research.

By considering more freshmen and sophomore students for departmental scholarships and also taking need into consideration rather than just past academic performance.

Several faculty are now using their first day of freshmen level classes as “orientation day”:

By giving tips on taking notes, studying for exams, test taking tips,

By assigning some sort of a group activity to allow students to network

By very specifically letting them know the faculty members expectations.

We are trying to modernize the way we teach by using different instructional strategies and by using appropriate technology. Some of the technology age students tend to relate better to teachers using modern technology. Other courses are greatly enhanced by downloaded supplemental material such as pictures of organisms, or sound clips of birdcalls, etc..

All classrooms are set up as smart rooms with computers, digital projectors with sound capabilities, and document cameras. Carts with similar equipment are available for use in labs.

With every classroom now having the proper equipment, the increased use of Interwrite®) tablets for use by some of the mathematics faculty, which not only allows for a cleaner presentation of the material but also allows easier dissemination of lecture materials prior to class through e-mail or website access.

The Physics lab computer network is being improved with additional hardware and software.

New microscopes have been purchased for the microbiology laboratory, greatly improving the laboratory experience for the students taking that course.

We have invited faculty from graduate programs and professional programs to visit with our students in order to give them career options. In the past year, engineering faculty have visited from Louisiana Tech and Arkansas State. UAMS has sent representatives from medical, pharmacy, and allied health programs. Harding University College of Pharmacy also made a recruiting visit.

## Appendices

- I. Graduate Survey
- II. Representative Syllabi
  - A. Chemistry
  - B. Biology
  - C. Math
- III. Retention Letter
- IV. List of Chemistry Graduates and placement
- V. C & S proposal for Chemistry change
- VI. Test Scores

# Appendix I

## Graduate Survey

Three received during the  
last academic year from  
responses related to the  
Math and Science  
Newsletter

## Mathematical and Natural Sciences Graduate Survey

Your response is very important to the internal assessment of our programs. Please complete the following. Feel free to give specific examples related to your job, your continued education, or about UAM courses that you have taken. Feel free to attach additional pages if needed. This page is also available on the Math/Science homepage and may be submitted by email as an attachment

Do you feel that UAM prepared you for your professional life?

Yes, I feel that UAM prepared me for my professional life.

What did you like most about the School of Math and Sciences? (Strengths)

Ease of communication between student and professors and how professors considered the curriculum one might encounter w/ their further education and on the field. Also, how they were accommodating in helping one achieve their goals towards their professional education.

What did you like least about the School of Math and Sciences? (Weaknesses)

What changes do you recommend?

Is there anything else you would like to add?

For a small school, I feel that UAM is very fortunate to have professors who enjoy and are dedicated to their profession. I could say that lack of better equipment would be a weakness of the School of Math and Sciences but from my experience, I have yet to see this as a disadvantage from my counterparts who went to larger schools w/ better equipment but less personal interaction w/ their professors.

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The following information is optional:

Name: [REDACTED]

Major(s): Biology 2007 graduate

Minor(s): Natural Science

E-mail address [REDACTED]

What are your plans after graduation?

Pharmacy School

Please drop off your survey to the Math/Science Office in the Science Center or mail to:  
Graduate Survey  
School of Mathematical and Natural Sciences  
P.O. Box 3480  
Monticello, AR 71656-3480

Feel free to drop in for a visit. There's usually coffee available. Student organizations have tailgating at football games, etc... You are always welcome to join in. The newsletter is produced periodically. (Usually early Fall)  
If you don't receive an annual newsletter by mail or electronically, please contact the Math/Science office at 870-460-1016.

Mathematical and Natural Sciences Graduate Survey

Your response is very important to the internal assessment of our programs. Please complete the following. Feel free to give specific examples related to your job, your continued education, or about UAM courses that you have taken. Feel free to attach additional pages if needed. This page is also available on the Math/Science homepage and may be submitted by email as an attachment

A

Do you feel that UAM prepared you for your professional life?

*Absolutely. Upon graduating from UAM with a double major in math and chemistry, I went to graduate school in chemistry at the Univ. of Oklahoma where I passed all my entrance exams in the chemistry subdisciplines, including doing well enough on the physical chemistry part to count that as my written qualifier toward my PhD. I never felt that I was behind in any area when compared to other graduate students who had attended undergraduate programs from around the country.*

What did you like most about the School of Math and Sciences? (Strengths)

*Certainly the best feature was, and still is, the faculty. About half of all my college credit hours at UAM came from Drs. Abedi, Annulis, and Godwin combined. All of the faculty were enormously helpful, approachable, and friendly. I try to model much of my own behavior as a faculty member by remembering their example.*

What did you like least about the School of Math and Sciences? (Weaknesses)

*The least-likeable feature was, and still is, the facilities. The science/math building needed to be replaced when I was there in the early 90's, and despite some remodeling efforts, needs to be replaced even more now. Given the number of students that these areas serve, there is no justification for continuing to use this outdated building when so many other campuses with lower quality faculty and programs can boast of such wonderful facilities. I think constructing a new science/math building should be one of UAM's top near-term strategic planning goals so that the outward appearance can match the stellar work that goes on inside.*

What changes do you recommend?

*Other than constructing a new building, I have no other changes to recommend.*

Is there anything else you would like to add?

*No.*

---

The following information is optional:

Name: \_\_\_\_\_ *1993 graduate*

Major(s): Chemistry and Mathematics

Minor(s): none

E-mail address \_\_\_\_\_

What are your plans after graduation?

*I graduated in 1993. I earned my PhD in chemistry from OU in 1998. From 1998-2003 I taught at Campbellsville University in Campbellsville, Kentucky. I am currently an Associate Professor of Chemistry at Lyon College in Batesville, Arkansas.*

Please drop off your survey to the Math/Science Office in the Science Center or mail to:

Graduate Survey  
School of Mathematical and Natural Sciences  
P.O. Box 3480  
Monticello, AR 71656-3480

Feel free to drop in for a visit. There's usually coffee available. Student organizations have tailgating at football games, etc... You are always welcome to join in. The newsletter is produced periodically. (Usually early Fall)  
If you don't receive an annual newsletter by mail or electronically, please contact the Math/Science office at 870-460-1016.

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Your response is very important to the internal assessment of our programs. Please complete the following. Feel free to give specific examples related to your job, your continued education, or about UAM courses that you have taken. Feel free to attach additional pages if needed. This page is also available on the Math/Science homepage and may be submitted by email as an attachment

Do you feel that UAM prepared you for your professional life?

Over all yes, if a person is older and gets into a profession away from his field of study it can be a problem.

What did you like most about the School of Math and Sciences? (Strengths)

The small class sizes and individualized learning that is available is a great advantage.

Another advantage is being able to schedule lab time in the upper level chem. labs (quant.) any time it helps in adding lab skills.

Compared to some colleges and universities, a person is much more ready to take on independent lab work when they leave your school.

What did you like least about the School of Math and Sciences? (Weaknesses)

Some of the depts. are not able to offer enough courses due to a lack of demand.

What changes do you recommend?

Encourage more students to get into the areas of math and science, try to involve the students in more activities in the school (I believe that is already happening) as a recruiting tool.

Try to help with job placement, a possible way would be links on your web page to job listings that you know about.

Is there anything else you would like to add?

I would not trade my time at UAM and in the School of Math and Science for anything in the world. It is hard for me to believe that Dr. Annulis, Bacon, and Godwin have retired. I wish for them and all of the people that I knew there the very best in the world.

If anyone from there makes it up this way, please look me up.

---

The following information is optional:

Name:

*2000 Graduate*

Major(s): Chemistry

Minor(s): Biology

E-mail address

What are your plans after graduation?

After my next graduation (grad school with a PhD, Fall 09) I plan to be a faculty member at a small college or university.

Please drop off your survey to the Math/Science Office in the Science Center or mail to:

Graduate Survey

School of Mathematical and Natural Sciences

P.O. Box 3480

Monticello, AR 71656-3480

Feel free to drop in for a visit. There's usually coffee available. Student organizations have tailgating at football games, etc...

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# Appendix II

## Representative Syllabi

A. Chemistry

B. Biology

C. Mathematics

# Appendix III

## Representative Retention Letter

July 24, 2009

{Name 1} {Name 2}  
{Address 1}  
{Address 2}  
{City} {State} {Zip}

Dear {Name 1}

I am writing this letter to encourage you to finish your degree. You are extremely close to finishing, and I would like to see you complete the degree. Of course, you can take courses on our campus, possibly on-line courses from our campus, or even courses at another university and transfer them back to UAM. If you are interested, contact me by telephone at 870-460-1116 or by e-mail at [bramlett@uamont.edu](mailto:bramlett@uamont.edu).

You may consider changing your major from Chemistry to Natural Sciences. It appears that you lack only 3 courses to complete that degree; however you will likely need to take a 4<sup>th</sup> class in order to have enough upper level hours to meet the graduation requirements. Another option is the Bachelor of General Studies degree, which is a new degree that was just approved at UAM. In reviewing your transcript, it appears that you would need approximately the same number of classes as needed for the Natural Science degree. We will review all options to see which will allow you to complete your degree in a timely fashion.

I'd love to hear from you even if you aren't interested in returning at this time.

Take care,

J. Morris Bramlett, Ph.D.  
Dean, School of Mathematical and Natural Sciences

# Appendix IV

Chemistry Graduates  
1991-present

	Year	1st Major	2nd Major	Minor	After graduation
1	2009	Chemistry		Math	Ph.D. Chem at Univ. of Mississippi
2	2009	Chemistry		Math	Ph.D. Chem at Univ of Arkansas
3	2009	Chemistry	Biology		Employed at UAM as ARKLSAMP asst director
4	2009	Chemistry		Math	Employed by chemical company in KS
5	2008	Chemistry	Biology		Ph.D. Chem at Univ. of Cal-San Diego
6	2008	Chemistry		Math	Ph.D. Chem at Univ. of Minnesota
7	2007	Chemistry	Math		D.O. Program, Virginia Tech University
8	2006	Chemistry		Math	M.S. In Chem (Polymers), Univ. Southern Miss
9	2006	Chemistry		Math	Ph.D. Chem at Univ. of Arkansas
10	2005	Chemistry		Math	M.D. Program at Ross University
11	2005	Chemistry		Math	Physical Therapy School at UCA
12	2004	Chemistry	Biology		M.D. UAMS
13	2004	Chemistry	Biology		Radiology School at UAMS
14	2004	Chemistry	Math		Ph.D. Chem at Northwestern Univ.
15	2004	Chemistry		Math	Pharmacy School at UAMS
16	2003	Chemistry		Math	Pharmacy School at Univ. Louisiana-Monroe
17	2003	Chemistry		Biology	Ph.D. Chemistry, Univ. of South Carolina
18	2002	Chemistry		Math	Ph.D. Chemistry, Texas A&M
19	2002	Chemistry	Math		Ph.D. Engineering, Tulane University
20	2002	Chemistry	Math		M.S. Applied Science at UALR
21	2001	Chemistry		Biology & Math	NASA, Langley Virginia as lab tech
22	2001	Chemistry		Math	Chemist at Pine Bluff Arsenal
23	2001	Chemistry	Math		Ph.D. Chemistry, Washington Univ of St. Louis
24	2001	Chemistry		Biology & Math	M.S. Physics program at UM-Rolla
25	2000	Chemistry		Math	Ph.D. Univ of Massachusetstts
26	2000	Chemistry		Math	Ph.D. Louisiana State Univ.
27	2000	Chemistry		Biology	M.S Biochem U-ARK, Ph.D Mol. Biology, U-ARK
28	2000	Chemistry			M.S. Chemistry from UALR in 2002
29	2000	Chemistry		Math	Chemist/Quality Control for Hi-Tech, Camden
30	2000	Chemistry	Physics		Chemist for chem waste disposal co, Benton
31	1999	Chemistry		Math	Ph.D. Louisiana State University
32	1999	Chemistry		Math	Ph.D. program Univ. of Arkansas (didn't finish)
33	1999	Chemistry		Math	Pharm D., UAMS
34	1998	Chemistry		Biology	Pharm D., UAMS
35	1998	Chemistry		Biology	Pharm D., UAMS
36	1997	Chemistry		Biology	Pharm D., UAMS
37	1997	Chemistry		Gen Sci	Pharm D. UAMS
38	1997	Chemistry		Math	
39	1997	Chemistry		Biology	M.S. Environmental Science, ASU

40	1997	Chemistry		Math	M.S. Engineering at Louisiana Tech Univ.
41	1995	Chemistry		Math	?
42	1995	Chemistry		Math	Chemist for Potlatch
43	1995	Chemistry		Math	Teaching position at Hampton, AR
44	1995	Chemistry			Chemist for Georgia Pacific
45	1995	Chemistry	Sec Ed	Math	High School, M.Ed. at UALR
46	1994	Chemistry		Biology	M.D. UAMS
47	1992	Chemistry		Biology	M.S. Chemistry, Univ. of Louisiana Monroe
48	1992	Chemistry		Biology	M.D. UAMS
49	1993	Chemistry	Math		Ph.D. University of Oklahoma
50	1992	Chemistry		Math	Ph.D. University of Arkansas
51	1992	Chemistry		Math	?
52	1991	Chemistry		Math	Arkansas Govt. Employee (Chemist)

# Appendix V

## C&S Proposal for Chemistry Change

APPROVAL SHEET  
FOR COURSE AND CURRICULUM CHANGES

Date: February 11, 2009

Division/School: School of Mathematics and Sciences

Signature of Initiating Unit Chair/Dean: J. Morris Bramlett

Desired Effective Date of Change: July 1, 2009

Nature of Change (Circle One):  ADD      DELETE      MODIFY

**Current Listing In Catalog/Handbooks: None**

**New Listing In Catalog:**

**Chemistry Major, Biochemistry Option, Bachelor of Science**

**Supportive Requirements: 38 hours**

BIOL 1041 Principles of Biology I Lab  
BIOL 1053 Principles of Biology I  
BIOL 1083 Principles of Biology II  
BIOL 1091 Principles of Biology II Lab  
BIOL 3553 Microbiology  
BIOL 3561 Microbiology Lab  
BIOL 3363 Cell Biology  
BIOL 3354 Genetics  
MATH 1043 College Algebra  
MATH1033 Trigonometry  
MATH2255 Calculus I  
PHYS 2231 General and University Physics Laboratory I  
PHYS 2241 General and University Physics Laboratory II

Select one of the following:

PHYS 2203 General Physics I and  
PHYS 2213 General Physics II

or

PHYS 2313 University Physics I and  
PHYS 2323 University Physics II

**Major Requirements: 35-36 hours**

CHEM 1103 General Chemistry I  
CHEM 1113 General Chemistry II  
CHEM 1121 General Chemistry I Laboratory  
CHEM 1131 General Chemistry II Laboratory  
CHEM 3314 Quantitative Analysis  
CHEM 3404 Organic Chemistry I  
CHEM 3414 Organic Chemistry II  
CHEM 3XX4 Elements of Physical Chemistry  
CHEM 4633 Biochemistry I  
CHEM 4643 Biochemistry II  
CHEM 4731 Biochemistry Lab  
CHEM or BIOL 3000-4000 level elective (3 hours)

Choose one of the following:

CHEM 4742 Advanced Laboratory Techniques

or

CHEM 4611 Chemistry Seminar

or

CHEM 4691 Senior Research

or

BIOL 4741 Biology Seminar

Note: If students are seeking Biology as a second major or as a minor, the BIOL 3000-4000 level elective nor the Biology Seminar can be used to fulfill requirements in both degrees.

**Justification:** The biochemistry option better fits the needs of students planning to enter medical school, pharmacy school, or a graduate program in a biochemical related field. With several biology courses being required as supportive requirements, we hope that several biology majors will elect this option as a second major instead of selecting the chemistry minor. This will hopefully increase the number of chemistry graduates.

Approved:

Date:

\_\_\_\_\_  
Chairperson, Curriculum and Standards Committee

\_\_\_\_\_  
Chairperson, Assembly

\_\_\_\_\_  
Chancellor

# Appendix VI

## Scores on OAT, PCAT, MCAT, GRE, and DAT Exams

# OAT Exam Scores

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Optometry Admission Test Score Report  
Student A    Test Center 5212    June 6, 2009

<u>Subject</u>	<u>Standard Score</u>	<u>Percentile below</u>
Quantitative Reasoning	290	42.3
Reading Comprehension	390	99.0
Biology	350	83.3
General Chemistry	310	60.6
Organic Chemistry	400	100.0
Physics	330	80.4
Total Science	350	87.6
Academic Average	350	93.8

**Standard scores** used in the testing program range from 200 to 400. Only the standard scores are reported to the optometry schools. Through the use of standard scores, it is possible to compare the performance of examinees taking different editions of the Optometry Admissions Test.

The **Academic Average** is the average of the six scores rounded to the nearest ten: Quantitative Reasoning, Reading Comprehension, Physics, Biology, General Chemistry, and Organic Chemistry.

The **Total Science** score is a standard score based on all 140 questions in Physics, Biology, General Chemistry, and Organic Chemistry tests. It is **not** the average of the four science standard scores.

# PCAT Exam Scores

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Student B                      Test Date October 2008                      The Psychological Corporation

Multiple Choice Scores                      Scaled Score                      Percentile Rank

Verbal Ability	410	65
Biology	418	76
Reading Comprehension	411	63
Quantitative Ability	399	39
Chemistry	437	90
Composite	415	73

Writing Scores                      Your Score      Avg Score

Conventional Language	3.0	2.76
Problem Solving	3.0	2.76

---

Student C                      Test Date October 2008                      The Psychological Corporation

Multiple Choice Scores                      Scaled Score                      Percentile Rank

Verbal Ability	404	55
Biology	411	66
Reading Comprehension	399	48
Quantitative Ability	409	60
Chemistry	395	44
Composite	404	53

Writing Scores                      Your Score      Avg Score

Conventional Language	3.0	2.76
Problem Solving	3.2	2.76

---

Student D

Test Date Nov 2008

The Psychological Corporation

Multiple Choice Scores	Scaled Score	Percentile Rank
Verbal Ability	412	66
Biology	414	73
Reading Comprehension	411	63
Quantitative Ability	416	69
Chemistry	435	88
Composite	418	79

  

Writing Scores	Your Score	Avg Score
Conventional Language	3.2	2.79
Problem Solving	3.3	2.79

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## MCAT Test Scores

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Student E

Test Date	08/2008 (Series 84)	Score	Percentile
	Verbal Reasoning	06	16.6 - 28.5
	Physical Sciences	08	38.6 - 55.5
	Writing Sample	O	41.4 - 54.8
	Biological Sciences	09	40.9 - 57.6
	Total Score	23-O	32.4 - 37.7

Note: Computer Based Test

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Student A

Test Date	06/2009	Score	Percentile
	Verbal Reasoning	08	37.9 - 52.7
	Physical Sciences	10	70.8 - 81.9
	Writing Sample	M	11.9 - 35.1
	Biological Sciences	10	57.8 - 76.9
	Total Score	28-M	63.7 - 69.5

Note: Computer Based Test

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Student F

Test Date	06/2009	Score	Percentile
	Verbal Reasoning	11	84.6 - 95.5
	Physical Sciences	10	70.8 - 81.9
	Writing Sample	O	44.2 - 57.3
	Biological Sciences	08	26.1 - 41.7
	Total Score	29-O	69.6 - 75.2

Note: Computer Based Test

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## GRE Test Scores

Student Identifier	Test Date	Verbal		Quantitative		Analytical Writing	
		Score	%Below	Score	% Below	Score	% Below
G	06/08	410	35	610	51	3.0	08
H	12/08	400	33	620	52	*2.0	01
I	06/09	390	30	620	53	4.0	37

\* ETS expected a grading error on the Analytical Writing sample and offered the student an opportunity to re-take the exam for free; however, the student declined due to the fact that she had been accepted into a graduate program. The new scores would not be available until after the deadline for application.

---

# DAT Test Scores

Dental Admissions Testing Program

American Dental Association

Test Date January 13, 2009

Student J

Subject	Standard Score	Percentile
Perceptual Ability	17	52.4
Quantitative Reasoning	17	64.0
Reading Comprehension	18	39.0
Biology	16	36.4
General Chemistry	18	60.6
Organic Chemistry	17	52.7
Total Science	17	50.6
Academic Average	17	47.6

**Standard scores** used in the testing program range from 1 to 30. Only the standard scores are reported to the dental schools. Through the use of standard scores, it is possible to compare the performance of examinees taking different editions of the Dental Admissions Test.

The **Academic Average** is the average of the five scores rounded to the nearest whole number: Quantitative Reasoning, Reading Comprehension, Biology, General Chemistry, and Organic Chemistry.

The **Total Science** score is a standard score based on all 100 questions in Biology, General Chemistry, and Organic Chemistry tests. It is **not** the average of the three science standard scores.

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