Natural Science Program Review

University of Arkansas at Monticello

School of Mathematical and Natural Sciences

Fall 2015

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GOALS, OBJECTIVES, AND ACTIVITIES

Describe specific educational goals, objectives, and activities of the program.

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 statement 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, animal science, 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 or associate degree.

These goals are important to the Natural Science program, whose main objective is to offer Bachelor of Science degrees with a major or minor in Natural Sciences. There are no courses specific only to the Natural Science major. It is a totally embedded major with every course coming from Biology, Chemistry, Earth Science, or Physics courses that are taught as part of other majors, minors, or general education offerings. Initially, the Natural Science major was designed to prepare graduates who would have the content knowledge to pass the appropriate Praxis exams, and the background to be an effective secondary science teacher upon completion of the Master of Arts in Teaching degree. At the time the Natural Science degree was put in place, Arkansas had two science certifications at the secondary level: 1) life science and earth science; and 2) physical science and earth science. The Natural Science degree was designed with a set of core courses which led to two options: a Life Science Option which is comprised of Biology courses or a Physical Science Option which was comprised of Chemistry and Physics courses. Earth Science courses were incorporated into the core to give both options a background in that area adequate to meet certification. In order to give the students maximum flexibility in seeking a secondary area of expertise, no minor is required for this degree. The degree itself does not include the education courses needed for certification; it is necessary for the graduates to enter the Master of Arts in Teaching (MAT) program. Upon passing of the Praxis Core and the Praxis II (content area) examinations, the Natural Science graduates will be given a temporary certification and are allowed to teach while they complete the MAT program, which is now totally online. Several students have successfully taken this path to a career in education; however, there have been a large number of students who completed this degree who entered professional or graduate programs, or have been employed in business or in a science field. Most of these graduates have used the Natural Science degree as a back-up plan when they are unable to complete their initial degree plan in Chemistry or Biology. The existence of this degree has certainly improved retention in the School of Mathematical and Natural Sciences. Other groups of students whom we did not expect have also chosen this major. Many Allied Health program students have chosen this major due to its wide variety of course requirements, with many hours of electives that could be tailored to meet the admission requirements of their desired professional program. With recent changes in national financial aid policy, all entering Allied Health students needed to be enrolled in a major that leads to a degree in order to qualify for financial aid. These students are now initially entered as a Natural Science major, Life Science Option, which can be changed to another major at the request of the student. Other students simply choose the Natural Science major because it gives them the most course options and the shortest timeline to graduation.

We encourage all our students to consider post-baccalaureate education upon graduation. In fact, we begin pushing students to think about their post-baccalaureate education during their first freshman semester. Our most important objective is to help our students achieve their educational and career goals; we truly feel that their success is our success.

Faculty members have high expectations in the classroom in all science 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 are:

A. Sigma Zeta Math and Science Honor Society is an active student organization which fosters group camaraderie and allows students to network with others in the School of Mathematics and Natural Sciences. The students in the Sigma Zeta chapter participate in various service projects throughout the year, including working with the Southeast Arkansas Regional Science Fair and the ACTM Regional Mathematics Contest. They host a biannual Science Center cleanup day in which classrooms and laboratories are deeply cleaned, and unused or obsolete materials and equipment are removed. Members often work with high school students on various events on campus, such as Advanced Placement test preparation events, to promote interest in the sciences and mathematics.

B. The Southeast Arkansas Regional Science Fair (SEARSF) has been hosted by UAM School of Mathematical and Natural Sciences for fifty-nine years. The fair is open to all high school and junior high school students from schools located in the southeastern region of the state. Students present research projects in a wide variety of categories, including Animal Sciences, Biochemistry, Biology, Chemistry, Computer Science, Engineering, Environmental Sciences, Mathematics, Plant Sciences, Space Sciences, and an all-encompassing classification for team projects. Natural Science faculty members and students often assist participants in setting up displays properly, serve as judges of the projects, or work with teachers during the research phase of project preparation.

C. The University of Arkansas at Monticello is a member of the Arkansas Space Grant Consortium (ASGC), which is funded by NASA. The UAM School of Mathematical and Natural Sciences receives funding from this program yearly through Research Infrastructure Development awards of about $10,000 to $20,000 per year. These awards have provided stipends for students to work with UAM Chemistry faculty members. Some of these students have also visited NASA research facilities. The ASGC also has an annual meeting where UAM students and faculty have presented their research results.

D. The UAM Medical Science Club is a group consisting of pre-professional students. This group has several chemistry majors as members. They promote pre-professional studies and also provide a social outlet for the students. The Medical Sciences Club sponsors visits by recruiters from various medical, pharmacy, and veterinary schools, and promotes talks from UAM graduates who can share their experiences with current students. The club sponsors visits by groups of UAM students to medical schools, dental schools, pharmacy schools, and graduate schools.

E. The UAM Tutoring Center employs many of our majors as work-study students to tutor lower-level chemistry students. Not only is this a benefit to the lower-level students, but it gives the tutors a much deeper understanding of the material, and also allows them to hone their teaching skills prior to going into the MAT or other graduate programs.

F. The UAM Research Program for Minority Students (UAM-RPMS) is a Science, Technology, Engineering and Mathematics (STEM) program which promotes research skills for students who are members of underrepresented minorities. The program provides a stipend to the students, involves the students in STEM research, and provides funds for the students to travel and present their research results at state, regional, and national meetings. The program began with a substantial grant from the Arkansas Lewis Stokes Alliance for Minority Participation (ARK-LSAMP, funded by the National Science Foundation), and has since transitioned to being funded completely by UAM. This program has been very successful; many students who have participated in UAM-RPMS have been accepted to graduate schools, medical schools, and other post-graduate programs.

G. Although UAM is primarily a teaching university, all tenure-track faculty members in the Natural Sciences conduct scientific research. In most cases, this research includes participation of undergraduate students. Several students who have conducted research have been accepted into graduate and pre-professional programs.

H. The University of Arkansas at Monticello is a member school of the Arkansas Academy of Science. Faculty members and students attend the annual meeting of the Academy and are eligible to present research talks and posters and to compete for student awards. Faculty and student research is often published in the Journal of the Arkansas Academy of Science.

I. The University of Arkansas at Monticello is an affiliate of the Arkansas Idea Network for Biomedical Research and Education (AR-INBRE), a program funded by the National Institutes of Health (NIH). The Arkansas INBRE program provides support for biomedical research and education through several types of grant programs. Chemists and biologists at UAM have received several instrumentation awards and a faculty summer internship award over the last several years. UAM received a $190,000 renovation grant which will be used for portions of the UAM Botanical Research Center and Herbarium building and renovations of research facilities in the Turner Neal Museum of Natural History.

Explain how the program serves the general education program and other disciplinary programs on campus, if applicable.

An important goal in the School of Math and Sciences 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. Numerous courses in the Natural Science major are acceptable as general education science courses; however, all of these courses are part of Biology, Chemistry, Earth Science or Physics

Document market demand and/or state/industry need for careers stemming from the program.

Arkansas has experienced steady population growth, and this growth has led to continued demand for secondary school teachers. Secondary science teachers (life, physical, and earth sciences) are usually on the annual list of subject shortage areas compiled by the Arkansas Department of Education. Although the population of southeastern Arkansas has not grown as much as the rest of the state, the demand for science teachers remains high in this region. In fact, virtually every school district in the southeastern part of the state qualifies as a High-Needs District based on criteria established by the National Science Foundation. 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 Natural Science 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.

Graduates with the Natural Science major may advance to professional schools such as medical school, dental school, pharmacy school, allied health-related programs and even graduate programs in science fields. Some graduates enter positions in industry.

The Association of American Medical Colleges has estimated that the United States could face a shortage of physicians that may number over 90,000 by the year 2020. The same organization lists Arkansas as the second-most underserved state in terms of number of doctors per resident, with many of the other underserved areas being in neighboring states. In rural areas such as southeastern Arkansas, the problem is exacerbated. The State of Arkansas has acknowledged these shortages and is working to solve them by implementing the Rural Medical Practice Program. 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. The only medical school in the state, the University of Arkansas for Medical Sciences, has slightly increased its class size over the last few years, and more increases are being considered. More importantly, two schools of osteopathic medicine will open in Arkansas in the next few years (one at Arkansas State University in Jonesboro and another at Fort Smith). Graduates of the

UAM Chemistry, Biology, and Natural Sciences program are in demand by medical schools; 22 of 24 med-school applicants have been accepted during the last 10 years. The two new D.O. schools will only increase this demand.

Similarly, while the demand for pharmacists is strong nationwide, it is strongest in Arkansas. According to the Aggregate Demand Index (ADI) computed by the Pharmacy Workforce Center, Arkansas has the highest demand for pharmacists of any state. The ADI rates the demand for the state as 4.6 out of 5.0, meaning that there is difficulty in filling many open pharmacy positions. 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.

Document student demand for the program.

The Natural Science major is an embedded program, meaning all its courses are part of other majors, minors, or general education offerings; therefore, Natural Sciences is not bound to the minimum number of graduates that are required in other majors as governed by the Arkansas Department of Higher Education (ADHE).

The number of majors remains small in Natural Science. The freshmen and sophomore years have especially small numbers until the past year when allied health majors were automatically entered as Natural Science majors. In the past, there has been a growth in the number of majors in the junior and senior year, largely due to Biology and Chemistry majors who changed their major to Natural Sciences.

Table 1 (below) lists the number of Natural Science majors by class level over the last ten years. The large growth in the number of majors in 2014 is mainly due to addition of allied health majors.

Table 1.—Number of Majors per Class Level per Year

Natural Sciences

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Freshman	2	1	1	0	0	1	2	0	1	14
Sophomore	0	0	1	1	0	1	2	2	0	9
Junior	2	3	2	1	0	1	4	3	2	7
Senior	8	6	6	4	4	3	4	3	5	6
Total	12	10	10	6	4	7	12	8	8	36

The number of graduates in Natural Science in some years is larger than the number of seniors in the previous year due to last minute major changes from Biology or Chemistry. Rather than staying in college for an additional year to re-take courses, or take courses they could not schedule, they change to Natural Science in order to graduate on time. Table 2 below shows the number of graduates in the past ten years.

Table 2.—Number of Natural Science Graduates by Year

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	10 Yr Ave	3 Yr Ave
4	3	7	2	8	4	12	2	4	4	5.0	3.3

In 2012, a review was done of former students that entered professional school prior to graduation. UAM has a policy that allows those students who achieve early acceptance into a professional program to transfer credits back from the professional program to complete their degree. Several of these students were contacted and informed that they qualified for a Natural Science degree if they chose to apply for graduation. Several students completed their degree, resulting in an abnormally high number of graduates in that year. While we felt this was the appropriate thing to do for the students involved, it has created several complications in performance funding due to the average number of graduates over the previous two years does not exceed the average number of graduates from the three prior years.

Over the past several years, the courses that make up the Natural Science major have seen growth in enrollment; however, that growth cannot be attributed specifically to the Natural Science major. The Biology and Chemistry programs have shown growth during the last several years, which is good for the Natural Sciences program due to the number of students that change their major to Natural Sciences.

CURRICULUM

Describe how program content parallels current thinking and trends in the field (best practices, advisory committee recommendations, etc.).

The Natural Sciences majors take the same biology and chemistry courses as students majoring in those fields. 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.

Biology, Chemistry, Earth Science, and Physics faculty members continually review the curriculum in an effort to meet the needs of their majors, minors, pre-professional students, and Natural Science majors. This goal is achieved in a number of different ways. All Natural Science 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 of professional individual faculty, 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, Biology, Earth Science, and Physics departments at UAM are relatively small. Although there are disadvantages associated with small size, the School of Math and Sciences uses its size to the advantage of students. With the small number of faculty, all faculty members are involved with curriculum changes and planning at all levels.

In addition, faculty members in the sciences constantly monitor requirements for various post-graduate programs to ensure that the curriculum contains all required courses and all necessary material within those courses. For example, the Dean attends annual meetings of Pre-Pharmacy and Pre-Medical advisors at UAMS to stay abreast of current admission requirements and changes to the entrance exams. When changes occur, the faculty members make in-course adjustments where appropriate in order to better prepare our students for the upcoming changes. Recent changes in teacher certification and Praxis exams have led to changes in academic advising, encouraging students to take Earth Science courses earlier in their curriculum so they can be prepared for those exams.

Provide an outline for each program curriculum, including the sequences of courses.

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, we have arranged our schedule so that students can receive a Natural Science degree with either a Life Science Option or a Physical Science Option in four academic years. The 8-Semester Course Sequences for the Natural Science major are included in APPENDIX A.

Students who arrive at UAM with a sufficient background in science and mathematics are advised to take a Biology course with lab or an Earth Science course with lab. Students that require remediation in mathematics or have not had sufficient high school science courses are encouraged to take mathematics and other courses in order to gain maturity and study skills. Currently, this is done through academic advising; however, there has been some thought of setting a minimum ACT requirement for entry into some of the entry level science courses. Typically, first semester freshmen with low ACT scores do not perform well in science courses. Students who need to start with a more basic science course than required by the Natural Science major, such as Introductory Chemistry have difficulty in completing either option of the Natural Science degree within four academic years unless the student attends summer school. Likewise, students who transfer from other universities, or those who declare Natural Science as a major later in their college career 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.

In the sciences, some courses are taught almost every term. Others are taught on a once per academic year schedule, and many upper level courses are scheduled on a two-year cycle. Most courses that are offered on a two-year sequence are upper level electives that can have another course substituted quite easily. A schedule of class offerings is depicted in Table 3 a, b, c & d, below.

Table 3a.—Schedule of Class Offerings in the UAM Biology Department

Class	Every Fall & Spring	Every Fall	Every Spring	Fall Odd Year	Fall Even Year	Spring Odd Year	Spring Even Year	Sum	As Needed	Last Term Taught
Intro Bio Science	X							X		Su15
Zoology /Lab	X							X		Su15
Botany / Lab	X									Sp15
Microbiology /Lab	X									Sp15
Princ. Biology I/Lab		X								F14
Princ. Biology II/Lab			X							Sp15
Anat. & Phys. I /Lab		X						X		Su15
Anat.&Phys. II/Lab			X					X		Su15
Ecology		X								F14
Genetics			X							F14
Comparative Anat		X								F14
Cell Biology			X							Sp15
Evolution			X							Sp15
Pharmacology			X							Sp15
Vert. Physiology			X							Sp15
Mammalogy				X						F13
Ichthyology					X					F14
Environmental Sci.					X					F14
Regional Flora						X				Sp15
Herpetology						X				Sp15
Waterfowl Ecology						X				Sp15
Molecular Biology						X				Sp15
Ornithology							X			Sp14
Marine Biology									X	Sp15
Invertebrate Zoology									X	Sp13
Biology Seminar			X							Sp15
Aquatic Biology									X	Sp12

Table 3b. Schedule of Class Offerings in the UAM Chemistry Department

Class	Every Fall & Spring	Every Fall	Every Spring	Fall Odd Year	Fall Even Year	Spring Odd Year	Spring Even Year	Sum	As Needed	Last Term Taught
Gen Chemistry I	X							X		Su15
Gen Chemistry I Lab	X							X		Su15
Gen Chemistry II			X					X		Su15
Gen Chemistry II Lab	X							X		Su15
Quantitative Analysis		X								F14
Organic Chemistry I		X						X		F14
Organic Chemistry II			X					X		Sp15
Elem of Phys Chem			X							Sp15
Instrumental Analysis						X				Sp15
Sp. Topics Chemistry				X					X	F13
Adv. Inorganic Chem					X					F14
Biochemistry I		X								F14
Biochemistry II			X							Sp15
Biochemistry Lab			X							Sp15
P-Chem: Thermodyn.						X				Sp15
P-Chem: Quan. & Kin							X			Sp14
Senior Research									X	Sp15
Adv Lab Techniques			X							Sp14

Table 3c. Schedule of Class Offerings in the UAM Earth Science Department

Class	Every Fall & Spring	Every Fall	Every Spring	Fall Odd Year	Fall Even Year	Spring Odd Year	Spring Even Year	Sum	As Needed	Last Term Taught
Elem. Geology/Lab		X								F14
Earth & Atmosphere			X							Sp15
Meteorology	X							X		Su15
Astronomy		X								F14

Table 3d. Schedule of Class Offerings in the UAM Physics Department

Class	Every Fall & Spring	Every Fall	Every Spring	Fall Odd Year	Fall Even Year	Spring Odd Year	Spring Even Year	Sum	As Needed	Last Term Taught
College Physics I/Lab		X								F14
College Physics II/Lab			X							Sp15
Univer. Physics I/Lab		X								F14
Univer. Physics II/Lab			X							Sp15
Univer Physics III/Lab		X								F14
Intro Electronics					X					F14
Mechanics									X	Sp12
Optics						X				Sp15
Modern Physics				X						F13
Computational Phys.			X							Sp15

State the degree requirements, including general education requirements, institutional, college, or school requirements, and major requirements.

The Bachelor of Science degree in Natural Science requires 120 hours, which includes 35 hours of General Education program, the Bachelor of Science identity requirement, 17-18 hours of supportive requirements, 16 hours of major core requirements and either 28 hours Life Science Option courses or 27-29 hours Physical Science Option courses . A minor is not required for the Natural Science degree. Electives will be needed to reach 120 hours. Since 40 hours of 3000-4000 level credit is needed for all degrees, Natural Science majors must take additional upper level hours. These hours can be from any discipline. Some students take additional math or science classes. Some take Education courses, others take courses in a discipline that will lead to a second area of teacher certification.

The Natural Science minor is 25 hours which is comprised of 8-hour blocks from two of the three areas of Biology, Chemistry, or Physics, and 9 hours of upper level electives from one of those areas. General Education requirements are listed in APPENDIX B. Natural Science major and minor requirements are found in APPENDIX C.

Indicate the semester/year the major/program courses were last offered. Exclude general education courses.

All classes that are required or serve as electives in the Natural Science major and minor and the most recent semester each was offered are listed in Table 4 on previous pages.

Provide syllabi for discipline-specific courses and departmental objectives for each course.

Syllabi for all classes that are required in the Natural Science major, minor or as upper level electives are assembled in APPENDIX D.

Outline the process for the introduction of new courses, including all internal curriculum review processes and the findings.

Science faculty members continually review the curriculum and make appropriate adjustments. Whenever a curriculum change is needed, 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 Math and Natural Science 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 meeting, which meets approximately 7 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 academic unit 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.

List courses in the degree program currently offered by distance delivery.

No required courses in the Natural Science program have been offered by distance delivery in the past ten years. Meteorology and Lab, an optional course in the major requirements is offered as a hybrid course. The lecture and lab materials are provided by The American Meteorological Society. All exams are taken face-to-face on the UAM campus. For the most part, the science faculty and the Dean of Mathematics and Natural Sciences are opposed to totally online courses, especially in laboratory offerings. Table 4 below shows courses in the program with a significant distance learning component.

Table 4. Natural Science Course Offerings with a Significant Distance Learning Component

Course	Name	Dissemination of Content	Turn in of homework and labs	Testing	Office Hours
ESCI 1123	Meteorology	Blackboard, Email, and AMS website	Blackboard and Email	Face-to-Face	Online or face-to-face
ESCI 1131	Meteorology Lab	Blackboard, Email, and AMS website	Blackboard and Email	Face-to-Face	Online or face-to-face

Describe the instructor-to-student and student-to-student interaction for distance courses (prerequisite courses, lab requirements, examination procedures-online/proctored, and instructor to student assignments).

The hybrid Meteorology lecture course is offered as an introductory college-level course with no pre-requisite and the corresponding laboratory course has the lecture as a co-requisite. Students are introduced to Earth's atmosphere and the dynamic world of weather via electronic textbooks and laboratory manuals A set of student laboratory learning investigations is coordinated with the textbook chapters by using current meteorological data delivered via the internet and coordinated with Current Weather Studies investigations delivered on the Real Time Weather Portal keyed to the day's weather by the American Meteorological Society. Students are given chapter review assignments in addition to the laboratory manual material which are submitted weekly into Blackboard. To facilitate instructor feedback on assignments a set of correct answers are e-mailed to students after the due date. The assignments are graded and grades are posted in Blackboard at two-week intervals. Students are encouraged to seek help from the instructor as needed and on-line/in office hours are kept. Exams (lecture/lab) are given on-campus and proctored by the instructor.

PROGRAM FACULTY (FULLTIME/ADJUNCT/PART-TIME)

Provide curriculum vitae or program faculty information form for all fulltime program faculty. The vita or form should include the following: all degrees and institutions granting the degrees; field or specialty of degrees; number of years employed as program faculty at the institution; current academic rank, if applicable; professional certifications/licenses; evidence of quality and quantity of creative and scholarly/research activity; evidence of quality and quantity of service activities; evidence of professional activities and non-teaching work experiences related to courses taught; list of course numbers/course titles of credit courses taught over the past two academic years; and other evidence of quality teaching.

Please see APPENDIX E for faculty vitae.

Indicate the academic credentials required for adjunct/part-time faculty teaching major/program courses.

No courses within the Natural Sciences are currently taught by adjunct or part-time faculty, and none have been taught on the main campus for several years. Occasionally an Introductory Chemistry section is taught by part-time adjuncts at the UAM Colleges of Technology. These serve as a general education course and are not accepted as part of the Chemistry or the Natural Sciences major. UAM and the School of Math and Natural Sciences strongly support the requirements set forth by the Arkansas Department of Higher Education. The requirements are: A master's degree, with at least 18 graduate hours in the field of study are required to be hired as an adjunct to teach lecture courses. No more than six hours can be education courses that focus on pedagogy.

A Bachelor's degree is required to serve as a laboratory instructor. An adjunct lab instructor was used one summer for General Chemistry I laboratory. The adjunct employee has a Master of Arts in Teaching degree and teaches chemistry at the local high school.

Describe the orientation and evaluation processes for faculty, including adjunct and part-time faculty.

During the Faculty Development Week that occurs just prior to the beginning of the fall semester, there is an official orientation program for new full-time faculty members. The orientation imparts information and documentation on advising, regulations, available resources, and teaching facilities. Throughout the meetings there are a number of workshops that provide training on academic advising, software, and accessible technology.

Each faculty member is evaluated annually. Faculty members are required to submit a self-evaluation to the Dean of the School of Mathematical and Natural Sciences. Those with less than six years of service are evaluated by a minimum of three peer faculty members, and observed in a classroom setting by the peer evaluators. In addition, each class is subjected to student evaluation. Tenured faculty and non-tenure-track faculty who have completed six years of service are required to undergo the full evaluation process at least once every five years. A full evaluation requires that three colleagues be chosen as peer evaluators with the individual being evaluated choosing two and the dean one. Peer reviewers of faculty members having a full evaluation must make at least one classroom observation. Also at least one section of each course the faculty member teaches during the spring and the fall semesters must complete a student evaluation. Those faculty members not required to undergo the full evaluation process (those with over six years of service) have one peer evaluator chosen by the Dean. Faculty members in the first six years of service undergo student evaluation in every class. After the sixth year, faculty members are required to have only one section of their classes complete a student evaluation per calendar year; however, most faculty members in Natural Science choose to have all classes evaluated. Faculty members submitting abbreviated evaluations include only new accomplishments in their self-evaluations.

Once this process is complete, the Dean reviews all of the combined evaluations to assess performance of the faculty member. The Dean uses the totality of peer evaluations, student evaluations, self-evaluation, and classroom observation data to complete a review of the faculty member's performance. The Dean schedules a meeting with the faculty member to discuss his or her accomplishments and make suggestions for possible improvements. After this review, the evaluation and all supporting material are sent to the Vice Chancellor for Academic Affairs (Provost) for his review and comments. If a faculty member disagrees with the Dean's evaluation, he may send information to the Vice Chancellor for additional consideration. After this process is completed, the Vice Chancellor for Academic Affairs sends his recommendation to each faculty member and to the Dean.

Provide average number of courses and number of credit hours taught for full time program faculty for the current academic year.

The expected course load is 12 credit hours per term for a full-time faculty member who holds an academic rank of Assistant Professor or higher. For these purposes, labs are credited at two-thirds of actual contact hours. The course load for those holding the rank of Instructor is 15 credit hours per term. Lab instructors are given credit for three hours of stockroom management as part of their teaching load. Occasionally, there are opportunities for extra courses to be taught as an overload for additional pay. Summer teaching opportunities are available for courses that meet the minimum enrollment of 10 students. A Chemistry Professor serves as the Dean of Mathematical and Natural Sciences, and therefore is on a quarter-time teaching appointment. See Table 5, below, for faculty workload for the past academic year. Table 6 shows the faculty appoints for the past academic year.

Table 5—Natural Science Faculty Workload for 2014-2015 Academic Year

		Summ II 2014			Fall 2014			Spring 2015			Summ I 2015			
Faculty Member	Department	credit hrs	contact hrs	SSCH	credit hrs	contact hrs	SSCH	credit hrs	contact hrs	SSCH	credit hrs	contact hrs	SSCH	Annual SSCH
Bacon, Ed	Biology				8	11	86	11	15	180				266
Bramlett, J.M.	Chem/Dean				3	3	228	3	3	129				357
Chappell, Jessie	Biology	2	5	21	7	17	174	7	14	145	2	6	21	361
Edson, James	Earth Sci	4	5	29	13	17	405	12	15	382				816
Fawley, K	Biology				9	13	384	10	16	219	1	3	1	604
Fawley, Marvin	Biology				1	2	2	1	2	5				7
Gavin, Jared	Math/Phys.	6	6	27	16	17	273	10	11	187				487
Huang, Jinming	Chemistry				11	17	334	15	20	74	4	6	39	447
Hunt, John	Biology	6	6	60	12	15	293	20	19	498				819
Manning, G	Biology				10	12	385	11	15	386	4	6	36	807
Morgan, Lauren	Biology				4	11	68	5	13	105				173
Sayyar, Kelley	Chem/ESCI	4	5	52	13	24	310	11	24	179				589
Serna, Juan	Physics				16	24	190	15	21	155				345
Sims, Chris	Biology				10	12	405	15	15	178	3	3	66	649
Stewart, Mary	Biology				7	12	335	10	12	260				595
Taylor, Jeff	Chemistry				8	12	211	12	18	283	4	6	36	497
Williams, A	Chemistry	4	6	53	10	12	208	12	12	438	4	5	60	759
Total On Campus with Full-time faculty members														8578

Jeff Taylor taught one lecture course in Spring 2015 for Biology (Pharmacology)

Kelley Sayyar's summer courses and one lecture and lab each term were in Earth Science (ESCI)

Karen Fawley receives a one course reduction each odd-year spring term for grant release time

Table 6. Natural Science Appointments 2014-2015

Program	Name	% Instr.	% Admin.	% Res./Outreach
Biology	Chappell	100		
	Bacon	100		Museum Director/Fund Raising
	Fawley, K	87.5		12.5 (Herbarium)
	Fawley, M		50 (Asst Dean)	50 (Res. Prog. for Minority Students)
	Hunt	100		
	Manning	100		
	Sims	100		
	Stewart	100		
Chemistry	Bramlett	25	75 (Dean)	
	Huang	100		
	Sayyar, K	75		
	Taylor	100		
	Williams	100		
Earth Sci	Edson	75		25 (Museum)
	Sayyar K.	25		
Physics	Serna	100		
	Gavin	50		

In Spring 2015, Karen Fawley received a one course reduction as Herbarium director. She will receive this release in Spring odd years.
Kelley Sayyar is technically the full-time chemistry lab instructor; however she teaches earth science courses
Jared Gavin is 50% mathematics, 50% physics

PROGRAM RESOURCES

Describe the institutional support available for faculty development in teaching, research, and service.

The University offers a variety of support in these areas. In the area of teaching, faculty members are encouraged to seek areas of special interest and, when possible, teach in those specific areas. Faculty members are encouraged to develop special topics courses, which may later become part of the regular curriculum if demand is great enough. Faculty members who wish to develop on-line or hybrid courses are supported with institutional training and financial incentives.

The University also provides technical support for those who wish to use instructional software such as Blackboard™ in their courses. The campus webmaster will provide assistance to faculty on their faculty webpages. All of the classrooms in the Science Center are equipped with a computer, a document camera, and a projector. Some Natural Science faculty members utilize this technology in their classroom instruction to a large extent, others use it very little.

Faculty members are encouraged to attend professional meetings to enhance their teaching skills or their work in other scholarly activities. The School of Mathematical and Natural Sciences may support faculty research and scholarly activity by granting course relief or off-campus assignment leave; Faculty members are encouraged to write textbooks and generate new methods of teaching using technology.

Competitive faculty research grants are available through the University to fund research. These grants can even pay student stipends for their work on projects with faculty members. Almost every tenured faculty member in the Natural Sciences has received one of these grants; several have won multiple grants. In addition, the University administration is extremely supportive to faculty who pursue research. UAM is primarily a teaching university, but the administration recognizes the importance of research for faculty renewal, and more importantly, for the advancement of students. The administration helps by facilitating and publicizing research.

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 Spectrometer, a UV-Vis Spectrometer, a workstation for molecular modeling, two standard thermal cyclers, a gradient thermal cycler, centrifuge with rotors, microcentrifuges, two research microscopes and digital cameras, bench top fluorometer, micropipetters, and miscellaneous laboratory supplies for teaching labs and undergraduate research have been purchased with these AR-INBRE instrumentation awards.

The UAM administration has also actively participated in fund-raising for the construction of a new Plant Research and Herbarium building on campus. The UAM Foundation provided an initial $100,000 for matching outside contributions for this building. The new building has been approved, and we anticipate completion of the project by Spring, 2016. The UAM Botanical Research and Herbarium building will house the UAM Sundell Herbarium, a collection of approximately 27,000 plant specimens that is extensively used for botanical research and teaching, a microscopy laboratory, a DNA sequencing laboratory, a botanical library and conference room, and office space for the UAM botanist.

The UAM administration has initiated a campaign to raise approximately $25 million to construct a new science and mathematics center on campus. Although the new building is likely several years away, this campaign indicates the sincere commitment of the UAM administration to STEM education and research.

The Natural Science faculty members are leaders on the UAM campus. Faculty members are encouraged to serve on university committees and the Natural Science faculty members are very active in this regard. Faculty members use their experience and specific skills while serving on committees. This provides a growth opportunity for faculty members and the university appreciates the services.

Natural Science faculty members are also active in service to the community, providing their expertise in a variety of areas. For instance, one faculty member provides planetarium shows to educational groups in the Pomeroy Planetarium, and also works closely with the public school chemistry teachers in Southeast Arkansas. Another has worked with Boy Scout troops, and has aided those young men in receiving their chemistry badges. One faculty member works closely with the Department of Education on the implementation of the Next Generation Science Standards. One faculty member occasionally works with the local police department to identify bones that turn up and are not easily identified by the average person. Biology faculty members serve as the Herbarium director and work closely with the Arkansas Native Plant Society and the Turner Neal Museum of Natural History. All the faculty play important roles as judges or head of the scientific review committee for the Southeast Arkansas Regional Science Fair.

Describe the professional development of full time program faculty over the past two years including the institutional financial support provided to faculty for the activities.

The School of Mathematical and Natural Sciences is provided a $6,600 annual budget for faculty development. A large portion of the money is used by Natural Science faculty members each year to attend professional meetings. Additional departmental funds are also used for faculty development. The development funds spent in Natural Science during the last two academic years are shown in Table 7 below.

Table 7.—Faculty Development Funds Spent 2013-2015

Date	Faculty Member	Location	Meeting or Conference	Cost
7/9/2013	Glenn Manning	Albuquerque, NM	Ichthyology and Herpetology Conference	621.35
8/14/2013	Andrew Williams	Indianapolis, IN	Gen Con Conference	114.20
9/27/2013	Glenn Manning	Steeleville, MO	Missouri Herp Association	338.61
10/5/2013	Andrew Williams	Little Rock, AR	Mid-South Inorganic Chemists Assoc. (MICA)	59.90
10/11/2013	Marvin Fawley	Mountain View, AR	Ark. Native Plant Society	99.00
10/17/2013	Mary Stewart	Fayetteville, AR	IDEA Network for Biomedical Research Excellence (INBRE)	339.85
10/17/2013	Marvin Fawley	Fayetteville, AR	IDEA Network for Biomedical Research Excellence (INBRE)	10.88
10/17/2013	Karen Fawley	Fayetteville, AR	IDEA Network for Biomedical Research Excellence (INBRE)	10.88
10/17/2013	Andrew Williams	Fayetteville, AR	IDEA Network for Biomedical Research Excellence (INBRE)	31.43
11/22/2013	Morris Bramlett	Conway, AR	Arkansas STEM Coalition	65.13
12/20/2013	Morris Bramlett	Little Rock, AR	NASA ASGC Meeting	58.99
1/17/2014	Morris Bramlett	Conway, AR	Arkansas STEM Board Meeting	75.61
2/13/2014	Morris Bramlett	Conway, AR	Arkansas STEM Board Meeting	76.19
2/13/2014	John Hunt	Nacogdoches, TX	Southeastern Bat Diversity Network	376.83
3/7/2014	Andrew Williams	Jonesboro, AR	Mid-South Inorganic Chemists Assoc.	191.84
3/6/2014	Morris Bramlett	Little Rock, AR	Posters at the Capitol	20.50

3/11/2014	Morris Bramlett	Conway, AR	Arkansas STEM Board Meeting	77.63
4/4/2014	Marvin Fawley	Searcy, AR	Arkansas Academy of Science	140.14
4/4/2014	Karen Fawley	Searcy, AR	Arkansas Academy of Science	30.94
4/4/2014	Ed Bacon	Searcy, AR	Arkansas Academy of Science	209.82
4/4/2014	Juan Serna	Searcy, AR	Arkansas Academy of Science	194.00
4/6/2014	Jinming Huang	Hot Springs, AR	NASA/ASGC Symposium	210.34
4/6/2014	Andrew Williams	Hot Springs, AR	NASA/ASGC Symposium	577.79
4/6/2014	Jeff Taylor	Hot Springs, AR	NASA/ASGC Symposium	124.18
4/12/2014	Morris Bramlett	Little Rock, AR	UAMS Pre-Medical Advisors Meetings	72.76
5/2/2014	Morris Bramlett	Conway, AR	Science Educators of Arkansas	73.39
7/30/2014	Glenn Manning	Chattanooga, TN	Ichthyology and Herpetology Conference	1270.17
8/13/2014	Andrew Williams	Indianapolis, IN	Gen Con Conference	202.58
8/8/2014	Morris Bramlett	Little Rock, AR	Arkansas STEM Coalition Meeting	79.31
9/5/2014	Morris Bramlett	Little Rock, AR	Arkansas STEM Coalition Meeting	60.94
9/9/2014	Morris Bramlett	Dumas, AR	AP Chem Teacher Workshop	25.20
9/19/2014	Morris Bramlett	Little Rock, AR	NASA/ASGC Meeting	65.67
10/10/2014	Marvin Fawley	Texarkana, AR	Ark. Native Plant Society	115.74
10/10/2014	Karen Fawley	Texarkana, AR	Ark. Native Plant Society	233.95
10/23/2014	Marvin Fawley	Hamburg, AR	Master Gardeners	24.36
11/6/2014	Lauren Morgan	Fayetteville, AR	INBRE Conference	35.85
11/6/2014	Jessie Chappell	Fayetteville, AR	INBRE Conference	34.15
11/6/2014	Karen Fawley	Fayetteville, AR	INBRE Conference	32.01
11/6/2014	Marvin Fawley	Fayetteville, AR	INBRE Conference	61.12
11/6/2014	Andrew Williams	Fayetteville, AR	INBRE Conference	56.85
11/6/2014	Jeff Taylor	Fayetteville, AR	INBRE Conference	76.21
11/6/2014	Jinming Huang	Fayetteville, AR	INBRE Conference	76.83
12/5/2014	Morris Bramlett	Conway, AR	Arkansas STEM Coalition Meeting	78.73
12/5/2014	Jim Edson	Hamburg, AR	Program for Elementary School Students	24.36
12/11/2014	Jinming Huang	Winston-Salem, NC	Instrument training workshop at Wake Forrest University	217.83
3/13/2015	Morris Bramlett	Little Rock, AR	Arkansas STEM Coalition Meeting	61.64
4/1/2015	John Hunt	San Diego, CA	Southwestern Association of Naturalist	1766.45
4/9/2015	Jinming Huang	Hot Springs, AR	NASA/ASGC Conference	210.34
4/9/2015	Andrew Williams	Hot Springs, AR	NASA/ASGC Conference	399.29
4/9/2015	Jeff Taylor	Hot Springs, AR	NASA/ASGC Conference	127.74
4/9/2015	Ed Bacon	Arkadelphia, AR	Arkansas Academy of Science	127.61
4/25/2015	John Hunt	Little Rock, AR	UAMS Pre-Med Advisors Meeting	62.38
5/15/2015	Morris Bramlett	Little Rock, AR	Arkansas STEM Coalition Meeting	56.39
6/5/2015	Morris Bramlett	Little Rock, AR	Arkansas STEM Coalition Meeting	66.69
6/15/2015	Glenn Manning	Reno, NV	Ichthyology and Herpetology Conference	320.00

Provide the annual library budget for the program or describe how library resources are provided for the program.

Each academic unit along with library liaisons recommends library purchases of materials. The budget is spent on books, e-books, journals, e-journals, and databases. The total budget for the entire School of Mathematics and Natural Sciences is $15,000; however, the budget is not split into amounts spent for each department. Periodically, library liaisons contact the School of Mathematical and Natural Sciences and seek guidance on new materials for the library. They also ask for advice concerning removal of obsolete material, old editions of books, or physically damaged material. Electronic databases are upgraded regularly giving the faculty excellent access to new publications. The library also offers a very liberal interlibrary loan policy, allowing each faculty free library loan requests.

Describe the availability, adequacy, and accessibility of campus resources (research, library, instructional support, instructional technology, etc).

The School of Mathematical and Natural Sciences provides the latest technology for instruction. Every classroom in the Science Center is equipped with a computer, a document camera, and a digital projector. All ten classrooms are connected to the internet. The Science Center Computer Lab and Tutor Center was upgraded in 2011 with computers that Information Technology (IT) indicates should provide excellent service for a minimum of seven years; five more computers were added in 2013. IT provides Microsoft™ software packages, SAS™ Statistical Software, and other needed software on request. IT also provides support for Blackboard™, which is available for every course offered on our campus or on-line.

The UAM Library features a large amount of content for faculty research and development, and can also be used in instructional technology. Library resources in the area of chemistry are extensive and include:

1. Periodical and Book Titles

   More than 1000 on-line periodical titles, 65 bound periodicals, and approximately 7000 books in various areas of biology, chemistry, physics and science are present in the library, in addition to extensive holdings in related areas, general science, and science education.
2. Electronic Resources by Subject
   a. Specialized Databases
      i. SciFinder
      ii. Science Direct
      iii. JSTOR: Life Sciences Collection
      iv. SpringerLink Ecology Abstracts
      v. GreenFILE
      vi. Wildlife and Ecology Studies Worldwide
   b. General Databases
      i. Academic Search Complete

ii. ArticleFirst
iii. Credo Reference Online
iv. FirstSearch Databases
v. LexisNexis Academic
vi. MasterFILE Premier 20
vii. ProQuest Research Library

3. Bibliographic Instruction

A faculty member may contact the library liaison to schedule a class period in which the librarian teaches students about resources that will be most helpful in their classes. Students can also request individual research consultations with a librarian.

Provide a list of program equipment purchases for the last three years.

Recent major purchases for the program are listed in Table 8 below. Note that this list does not include computers or audio-visual equipment for use in faculty offices, laboratories, or classrooms. Such equipment is generally replaced every 3-4 years, and is purchased with School of Mathematical and Natural Sciences funds. Some equipment is shared with other disciplines in Math and Sciences.

Table 8—Natural Science Major Equipment Purchases From 1-1-2012 to 7-1-2015

Date	Cost $	Item
Spring 2012	10,000	Molecular Modeling workstation and software
Spring 2012	3,500	Furnace
Spring 2102	700	Okaton pH Meter
Spring 2012	1,100	UV-Vis tabletop spectrophotometer
Spring 2012	14,340	Water Distillation Unit (shared with Biology)
Spring 2012	21,718	Nikon Stereo Microscope with Camera System
Fall 2012	8,545	Biological Incubator
Spring 2013	700	Okaton pH Meter
Spring 2013	1,200	UV-Vis tabletop spectrophotometer
Spring 2013	25,215	Nikon NIU Microscope
Spring 2014	860	Life Technologies SDS-PAGE Electrophoresis/Western blotting unit
Spring 2014	4000	Nitric Oxide Analyzer (used)
Spring 2015	59,023	70 Leica monocular microscopes and 4 digital microscope/camera units
Spring 2015	4,304	Set of 28 Micropipetteers

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. We have purposely avoided offering science courses using this medium. Faculty members are not discouraged from developing online or hybrid courses; however, very little has been done in this area. Only two courses are offered only with online instruction, Meteorology and Meteorology Lab. The two courses are considered hybrid courses with all testing done face-to-face. No courses within the Department of Chemistry are currently offered by distance delivery. Two sections of Introduction to Biology and lab are offered through the Office of Academic Affairs using an adjunct faculty member. Elements of Physics is offered in an online format once per year, and all other offerings of that course are face-to-face. Answers to the following questions are largely based on University policies, and may not directly apply to the limited distance learning offerings in this program.

Summarize institutional policies on the establishment, organization, funding, and management of distance courses/degrees.

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, Curriculum and Standards, Assembly, Chancellor, the University of Arkansas Board of Trustees, and the Arkansas Department of Higher Education Coordinating Board prior to implementation.

For an existing course to be offered via distance delivery, a Course Shell Authorization form must be completed and signed by the faculty member and approved by the academic unit dean and the Provost. Each faculty member who teaches an online course must participate in Blackboard, the campus learning management system, and in training offered by the UAM Office of Academic Computing prior to each fall semester or as the need arises. Technical assistance is provided by the Office of Academic Computing as needed throughout the academic year.

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.

Summarize the policies and procedures to keep the technology infrastructure current.

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.

In the summer of 2010, UAM, a founding member of the Arkansas Research and Education Optical Network (ARE-ON), connected to the ARE-ON Network allowing access to two high-speed national networks, the Internet2 and National Lambda Rail. Completion of this project allowed UAM to collaborate with all universities and colleges that share the network as well as access to the Internet at a much faster rate.

UAM has also purchased a financial and student information software system, PeopleSoft, updating the institution's 25-year old software system, which will make secure access to campus educational and planning resources available to students via the Internet. UAM began offering distance education courses in 1999 with WebCT, and utilized various versions of WebCT until summer 2010, when UAM changed over to Blackboard as its distance learning course management product of choice.

Summarize the procedures that assure the security of personal information.

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. The removal of any personal information found on the course management system is immediate. The Learning Management system (Blackboard in this case) is subject to the same security measures as all other Information Systems on the UAM campus and meets State of Arkansas security guidelines for protecting personal information.

Describe the support services that will be provided to students enrolled in distance technology courses/programs by the institution and/or other entities.

Support services provided to students enrolled in distance technology include advising, course registration, financial aid services, course withdrawal, e-mail services, access to library resources, and a help desk.

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.

Student e-mail accounts are governed by the University Information Technology department. The UAM webpage contains links to connect to e-mail, tutorials on using the e-mail system, instructions for initial login, and support phone numbers to contact in the event students are unable to log in to their e-mail. Information Technology is open 8 am-4:30 pm Monday-Friday for student e-mail account problems.

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 information should students need specific services that are not linked to the main page.

The Office of Academic Computing features a Support Center, also linked on the main UAM Webpage (Blackboard link). This link allows students to access tutorials on “How to Use Blackboard” and “Problems with Blackboard” for students to reference for quick resolutions. The support page also features contact phone numbers for the Support Center, a form to complete to request assistance via e-mail, and a “Live Chat” option in which the student can be directly connected to an individual in the support center for live assistance. The Office of Academic Computing also periodically offers workshops on Blackboard usage; these workshops are now required for all students utilizing any form of distance education.

Describe technology support services that will be provided to students enrolled in distance technology courses or programs by the institution or other entities.

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. The e-mail form, the chat option, and direct phone calls put users in contact with support personnel who gather information about the user’s computer, internet connection, and the specific problem. Using this information, support personnel attempt to diagnose the issue and provide a timely resolution to the problem.

Describe the orientation for students enrolled in distance technology courses or programs.

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 to this, the Meteorology and Meteorology Lab courses host a face-to-face orientation the first week of class. The instructor covers the basics of Blackboard, discusses homework requirements, and presents testing dates in person. Each style of orientation session presents the instructors contact information, office hours, and expectations for student performance in the course.

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. Students are also taught how to connect their personal and UAM technologies. Beginning with the Spring 2015 semester, students who wish to take an on-line class are required to take either the electronic version or face-to-face instruction and must be successful in an on-line assessment demonstrating mastery of the information. Students who fail to complete the course in a timely manner are dropped from on-line course registration.

Summarize the institutional policy for faculty course load and number of credit hours taught, compensation, and ownership of intellectual property.

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) 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) 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.

The Fair Use Doctrine currently enables educators to use copyrighted materials without first seeking permission. An educator can also use any materials where copyright permission has been obtained. The following sites offer more information.

• The Copyright Clearance Center (www.copyright.com) will obtain permission for educators; a fee is attached to this service.

• The Copyright Management Center at Indiana University/Purdue University site has information on how to seek copyright permissions. (http://www.iupui.edu/~webtrain/web_samples/cmc.html)

• The US Copyright Office (www.lcweb.loc.gov/copyright) allows one to search a database for copyright ownership."

In regard to course ownership of intellectual property developed by University faculty, please refer to attached APPENDIX F – University of Arkansas Board of Trustees Policy 210.2 regarding course ownership. In summary, this policy states that in most instances, faculty will own the copyright to material they have created, and retain the right to update, edit, or revise their work. Faculty also will receive all revenues of commercialization of content they create of their own initiative. For materials developed in regard to faculty contract employment pursuits, the University will retain the right for all revenues, but may decide to share such revenues with the developer at the discretion of the University.

MAJORS/DECLARED STUDENTS

State the number of undergraduate and graduate majors/declared students in each degree program under review for the past three years.

Number of students in the Natural Science program appears to have grown by approximately 400% in the past year; however, this is due to changes in the way allied health majors are listed at the University. To qualify for financial aid, students must be listed in a major that leads to a degree. Our allied health majors are now automatically enrolled in the Natural Science major, life science option. The major has enough elective hours that allow the student to take a wide variety of allied health program requirements. The major can be changed upon request of the student. Table 9, below, lists the number of Natural Science majors by class level during this period. There are no graduate Natural Science majors, as there is no graduate program in Natural Science at UAM.

Table 9—Number of Natural Science Majors per Class Level per Year, 2012-2015

	2012-2013	2013-2014	2014-2015
Freshman	0	1	14
Sophomore	2	0	9
Junior	3	2	7
Senior	3	5	6
Total	8	8	36

Describe strategies to recruit, retain, and graduate students.

As part of recruiting, the School of Mathematical and Natural Sciences has developed relationships with area high school science teachers. Faculty members occasionally make trips to local middle schools and high schools to present science topics to classes. One faculty member, Dr. Morris Bramlett, is very involved with the Advanced Placement Chemistry courses, and has worked with the Arkansas Advanced Initiative in Math and Sciences (AAIMS). He has provided training to over 1000 AP Chemistry students and their teachers over the last 5 years. These activities give faculty members an opportunity to market the University. Other faculty members provide expertise in their specific science content area.

The School of Mathematical and Natural Sciences also recruits potential students during their visits to events such as Scholar's Day, Weevil Welcome Days, and Parent/Family Appreciation Day. The Office of Admissions does an outstanding job of identifying top-notch students with skills in biology, chemistry, and mathematics and forwarding their information to our office. Prospective students receive a contact letter describing the science majors and pre-professional programs and an invitation to visit the school for further information concerning one of the Bachelors of Science degrees in our academic unit.

The State of Arkansas has changed the formula for state funding to emphasize the importance of retention and graduation, so that UAM has become even more focused than before on these important issues. The School of Mathematical and Natural Sciences has been heavily involved in a campus-wide initiative to promote retention and graduation. This initiative has resulted in a five-pronged attack on low retention and graduation rates:

1. E-Mentoring. This portion of the initiative seeks to teach students the fundamental computer related skills needed to succeed in both the traditional classroom setting and the on-line environment. This will be accomplished through the establishment of a Technology Fair, the introduction of a required On-line Learning Skills Course, and improvement and expansion of faculty use of Blackboard.
2. First Four Weeks program. This program seeks to improve student engagement, interest, and success during the first four weeks of each semester through a variety of techniques involving faculty-student interactions in the classroom. Faculty members will become more focused on raising expectations for student success, on communicating what those expectations are, on providing rapid, regular, complete feedback to students, and promoting active, engaged learning. Faculty members will also increase the integration of Student Support services into the learning experience.
3. First-Year Experience program. This initiative seeks to expand efforts to improve student success during the first year. Efforts will be made to aid students in improving their study skill set, and to provide assistance to faculty members in integrating study-skills components into freshmen level classes.
4. Student Services. This program seeks to increase the effectiveness of Student Services programs by achievement of synergies between academic advising, admissions, athletics, counseling/testing, instructional technology, library services, academic faculty, and the recruited student.
5. Remediation. Revision of scheduling and course load for students who require remediation has occurred, and adjustments will be continued as needed.

Several faculty members in the School of Mathematical and Natural Sciences served on the various committees involved in construction of this initiative, and many of the proposed strategies are already used by the science faculty, but more are being incorporated into the program.

To retain and graduate students, a large amount of emphasis is placed on academic advising. Every semester, each Math and Natural Science major must meet with the academic advisor prior to enrollment in classes. The advisors carefully plan the sequence of courses so that the student can graduate at the desired date. After the student reaches 70 hours, the advisor and student must submit an Advisement Report and a degree completion plan to the Registrar's Office.

Free tutoring is available on campus for students who are struggling, even in upper level courses. Many Math and Science upper level majors earn work-study wages by working in the tutoring lab. This helps the tutors handle the financial burden of college, while improving their content knowledge and teaching skills. Other students work as lab TA's, or grade homework for faculty members. The faculty members spend an enormous amount of time providing help sessions or working one-on-one with students during office hours.

During the student's last year of undergraduate work, faculty members help students with placement into a job in their field, or acceptance into a program where they can continue their education, such as medical school, dental school, pharmacy school, veterinary school, graduate school, or a masters of teaching (MAT) program. Even after graduation, faculty members often act as mentors for former students in various post-baccalaureate programs.

Provide the number of program graduates over the past three years.

There were 2 graduates of the UAM Natural Science program in 2013, 4 in 2014, and 4 in 2015, or an average of 3.3 per year. The ten-year average is 5.0 per year; however, that number is elevated by the excessively large number of graduates in 2012. Several in that group were students that received early admission into professional programs without ever graduating from UAM. If a student has 93 hours from undergraduate institutions, more than 30 hours from UAM, all general education courses completed, and more than 12 hours upper level credit, hours can be transferred back from the student's successful first year of their professional program to complete their degree at UAM. Six Natural Science graduates from that year were students that completed their degree requirements from professional school in previous year, but had never applied for their degree. Since the Natural Science degree contains courses that are part of the major or minor requirements of other disciplines, or general education courses, it is considered an embedded program, and is not subject to the minimum number of yearly graduates required by the Arkansas Department of Higher Education.

PROGRAM ASSESSMENT

Describe the program assessment process and provide outcomes data (standardized entrance or placement test results, exit test results, etc.).

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 to measure their learning. Exams cover material from the textbooks, instructor lecture, or activities completed during the course. In some classes, projects or homework are opportunities for students to display their understanding of concepts taught in the course as part of the grading component.

Secondly, several chemistry courses use the American Chemical Society standardized final exams. The Natural Science majors all take a minimum of 8 hours of chemistry, and most of those that choose the Physical Science Option will take chemistry as their upper level electives. 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, Math and Natural Sciences junior and senior students often take a standardized exam involving chemistry, biology, physics, or general science knowledge, 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 the natural sciences, or include specific science discipline course content 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. Recent pre-professional exam scores are shown in the table below. Note that not all students report results of such tests, and that some students take more than one test, or take one test more than once. Most of the students listed in Table 10 below are not Natural Science majors, but are majoring in one of the science fields that make up the components of the Natural Science major.

Table 10—Results of Standardized Pre-Professional Test Scores for Science Majors

MCAT (Medical College Admission Test) Science Majors-self reported

Student	Year	Physical Sciences	Biological Sciences	Total Score
A	2009	NA	NA	25
B	2009	7	9	23
C	2010	10	8	29
D	2010	10	10	28
E	2011	8	9	24
F	2011	7	7	22
G	2011	7	8	23
H	2011	10	12	32
I	2012	NA	NA	23
J	2012	9	11	28
K	2012	11	12	34
L	2012	7	8	25
M	2012	14	14	39
N	2013	8	8	23
O	2014	7	8	26
P	2014	6	5	16

MCAT (Medical College Admission Test) Science Majors-self reported (continued)

Student	Year	Physical Sciences	Biological Sciences	Total Score
Q	2014	10	10	29
R	2014	8	8	22

OAT (Optometry Admission Test) Science Majors - self reported

Student	Year	Gen Chem	%ile	Org Chem	%ile	Biology	%ile	Total Science	%ile
A	2009	310	61	400	100	350	83	350	88

GRE (Graduate Record Evaluation)

Student	Year	Verbal	%	Quantitative	%	Analytical	%
A	2007	590	83	580	44	4	33
B	2007	580	81	660	63	4	33
C	2009	390	30	620	53	4	37
D	2010	380	29	600	48	4	41
New Scoring System							
E	2011	162	90	158	74	NA	NA
F	2012	151	NA	146	NA	NA	NA
G	2012	158	79	160	84	4.5	72
H	2012	162	90	160	84	4	NA

DAT (Dental Admission Test) Chemistry Majors - self reported

Student	Year	Gen	%ile	Org	%ile	Total Science	%ile
A	2009	18	61	17	53	17	51
B	2010	17	47	21	86	18	63
C	2011	12	4	15	30	14	14
D	2011	18	62	18	60	17	49
E	2012	18	62	16	38	17	49
F	2014	21	89	19	75	20	88
G	2014	20	82	21	85	21	91

PCAT (Pharmacy College Admission Test) Chemistry Majors - self reported

Student	Year	Biol	%ile	Chem	%ile	Composite	%ile
A	2010	401	51	400	48	396	39
B	2012	434	91	412	68	410	68
C	2012	417	75	422	77	402	50
D	2012	411	63	392	34	401	47
E	2012	381	12	405	56	390	25
F	2012	399	40	395	39	400	45
G	2012	411	63	408	61	417	81
H	2012	411	63	418	76	409	66
I	2013	402	46	439	93	414	76
J	2013	399	40	415	72	406	59
K	2013	411	63	426	85	412	72
L	2014	430	89	422	81	414	76
M	2014	435	92	415	72	412	76

PCAT (Pharmacy College Admission Test) Chemistry Majors - self reported (continued)

Student	Year	Biol	%ile	Chem	%ile	Composite	%ile
N	2014	411	63	418	76	419	84
O	2014	396	35	405	56	388	20
P	2014	405	51	411	65	405	57
Q	2015			415	72	399	43
R	2015			396	45	382	16
S	2015			418	76	410	68

PRAXIS II Subject Area Exams Passed – Natural Science majors -Self Reported

Student	**Year**	**Subject Area Passed**
A	2006	Life Science and Earth Science
B	2007	Physical Science and Earth Science
C	2007	Life Science
D	2007	Life Science and Earth Science
E	2009	Life Science and Earth Science
F	2011	Life Science, Physical Science, Earth Science
G	2011	Life Science and Earth Science
H	2012	Physical Science
I	2012	Life Science

While the Natural Science degree does not have a single upper level course that all majors take, they are strongly encouraged to take Chemistry Advanced Lab Techniques if they are a Physical Science Option with Chemistry as their specialty, or Biology Seminar if they are the Life Science Option. Both courses require library research and writing a professionally formatted paper. An oral presentation is required at the end of the term. They are also encouraged to participate in undergraduate research which leads to a presentation at a local, regional, or national meeting.

Finally, the program is assessed by placement of the graduates. Most graduates are successful in finding positions. The UAM Natural Science graduates have entered a broad variety of jobs, graduate programs, and professional programs. The allied health students have a high rate of acceptance into their program of choice. Some students have applied to MAT programs; again, the acceptance rate is very high. A few have gone into private business or industrial positions. A graduate placement list is shown in APPENDIX G.

In addition to these methods of assessment, the School of Mathematics and Natural Sciences 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.

Describe program/major exit or capstone requirements.

The Natural Science major's broad range of topics makes it difficult to have a single capstone course that would be relevant to both the Life Science Option and the Physical Science Option of the major. Some of the Natural Science majors take the courses that serve as capstone courses for the Biology or the Chemistry programs; however most do not.

Provide information on how teaching is evaluated, the use of student evaluations, and how results have affected the curriculum.

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. The classroom observation portion of the evaluation process focuses on a faculty member's preparation and organization in the classroom, knowledge and presentation of the content, and communication and interpersonal relationship skills. This evaluation gives the reviewer a chance to provide constructive criticism on teaching performance and to suggest possible improvements. Please refer to APPENDIX H for the Classroom Visitation Form.

Student evaluations are an important means of feedback on the instructor's performance, the course content, and an opportunity to provide valuable comments and feedback for possible improvements in the course. Students are first asked to evaluate themselves as a student, thus providing some context for their input in regard to their classification, effort level, attendance, projected grade, and academic history. Students also evaluate the instructor on material presentation, teaching performance, and effectiveness. After evaluating the instructor, the student evaluates the course itself in the areas of content, testing, assignments, and textbooks. Student input is valuable in both the faculty evaluation process and feedback on the courses themselves. Student evaluation of courses is an important part of the process whereby the faculty reviews our curriculum. Student written comments in particular can provide valuable insight that faculty can consider for changes in course content or curriculum, or the possible creation of new courses.

Student evaluation of teaching is accomplished through a secure online survey operated by CoursEval. (The evaluation is being transitioned to Blackboard during the 2015-2016 academic year, but the evaluation process will be the same.) Students complete the survey outside of class. The survey consists of 6-8 specific questions, with opportunities to include written comments on some of the questions. In the survey, statements are made and the student has the opportunity to Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, or Strongly Disagree. The survey statements used on the Spring 2015 evaluations are:

1. The instructor is willing to help the students learn.
2. The instructor shows interest in and knowledge of the subject.
3. The instructor demonstrates effective oral and written communication skills.
4. I would recommend this instructor to other students.
5. I have more knowledge and a deeper understanding of the subject matter as a result of this course.
6. (A written response question) What did you like and dislike most about this course?

Faculty members use the written response question to make minor changes in their policies and course content. In addition, faculty members have the option to add questions to the normally used questions when specific circumstances dictate.

Provide transfer information for major/declared students including the receiving institutions for transfer and programs of study.

Incoming transfer students are welcomed to the program. Their transcripts are analyzed by one or more faculty members, and determinations are made as to which major requirements have been adequately fulfilled. There have been very few transfer students entering the program, and most of those have had very few upper level courses in Chemistry, Physics, and Biology; however, with the large number of electives allowed in the major, it is very transfer friendly. Faculty members are familiar with the other in-state programs and can efficiently evaluate the transcripts for students from those institutions. For other universities, the Registrar often supplies catalog information to the faculty to help in placement. Course substitutions are allowed when appropriate.

The Natural Science program does not serve as a feeder for specific programs at other institutions, so we rarely have a program student transfer to another university, other than for early acceptance into an allied health program or other professional school. However, 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. UAM Natural Science courses which meet these requirements include Introductory Chemistry and lab, General Chemistry and labs, and Introduction to Organic and Biochemistry and lab, Introduction to Biological Science and lab, Principles of Biology I and II with labs, Anatomy and Physiology I and II and labs, Botany and Lab, Zoology and lab, Earth and Atmosphere and lab, and College Physics I and II with labs. Students or faculty at UAM or other universities may determine transfer eligibility at the Arkansas Department of Higher Education website (http://acts.adhe.edu/studenttransfer.aspx).

Provide information for program graduates continuing their education by entering graduate school or by performing volunteer service.

The Natural Science faculty members at UAM feel that the program is successful when graduates are able to move on to the next level of their educational journey. It is the goal of the department to provide a program that is sufficiently broad to allow students to enter graduate programs, pre-professional programs, or to directly enter the workforce. The faculty works closely with all majors to make sure they are advised into the proper courses for the pathway they have chosen, and with juniors and seniors to help them make choices that best fit their skills and goals and to assist them through the various application processes. Two faculty members are assigned duties as allied health advisors. One faculty member is designated as the pre-med advisor, and acts as the primary advisor for most majors who wish to enter medical school. Another faculty member, and the dean, work with those wishing to enter pharmacy school. Over the past ten years, 1 Natural Science major has been accepted into medical school, 6 have been accepted into pharmacy school, 1 has been accepted into law school, 2 have been accepted into graduate school in sciences. Note that this number does not include several students who were accepted into allied health programs prior to completing their degree unless the student met the requirements of graduating as a professional school student, which is 93 hours, all general education completed, and a minimum of 12 hours of upper level credit from UAM. Since many allied health programs require only 36 -48 hours of undergraduate course work, many allied health students leave prior to receiving a degree of any kind from UAM. Placement information for all Natural Science graduates for the last ten years is provided in APPENDIX G.

Provide aggregate results of student/alumni/employer satisfaction surveys.

Each year, graduating seniors are invited to an exit interview with the Dean of the School of Mathematical and Natural Sciences. Many students take advantage of this opportunity. Their responses have been similar from year to year. The usual questions asked during the interview and typical responses are found below:

1) Background information: Name, Hometown, Major, Mailing Address, E-mail.
2) What brought you to UAM?
3) How do you rate your time at UAM, 1-5 with 5 being best?
4) What were your favorite parts of your educational experience at UAM?
5) What were your least favorite parts of your educational experience at UAM?
6) If you could do it over again, would you come to UAM? If no, why not?
7) Do you feel that you have received a quality education at UAM? If no, why not?
8) Is there anything you would change in your major curriculum?
9) Is there anything you would change in your minor (if in Math and Sciences)?
10) Was your academic advising adequate?
11) What about UAM would you change if you were chancellor for the day?
12) What are your plans after graduation?
13) What are your long term plans?
14) Is there anything else you would like to tell us?

Most Common Responses:

2) Grew up locally, didn't want to go far away. Have family that work in this area. Came because of athletics.

3) Most rank either 4 or 5. Occasionally someone ranks a 3. No student gave ranking of 1 or 2.

4) Small classes. Get to know professors and other students very well. Cheap. Lots of work study opportunities. Lots of friends here. I learned a lot.

5) Upper level courses not offered often enough. Not big enough to avoid course conflicts with multiple sections of some courses. Nothing to do here socially.

6) Most answer yes. Those that answer no usually indicate it is for non-academic reasons (lack of social life is most common explanation).

7) Most answer yes. The only negative response came from someone with no interest in graduate school or professional program, and couldn't find a job in this region in their area of study.

8) Reduce the number of labs needed for a degree in sciences. Don't have quant lab twice per week. More night class offerings. Offer more electives in chemistry.

9) Most say they have no changes. Don't require minors to take the lab portion of the courses. Increase the number of upper level options in physics.

10) Most say yes. There are a few, especially those that start in general studies, who complain about their first semester advising.

11) This question has a wide variety of replies. Improve buildings. Improve parking lots. Give entire campus wireless access. Build a new entrance to the college that doesn't have to go through Drew Central or Monticello schools. Drop athletic programs. Relax the alcohol rules on campus. Drop the history requirement.

12) Most have jobs or professional programs in place

13) Most have specific plans involving family and employment near hometown. A few plan to leave for bigger city.

14) This is most often unanswered.

The School of Mathematical and Natural Sciences has not conducted any sort of employer satisfaction survey concerning our 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.

Every effort is made by the Dean of Math and Sciences and by faculty members to remain in contact with alumni. Very few of these students have indicated that they have experienced any problems because of weaknesses in the program. Instead, most report that they have been exceptionally well-prepared for professional school, graduate programs, or their professional career.

Describe how the program is aligned with the current job market needs of the state or local communities.

As stated earlier in this document, Arkansas has an extremely strong demand for health-care professionals, including doctors and pharmacists. This area of the state has an exceptionally high need for those professionals. The Natural Science faculty constantly monitors the requirements for medical and pharmacy schools (as well as dental, veterinary, graduate, allied health, and other post-baccalaureate programs) to ensure that the curriculum is properly aligned with these schools. The Dean and Natural Science 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, so that graduates are well-prepared for entrance into a professional program in health care, an industrial laboratory, or education.

Provide job placement information for program graduates including the number of graduates placed in jobs related to the field of study.

A list of program graduates for the last 10 years and their initial placement is provided in APPENDIX G.

PROGRAM EFFECTIVENESS (STRENGTHS, OPPORTUNITIES)

List the strengths of the program.

The major strength in the program is the devotion of the faculty. The School of Mathematics and Natural Sciences has a very experienced and caring faculty who are continually searching for better methods to serve the students. In Chemistry and Biology, all tenure-track faculty members have received tenure and promotion, and have been at UAM since at least 2009. In Physics, the two tenure-track faculty members are fairly new; one hired in 2011 and the other in 2015. With the 2015 retirement of Jim Edson in Earth Science, the position was filled with a faculty member with a master's degree in Earth Science at the Instructor level. The faculty is extremely student-focused. Virtually every activity of each faculty member is conducted with students in mind; this student focus extends to faculty research programs and service activities. This attitude extends not just to Natural Science majors, but to all students of the School of Math and Science, and indeed to all students who take classes in the department. Every member of the faculty, from the most experienced professor to the newest lab instructor, understands that the only true measure of the success of the Department is the success of our students, so that every effort is made to ensure that success.

Being an embedded program with roots in the other sciences, the faculty members work very closely with each other. Individually, Chemistry, Biology, Physics, and Earth Science are strong departments; however, when combined, they form an exceptionally strong unit that is well connected to the public schools, graduate programs, and professional schools in the region. Rivalries and hard feelings between these departments that are sometimes seen at other universities are non-existent at UAM; instead, the Natural Science faculty members often work together on research projects and consult with each other about matters of curriculum, science, and student affairs. This collegiality extends to other units on campus that our students are closely involved with, such as the School of Education, the School of Nursing, The School of Forestry and Natural Resources, and the School of Agriculture.

The flexibility of the degree requirements is a major strength of this program. A 35 hour general education core, the 43-45 hours of major requirements, and 17 hours of supportive requirements leaves plenty of hours in the 120 hour degree to build the curriculum to fit the individual student. It was originally designed this way to fit the needs of science students that wanted to get certified to teach in a secondary science field; however, it now serves the many allied health programs that are popular today. An unintended result of developing this program is that UAM has a general science degree for science majors who don’t necessarily fit into one of the traditional science majors. Some students use it as the fall-back plan if the traditional science major doesn't work out; however, even those students have been quite successful upon graduation. See APPENDIX G for graduate placement.

Another program strength is the support received from administrators and staff across the University. The Dean of Math and Science is a chemistry faculty member that very much enjoys teaching. He remains involved in the day-to-day operation of the Natural Science program. He constantly fights for funding and is always willing to try any suggestion by the faculty that will help students succeed. The Admissions department works closely with the sciences to recruit top-notch students and to find scholarship or other financial aid for deserving students. The director of admissions is a strong supporter of the sciences at UAM. Upper administration recognizes the quality and success of the program and has moved to support it, especially within the last 5 years. The previous chancellor and the provost both openly praise the sciences at every possible opportunity.

A major strength of the program is the students. As a whole, UAM is known as an open-admissions university; however, very few students with low ACT scores enter the School of Mathematics and Natural Sciences. Data from a few years ago indicated that the average ACT for an entering freshman class was 17.4. The average ACT for the math and science majors was 24.3. The successful students are willing to work hard and put in long hours studying or working in the research labs. For the last several years, the upper level students have been instrumental in educating the freshmen in terms of what is expected of them. The students are quite proud of our record of success of acceptances into professional and graduate programs. As a whole, the School of Math and Sciences students are very involved with other aspects of university life. Some are athletes. Several are members of the Ambassadors, which is an elite group that serves the Office of Admissions. Several are in honor societies, such as Alpha Chi and Sigma Zeta. Many of our students are office-holders in clubs and social organizations.

List the areas of the program most in need of improvement.

The annual budget to support the sciences is less than is needed to maintain and replace aging equipment and supplies. A separate account of $10,000 is set aside each year for the School of Math and Sciences to purchase equipment. While this is greatly appreciated, it is not nearly enough to support Math, Physics, Geology, Biology and Chemistry. This amount is not enough to purchase larger equipment needed in the sciences. The last few years, a large portion of the money has gone to upgrade physics, which was in dire need of replacing aged 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. Although this will be a slow process, we hope that this will help improve the equipment holdings, which is the greatest improvement needed in the individual science programs.

The physical facilities are in great need of replacement. The Science Center continues to break down. There are several roof leaks that have not been repaired, despite multiple attempts. The cement steps are breaking apart in several locations around the building. Mold grows very well in the shady overhangs and shaded sides of the building. There is no return air in the labs which have hoods, so a great deal of air from underneath the building is pulled into the rooms. This has caused major problems with mold growing behind hoods, underneath lab benches, and under the heating and cooling units. Several faculty offices have mold deposits. Windows are original to the building. Most do not fit well and allow air and rain to enter the building. None offer any insulation. Since some of the windows are on the walls adjacent to raised sidewalks, security is non-existent. Many of the locking mechanisms are rusted to the point of not working at all. One digital projector system was stolen from the Science Center; others have been vandalized. Exterior doors offer little security. Frequently rain is blown under the doors. During weather changes more than one door sticks allowing air conditioning to be lost and creating very distracting noises. At times during the past year, certain doors were blocked off due to problems with the doors dragging. Even with its problems, many students think of the Science Center as their second home and hang out in the building between classes, despite the fact that there are no real student lounges or study areas. On top of the dilapidated state of the Science Center, it is too small to cope with growth in size and number of classes, and storage space is nearly non-existent. Great efforts have been made to make the Science Center a comfortable learning environment, but despite the best efforts of the Maintenance Department and the Dean of Math and Sciences, the building is unsafe, unhealthy, lacking in security, unattractive, and a barrier to recruitment. Fortunately, the upper Administration and Board of Trustees have recognized the situation and have made replacement of the Science Center a top priority of the University.

Approximately 20-30 years ago, several faculty retirements were not replaced. The number of science faculty has been the same since that time. Enrollment today is as much as twice it was 30 years ago. This has led to much larger sections, even though more sections are being taught. Larger classes not only diminish the quality of instruction, but this leaves little time for research or other scholarly activities by the faculty. Faculty are not given full credit toward their teaching load when teaching a laboratory, even though every faculty member would rather teach an additional lecture instead of a lab if given the choice.

Science faculty members are underpaid compared to faculty at similar institutions in the state and across the region. This disparity is especially egregious considering the experience and abilities of the faculty and the success of the students. Nowhere is this more evident than in the salaries of the lab instructors. Because laboratories traditionally have counted less toward the teaching load of faculty members, those who teach only labs have some of the heaviest workloads in the unit. Science laboratories are extremely important to students, as is reflected in the comments of graduates. However, lab instructors in the department have salaries which are even lower and more stagnant than other faculty members. When recently hiring a lab instructor, several qualified high school teachers turned down the opportunity to apply due to the fact it would have been a pay cut from their current position. There is some indication that the upper administration of the University has recognized this problem and will begin moving to solve it, but until this happens, faculty salaries will remain a drag on the morale of the Department.

There is an ever-increasing need for research experiences for science students. Many graduate schools and professional programs want students to have research experiences, which requires that our faculty members provide research opportunities. However, as teaching loads are presently calculated, faculty members receive no credit for one-on-one research training with students. This policy needs to be modified to encourage and reward faculty members for mentoring undergraduate research. We have essentially reached a point where most of the faculty members are unable to take additional students because they lack research space, equipment, and time. Some students have been turned away from research projects, or put off until a later term, simply because the faculty member cannot make the time to properly mentor another student.

List program improvements accomplished over the past two years.

Natural Sciences, and the departments that make up that major, its faculty, and its students have been consistently successful for many years. 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. To continue this success, the faculty is always striving to improve and upgrade the program. The largest improvement over the last two years is the increase in the number of undergraduates performing research and making presentations at professional meetings.

There have been no changes to the Natural Science curriculum in the last few years. Several have been discussed among the faculty; however, we have resisted adding specific requirements that would hinder the flexibility of this degree. This degree was designed for students interested in getting a broad background in science in preparation for a career in teaching. With that in mind, the major was intentionally left with a large number of hours as electives so that students could take courses from the School of Education, or from another area of interest that the student desired for certification.

Some students seek this major as an alternative to one of the other science majors. Occasionally a single course, such as Organic Chemistry, serves as a stumbling block for students in a particular major. The flexibility of the Natural Science programs allows students to switch to a different degree program without totally changing their career goals. The students that switch to Natural Science from one of the other sciences are not failures. They simply change their goals to better fit their skills. They continue to be successful with this degree. Some students choose this major because its flexibility allows them to graduate much quicker than would be possible in one of the conventional science programs.

Describe planned program improvements, including a timetable and the estimated costs. Identify program improvement priorities.

The most important improvement planned is a new Science Center. In 2014, a Building Committee was established to work with an architect to submit a proposal for a new Science Center. The Committee and the architect submitted a plan for a three-story building with ample classroom and laboratory space. Estimated cost of the new building is 25 million dollars. The UAM Office of Advancement has begun preliminary efforts to secure funding for the building, and the Administration has declared that the new Science Center is the top priority of the University. A timetable for building the new Science Center is contingent upon funding, but the architect estimated that construction would require about two years once the appropriate funds have been raised to start the building. The goal is have approximately one-third of the funds raised through private donations, one-third through a bond issue, and one-third from the state. Proposed plans for the new Science Center are included in APPENDIX I.

Funding has been secured for a new Botanical Research and Herbarium building that will house the UAM Sundell Herbarium, new laboratory space, a library and conference room, and office space. Renovations will also be made to portions of the Turner Neal Museum of Natural History, including upgrades to the climate control system, renovated laboratory space, and revamped office space. Construction will likely begin during the Fall 2015 semester. These projects will enhance research and education in the Natural Science Life Science Option.

Improvements will be made in equipment holdings. Recently, an equipment grant was received from the Arkansas IDEA Network for Biomedical Research Excellence (INBRE). A new HPLC system will be purchased along with several smaller items with that grant money. This purchase will be made within the next few months. For the next round of funding on this grant, it is likely that we will seek a GC-MS. This would be used in several upper level courses, as well as in research. It is hoped that this piece of equipment would be purchased in the next five years. Another piece of equipment that will likely be considered for the next major purchase in chemistry is an NMR. Because of our size and limited resources, we cannot afford the cryogens necessary for a superconducting instrument. We are strongly considering the injected sample NMR by Thermo-Fisher because of its reasonable price and durability. We currently have a 60 MHz Hitachi instrument that is broken. Some work has been done on that instrument; however, it is not known whether it can be repaired to satisfactory condition. Other small items, such as Spec-20 type spectrophotometers, pH meters, etc... are needed for the teaching labs.

In Physics, additional teaching equipment is being purchased. The teaching labs have improved tremendously in the past few years; however, we hope to continue to improve the equipment to be able to provide modern, high quality, experimental physics experiences for the Natural Science majors.

There has been discussion of enacting a physics curriculum that will provide an avenue for students wanting a degree in a physics field. Currently, there is not a Bachelor's degree in Physics; however, a Natural Science degree with an emphasis in Physics will certainly serve the purpose of putting well trained teachers with a physics background in the public schools to teach that subject and will also give the student an opportunity to enter graduate programs in that field. This would essentially do away with the single Physical Science Option, and lead to the development of a Natural Science degree-Chemistry emphasis and a Natural Science degree-Physics emphasis. This has not been a top priority since we have had very few students in the Natural Science major with interest in the physics option.

Biology has purchased several items of research equipment through funding from the Arkansas INBRE program in recent years that are also used for instruction. New microscopes were purchased using funding from donations and the UAM Centennial Fund; however, there is still a need for new dissecting microscopes and other small laboratory equipment.

There is continued discussion of adding specific requirements to the degree plan. Without a minor required, students have to pay close attention to the rule requiring 40 hours of 3000-4000 level credits. The major alone does not provide enough upper level hours to reach that number. Other upper level hours from any field must be taken as electives. We have discussed adding the requirement of Organic Chemistry I or Introduction to Organic and Biochemistry to the Life Science Option; however, some feel that this would not be good for the allied health students taking that major, so it remains unchanged at this time.