

Biology Program Review

School of Mathematical and Natural Sciences

University of Arkansas at Monticello

UAM is a comprehensive post-secondary institution in southeast Arkansas, serving the needs of students through teaching, research, and service. The School of Mathematical and Natural Sciences offers programs/courses in astronomy, biology, chemistry, earth science, mathematics, and physics. The focus of this review is the biology program.

I. Review of Program Goals, Objectives and Activities

A. Are the intended educational (learning) goals for the program appropriate and assessed?

The learning goals of the program don't seem appropriate. They aim to help students 1) obtain a degree, 2) prepare for their career or post grad education, and 3) reach their personal goals. However, they do not sound like learning goals specifically for biology. These are important goals, but what specific biological learning objectives does the program have? Do they want students to learn about evolution, the scientific process, applying biology to the real world? Vision and Change (www.visionandchange.org) provides an excellent framework constructed by AAAS, NSF, and others to identify the conceptual goals that are important for biology students. These include:

- evolution;
- pathways and transformations of energy and matter;
- information flow, exchange, and storage;
- structure and function; and
- systems

Learning goals are supposed to help you construct your program in a meaningful way. The programs current learning goals provide no method for deciding what classes are appropriate for a biology student. Give the current goals I guess they would take courses that would prepare them for specific careers. They can build a program around what others expect when the students graduate, but I think it would be better for student learning if their courses were constructed around understanding biology as a whole as well as prepare them for future positions. I think it would also be good to have a goal for faculty to use high impact practices (<https://www.aacu.org/leap/hips>). The program currently does undergraduate research and capstone experiences, which are high impact practices. Saying so explicitly in the program learning objectives would help students/faculty know the impactful ways to teach.

B. How are the faculty and students accomplishing the program's goals and objectives?

They are involved in: honors societies, science fairs, grant consortia, clubs, tutoring, programs for minorities, student research, capstone courses, Arkansas Academy of Sciences, scientific meetings and journals, biological stations and research laboratories, Arkansas Idea Network for Biomedical Research and Education. All of these endeavors will help prepare students for future careers and programs.

C. How is the program meeting market/industry demands and/or preparing students for advanced study?

They are successfully placing students in market/industry careers and grad schools. There is a large demand for medical, pharmacy, and teaching students in the nation and even more so in the state of Arkansas, so this is evidence for demand for the biology program. 22/24 med school applicants in past 10 years have been placed in programs. Students regularly go into pharmacy programs and teaching programs.

D. Is there sufficient student demand for the program?

The biology population of students appears to have remained stable for the past 10 years with 2014 being a peak for biology students. The program is growing in its service to other majors.

E. Do course enrollments and program graduation/completion rates justify the required resources?

Yes, majors have remained steady and demand outside of the program is increasing. It seems that the program should likely be allocated more resources to encourage this growth (if that is the goal of the program).

II. Review of Program Curriculum

A. Is the program curriculum appropriate to meet current and future market/industry needs and/or to prepare students for advanced study?

Yes. They offer courses commonly needed for market/industry and advanced study.

B. Are institutional policies and procedures appropriate to keep the program curriculum current to meet industry standards?

The process for introducing a new course seems appropriate.

C. Are program exit requirements appropriate?

They are appropriate. 120 credits, gen eds, minor. Also, capstone experience.

D. Does the program contain evidence of good breadth/focus and currency, including consistency with good practice?

The program has good breadth and has standard courses for the field.

E. Are students introduced to experiences within the workplace and introduced to professionals in the field?

As stated above, students are exposed to professionals in the field in several ways. See section IB.

F. Does the program promote and support interdisciplinary initiatives?

Yes, they are listed in section IB.

G. Does the program provide respect and understanding for cultural diversity as evidenced in the curriculum, in program activities, in assignment of program responsibility and duties; in honors, awards, and scholarship recognition; in recruitment?

Not entirely clear, but they are involved in the UAM research program for minority students.

III. Review of Academic Support

A. Does the program provide appropriate quality and quantity of academic advising and mentoring of students?

Yes, each major has to meet with faculty each semester. This is great. We do this in our program, as well. Submit advisement report. Faculty continue their connections to students even after they have left the program.

B. Does the program provide for retention of qualified students from term to term and support student progress toward and achievement of graduation?

Yes. In order to retain students the program is using e-mentoring, first four week program, first-year experience program (which is a higher impact practice!), student services, and remediation

IV. Review of Program Faculty

A. Do program faculty have appropriate academic credentials and/or professional licensure/certification?

Yes. The fact that they do not need to use part-time/adjunct staff seems great.

B. Are the faculty orientation and faculty evaluation processes appropriate?

Yes. There is an orientation and faculty are evaluated yearly, including peer review.

C. Is the faculty workload in keeping with best practices?

The faculty work load is standard. 12 credit hours per term.

V. Review of Program Resources

A. Is there an appropriate level of institutional support for program operation?

Faculty and staff pay is below levels at comparable institutions. Supplies are appropriate for teaching. Plenty of support for modest research (enough for a teaching institution). Plans for new facilities is great.

B. Are faculty, library, professional development and other program resources sufficient?

Yes. \$6600 for professional development, \$15,000 for library across School of Math and Nat. Science.

VI. Review of Program Effectiveness

A. Indicate areas of program strength.

For being a program that has relatively few faculty and staff the program offers a broad array of classes. As a student I would be very impressed with the diversity of courses. The program appears to have a strong commitment to professional development and research, which is always helpful to keep teaching on the cutting edge. The program has a strong field biology component.

The program is to be commended on their ability to keep track of where students go after graduation and their graduate exam records. I have to admit that our department is behind on keep track of these numbers.

Adding molecular biology and immunology will likely be appreciated by the pre-health students. The recent hire seems like a great and necessary addition to the program.

B. Indicate the program areas in need of improvement within the next 12 months; over the next 2-5 years.

Work on developing program learning goals that align with Vision and Change (www.visionandchange.org). Also, the Partnership for Undergraduate Life Science Education (PULSE, www.pulsecommunity.org) website provides opportunities for you to connect with other programs attempting to make this transition.

Work on developing ways to assess student learning beyond just exams and homework. If you are looking for places to start try the books: Scientific Teaching (Handelsman et al., 2007), Reaching Students (Kober, 2015), and Using Evidence of Student Learning to Improve Higher Education (Kuh et al., 2015). The former book was developed by the National Institute for Learning Outcomes Assessment (NILOA, <http://www.learningoutcomesassessment.org/>). Their website is helpful. Also, the Partnership for Undergraduate Life Science Education (PULSE, www.pulsecommunity.org) website is a wonderful resource for implementing Vision and Change and assessment. You can find a pdf on selecting assessment instruments here: <http://simpson.edu/wp-content/uploads/2012/08/Selecting-Assessment-Instruments.pdf>. The program suggests that being student-focused is one of their strengths. They can document their student focus by assessing the students and hearing in more detail what the students are learning and how they could better reach students from all backgrounds.

It is likely that the faculty member who advises all of the pre-health students has a very large advising burden. Try to come up with a strategy to relieve this advising load if you have not done so already.

Another area of improvement would be to develop specific courses dealing with introduction to college life and the biology program (i.e. first year experience course) and a course specific to biological research and the scientific method. The former course is a higher impact practice and would improve retention within the program. Given the strength of the faculty in terms of research the latter course would likely be fun to teach and would help give the students a stronger introduction to research. This course would be beneficial to all majors, because it would detail the scientific method and give students the opportunity to do their own (guided) research and read scientific literature. You could consider reducing some of the more redundant higher level courses based on taxonomy to provide time for faculty to teach the research course. This would also help solve the program's concern that they don't have support for conducting research with students. This proposed course would give the faculty the ability to bring their research into a class that they get credit for teaching. We have done this at our institution and have found the course is highly effective at improving outcomes for student knowledge of scientific research and for allowing faculty to pursue research (and getting credit for it at the same time). We have data that suggests that our course (which currently has 16 students) is more effective than individual research experiences. We used a national assessment tool for this.

I disagree with the school's stance on distance education. There has always been a need to educate people that don't have the ability to attend university in person. I have found that there is a large amount of distrust of distance education among colleagues of mine. I suggest that the department meet with their colleagues in distance education to discuss their fears about distance education. In many aspects I find distance learning courses to be more interactive (i.e. more contact between students and faculty) and challenging than brick and mortar courses. Often distance learning courses have higher standards for assessment than brick and mortar, as well. I do not know of any research that suggests brick and mortar is far superior to distance learning.

C. Indicate areas for program development based on market/industry demands that have not been identified by the institution.

I have no suggestions.

VII. Review of Instruction by Distance Technology (if program courses offered by distance)

A. Are the program distance technology courses offered/delivered in accordance with best practices?

NA

B. Does the institution have appropriate procedures in place to assure the security of personal information?

NA

C. Are technology support services appropriate for students enrolled in and faculty teaching courses/programs utilizing technology?

NA

D. Are policies for student/faculty ratio and faculty course load in accordance with best practices?

NA

E. Are policies on intellectual property in accordance with best practices?

NA

VIII. Review of Program Research and Service

A. Are the intended research and creative outcomes for each program appropriate, assessed, and results utilized?

They suggest students present at conferences. Some faculty publish papers and present at conferences. There is no mention as to how student research is assessed.

B. Are the intended outreach/service/entrepreneurial outcomes for each program's initiatives appropriately assessed and results utilized?

This was not addressed.

IX. Local Review Comments

A. How is the program meeting market/industry demands and /or preparing students for advanced study?

NA

B. What program modifications are needed?

NA

X. Report Summary

A. Include reviewer comments on the overall need for the program graduates/completers in the local area, region, and/or nation over the next 5 years.

There is an apparent need for this program as service to the rest of the university and as a training ground for those going into underserved medical, pharmaceutical, and teaching areas.

B. Include reviewer comments on overall program quality, state program review process, etc.

Overall, it appears that the program is strong. It is serving a growing population of students and has the courses required to prepare students for any biology-related career. They are placing students into competitive opportunities post-graduation. The faculty appear to be close knit and enjoy pursuing research and maintaining professional development. Their learning objectives need to be improved and more assessment beyond exams and assignments would put them at the forefront compared to other biology departments. The recent addition of new faculty, courses, and facilities makes the program even stronger.

