



Comprehensive Program Review

FY 2020 – 2021

Institution: Middle Georgia State University

Academic Program: BS Biology

College or School: School of Health and Natural Sciences

Department: Natural Sciences

CIP Code: 260101

Date of Last Internal Review: June 13, 2016

Faculty Completing Report: Dawn Sherry

Current Date: February 10, 2021

5 Year Enrollment by Campus and Graduation Trends

Enrollment: 5 year growth for programs by locations is -5.95% for Macon and -17.96% for Cochran. The overall 5 year growth regardless of campus is -7.70%.

Campus	Fall 2016	Fall 2017	Fall 2018	Fall 2019	Fall 2020	5 YR Growth	Fall 2016 compared to Fall 2020 only
Macon	262	262	293	216	205	-5.95%	-22%
Cochran	170	140	146	109	77	-17.96%	-55%
Warner Robins	30	23	29	28	16		
Dublin	22	20	21	19	4		
Eastman	1	2	0	0	0		
Online	18	18	24	37	63		
Off Campus	0	0	8	1	0		
Total	503	465	521	410	365	-7.70%	-27%

Graduates

- For data consistency, the fiscal year is in which the degree was awarded. For example, fiscal year 2019 includes degrees conferred in Summer 2018, Fall 2018, and Spring 2019.

FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	5 YR Growth	FY16 compared to FY20 only
27	12	33	24	34	5.93%	26%

Program Purpose & Mission

The Bachelor of Science degree in Biology prepares students for the array of opportunities in the field of biological science. This program offers an academically strong preparation of students planning to: (1) attend professional and graduate schools in biological and health science fields, (2) seek employment in industries using biologically related technology, or (3) teach biology in secondary schools. The department is committed to creating a well-rounded, scientifically educated student that is capable of competing on the local as well as national level.

Alignment of program mission with department, school and institutional mission

The B.S. Biology program aligns well with the mission of the Department of Natural Sciences, which is, in part, to provide courses for science majors pursuing their degrees. The B.S. Biology program does provide students interested in pursuing health science-related professional degrees (e.g., medical, dental, pharmacy, etc.) with a robust undergraduate biology degree that allows them to be successful in their professional programs. This aligns well with the school of Health & Natural Sciences mission. It should be noted that the biology degree also supports students interested in disciplines beyond health sciences and students have gone on to rigorous graduate/professional programs in Ecology, Veterinary Sciences, Biology and Wildlife & Fisheries. The department also has numerous students who enter directly into the workforce. Biology majors have gotten jobs related to water and wastewater management, in scientific laboratories and also teaching science in local schools (e.g., Stratford, Bibb county, Jasper County H.S., etc.) all of which align quite well with the institutional mission of creating lifelong learners whose scholarship and careers enhance the region.

Program age, tracks, concentrations, etc.

The B.S. Biology program has been offered on the Macon campus since the Fall of 2006. The Cochran campus program was first offered in Fall 2012. There are currently two tracks, the Biology track and the Biology Education track. The Biology Education track, which was housed in the School of Education from Fall 2016-Fall 2020, was moved back to the Dept of Natural Sciences starting Fall 2020.

Method of Delivery

The B.S. Biology program is only offered as face-to face, as warranted by the discipline.

Changes since last review

The most significant change to the program since last review is the reorganization of the College of Arts and Sciences and the subsequent move of the Department of Natural Sciences into the newly created School of Health and Natural Sciences. Additionally, the B.S. Biology Education track which was housed in the School of Education from Fall 2016-Fall 2020. In fall 2021, the B.S. Biology Education track is offered by the Department of Natural Sciences.

Benchmarks of Progress

Overall, the B.S. Biology program is a robust program at Middle Georgia State University. The B.S. Biology majors' graduation rate has increased over the past five years. This is likely due to the schedule having undergone critical review to ensure students are able to complete the program with course offerings as listed and a recent change to upper level electives, allowing any 3000 or 4000 level course to count toward the degree. Students who have graduated from the program have found jobs as laboratory analysts for wastewater treatment plants, as high school science teachers, as lab assistants in hospitals and other health care related facilities. Others have gone on to professional post-baccalaureate programs including medical, dental, veterinary and pharmacy schools. Currently, the department has alumni enrolled in medical school at Mercer University, in the Dental College of Georgia at Augusta University and at South University School of Pharmacy. Alumni have also entered graduate school programs at both the Ph.D. level (e.g., Kansas State University and University of Oklahoma) and the Master's degree level (Missouri State University).

Enrollment is down in the B.S. Biology program on both campuses. In Fall 2019 there was a noticeable drop in enrollment in the program (Table 1) and this decline in enrollment was greater in Cochran than in Macon. There are several factors contributing to the decline in enrollment on the Cochran campus. In Fall 2018, a new program offering, the B.S. in Rehabilitation Science, was started on the Cochran campus. The program is promoted as a pathway to physician's assistant studies physical therapy and other health care fields. Prior to the advent of this program, students interested in these types of programs would have sought a biology degree in order to meet the prerequisite requirements of these programs (<https://www.augusta.edu/alliedhealth/pa/requirements.php>; <https://www.apta.org/your-career/careers-in-physical-therapy/pt-admissions-process>). Therefore, it is likely that the

reduction in biology majors can be attributed, in part, to the new program. Additionally, over the last several years, enrollment in the GAMES program on the Cochran campus has declined precipitously (Table 3). These students were declared as STEM majors (e.g., biology, engineering, biochemistry, etc.), so decline in GAMES program enrollment negatively impacted Cochran enrollment.

Year	Count of Enrolled GAMES students
Fall 2016	23
Fall 2017	14
Fall 2018	11
Fall 2019	6
Fall 2020	2
Grand Total	56

Table 3. Count of enrolled GAMES STEM students from Fall 2016-Fall 2020.

Finally, Fall 2020 enrollment in face-to-face classes is likely down due to the global pandemic that is impacting enrollment across the United States. In Cochran, on-campus housing data comparing Fall 2020 to Fall 2016 mirrored the decline in enrollment in the B.S. Biology degree at -55% (Fall 2016, n=170 students total to Fall 2020, n=77 students total.)

There continues to be a challenge to offering upper level courses in Cochran due to low enrollment in upper level courses. Extremely low enrollment in Cochran upper level courses (e.g., <5 students) has resulted in cancellation of upper level courses in order to be able to offer

lower level courses required by non-science majors. This has been compounded by an increased need for more lower level courses in support of Health Sciences students' degree plans. It is recommended that the Cochran campus be responsible only for the first two years of the B.S. Biology degree. This recommendation is the same as it was in 2016. Removing the B. S. Biology program from the Cochran campus would solve two problems: 1) faculty with courses that are under-enrolled can be used to offer high enrollment lower level courses that are in demand (e.g., BIOL 1001/1002, CHEM 1151/1152, etc.); and 2) reduced lab space on the Cochran campus can be devoted to non-science major courses.

From fall 2016 until today, the Department of Natural Sciences has won grant monies from the USG STEM Education Initiative Fund for both STEM III and STEM IV grants for a total of approximately \$278,000.00. Grant monies were primarily used to improve performance and retention in STEM core courses and majors. Departmental faculty have been given opportunities to apply for STEM funded mini-grants to encourage undergraduate research opportunities for B.S. Biology majors. Students can pursue undergraduate research experiences by taking SCIE 2999 courses or BIOL 4894 courses.

Students who participated in undergraduate research tended to persist in the program. Across the grant period (Fall 2016-Spring 2020), the total number of students who have participated in undergraduate research for credit in the SCIE 2999 courses at Middle Georgia State University (MGA) was 143. Of these students, forty-seven did more than one research experience. Therefore, the number of unique students was 93. Of the 93 unique students, 32 of them were GAMES students (34%) and 61 were traditional students (66%). Eighty-one percent of the total 93 students persisted in STEM majors as undergraduates and 19% did not. During the USG STEM Grant period, 31 students who participated in undergraduate research projects graduated with B.S. Biology and of those 43% went on to STEM-related post baccalaureate programs. Twenty-three are still current students.

This past year, department faculty have introduced Course Related Undergraduate Research Experience (CURE) opportunities to students. Faculty were encouraged to apply for STEM grant funding to offer CUREs in their courses with priority given to STEM courses at the introductory level. This allowed a larger population of students to participate in research and has been shown to increase persistence in STEM majors. Five faculty opted in and offered the first CURE experiences at MGA from Fall 2019-Spring 2020 to a total of fifty-seven students. Courses in which CUREs were offered included both majors (e.g., BIOL 4110K, CHEM 1212K, MATH) and non-majors (BIOL 1002K). Multiple STEM disciplines were represented with these CUREs. Faculty in several of the courses surveyed students about the experience. STEM majors felt that the CUREs were a good way to learn about the process of science. Non-majors felt like they were contributing meaningful data and reported higher engagement levels compared to regular

labs. The Chemistry faculty compared performance of students on a lab report between one section that had CURE labs associated with them versus one section with no CURE labs. Their results indicated that students in the CURE labs were better able to relate specific water chemistry tests to tropical fish health. All but one of the faculty who offered CURE's last year, are offering them again this year. They intend to refine some of the CURE work they did last year by either narrowing the scope of the labs (Genetics) or by not having to move a number of labs online due to Covid-19 (Chemistry).

Plans for Action

The Department will continue to promote the B.S. Biology program to the best of its ability. This includes participating in campus recruitment events, engaging students with social media and keeping the website up to date. The department would appreciate institutional promotion of the biology degree as a professional degree that can lead to job opportunities at the B.S. level as well as the potential to pursue post-baccalaureate programs. In the upcoming year, departmental faculty have been invited to participate in the Southeastern Regional PULSE (SERP) Institute to improve undergraduate life sciences for all students in our region. The objective of the SERP Institute is to inspire and support departments in improving factors known to optimize student success and faculty efficacy.

Departmental biology faculty are interested in developing a distinct B.A. Biology degree to distinguish students who take non-science electives in the upper level curriculum from students who take all science courses. This distinction has a precedent at other USG institutions (ref websites) and is relevant to students applying to post-baccalaureate science programs. There is also considerable interest in developing an M.S. in Biology degree.

Program Demand

It is likely that demand for the B.S. Biology degree will remain high in the upcoming years. Students with science degrees can work in multiple sectors including scientific research, industrial and education. Employment outcomes for B.S. Biology degree holders are promising. Median annual earnings of Biology degree holders are at the national average and unemployment rate is lower than the national average (<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020144>) . The biology program also prepares students well for rigorous post-baccalaureate programs as evidenced by their admissions into graduate programs and medical, dental and veterinary schools.

Literature Cited

The Condition of Education 2020. National Center for Education Statistics. May 2020.
<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020144>. Accessed 2 February 2021.