

Academic Program of Review- Bachelor's of Science in Biology

College of Arts and Sciences

Dakota State University

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Part 1: Executive Summary of Findings

The Biology Program at Dakota State University (DSU) consists of five highly dedicated faculty members that are committed to provide quality education and independent research experiences to their students. The Biology program is supported by faculty members in Chemistry, Physics, Mathematics and Exercise Science who teach science and math support courses. In 2021 the Biology Program merged the Biology Education and the Biology degrees into a single Biology (BS) degree with two different tracks of specialization-Biology Education and Integrative Biology. Currently, the Biology Program is focused on four primary objectives that align with national trends in biology education. These goals aim to cultivate adept biologists capable of proficient problem-solving, critical thinking, and effective communication of biological concepts. In addition the program has goals that correspond with the mission of DSU to integrate technology into all curriculums. The program is in the process of developing new Program Learning Outcomes (PLOs) based on curriculum mapping and new assessment processes. The development of the new goals is to accommodate the change in staff and to better serve the Biology students.

The Biology Program is located in the recently renovated C. Ruth Habeger Science Center. This is a modern facility that has four teaching laboratories that serve as the classroom for upper level Biology courses. The Science Center is also home to Chemistry, Mathematics and Physics, facilitating collaboration between the different departments. While the current facilities and equipment meet the requirements for a Biology program, there still is a lack of dedicated space for faculty research labs. The current setup is not ideal and requires students and faculty members to work on independent research around class and lab schedules. If the program grows like they would like, this will become an even larger issue. In addition there is no dedicated budget for the purchase and maintenance of instrumentation. Current funding to support the Biology Program is dependent on limited state funding and lab fees. The unspent funds are placed into a reserve account that is carried over, and currently is the fund to purchase new equipment with. While it is important to purchase and maintain equipment it should not come from the student fees. These fees should be used for consumables used in the teaching laboratories.

To obtain a BS in Biology student must take the core biology course along with several other courses in the areas of Chemistry, Mathematics, Physics and Science Technology. Together these courses develop well trained biology students. The core biology courses, along with the biology elective courses help students master the program goals. Because faculty members are already at their max for teaching load with the required General Education course, the upper-level courses are only offered every other year. This becomes an issue when students take a class that is aimed at mastering a learning goal before it has been reinforced in another course. Developing a vertical system that builds on previous knowledge and having prerequisites for upper-level courses that go beyond BIOL 151 would address this issue.

It's evident that the Biology Program at DSU is smaller compared to other programs within the university. While the program sees a sufficient number of students enrolling, its retention rate is

unfortunately low, although aligning with the university's overall average. Identifying the reasons behind student departures could provide valuable insights for implementing strategies to encourage their continued presence on campus. The Biology Program is actively seeking alternative methods to both attract students to the program and improve retention rates. The introduction of dual majors such as Biology and Exercise Science presents an appealing option, particularly for those interested in pre-health professional programs. During my visit, it was apparent that the Biology department prides itself on delivering high-quality teaching and providing unique research opportunities for students. Interactions between students and faculty members were characterized by genuine care and positivity, fostering a nurturing learning environment. The department's greatest strength lies in its enthusiastic faculty members, who are eager to impart knowledge to their students. Despite being stretched thin by maximum teaching loads, service commitments, and departmental obligations, faculty members wholeheartedly support student research endeavors. It's crucial for the university to prioritize support for faculty members and their research programs to facilitate the growth and success of the Biology Program. By nurturing faculty enthusiasm and providing the necessary resources, DSU can attract more ambitious individuals and enhance the Biology Program's standing.

Part 2: Schedule of On-Site Visit

April 5, 2024

8:15-9:00 am - Provost Rebecca Hoey/Dean Mark Spanier-Heston Hall 309

9:15-9:45 am - Pete Hoelsing, Associate VP for Research & Economic Development
[Danielle Bolland-Peter Hoelsing Zoom link](#)

10:00-10:30 am -Jeanette McGreevy, Director of Institutional Effectiveness, Assessment, and Policy (DSC 133)

10:30-11:00 am-Andrew Sathoff DSU laboratory tour

11:00-11:30 am-Other support course's faculty: Jeffrey Elbert, Assistant Professor of Chemistry ; Peng Guo, Assistant Professor of Physics; Jeff Palmer, Professor of Mathematics

11:30-12:00 pm – Luke Chowning, Program Coordinator/Assistant Professor Exercise Program, which can double major with Integrative Biology Program starting in 2024-2025 (DSC 133)

12:15-1:15 pm - Lunch with Biology faculty (DSC 133)

1:30-2:00 pm- Biology majors: Oleksandra Rachynska, Braxton Lacher, Adam Peak, Brandon Daniels, Carter Malone, Wyatt Olson, Derek Moreno, Hannah Evans, Denyce Bravo, and Razim Sejmenovic, Jonah Worden, Emme Josko, Hannah Feser, Lilli Mackley will be invited but not all may be able to attend.

2:15-3:00 pm- Provost Hoey/Dean Spanier/Dr. Andrew Sathoff -Heston Hall 309

Part 3: Program Evaluation

I. Program goals and strategic planning

The program has four clear goals that will continue to be used till the end of the 23/24 academic year:

- 1. Graduates will have a basic knowledge of the principles of Biology.**
 - a. Graduates will understand the important concepts and methods of the major disciplines within Biology.
 - b. Graduates will have a basic knowledge of the history and philosophy of science and will understand the ethical and humanistic implications of the practices of science including issues in Biology that are controversial in nature.
- 2. Students will be able to use their knowledge of concepts in Biology to solve new problems.**
 - a. Students will understand the process of science including the basic steps of the scientific method and use this ability to conduct research in Biology.
 - b. Graduates will think logically and be experienced problem solvers.
- 3. Have a high degree of proficiency in the use of computer technology.**
 - a. Students will be proficient in users of computer technology to information, acquire and analyze data, and communicate results and conclusions.
 - b. Graduates will be able to successfully use technology in their post-graduate career.
- 4. Students will be able to communicate their knowledge and results effectively for a wide range of purposes and intended audiences.**
 - a. Graduates can effectively communicate information in writing.
 - b. Graduates are effective speakers communicating information to a variety of audiences.

In the Fall of 2021, Biology Education and Biology degrees were merged into a single Biology (BS) degree. Two different tracks of specialization were developed to support student's needs. This includes Biology Education and Integrative Biology. According to a self-reported study, most students focus on Integrative Biology, however, both tracks are trained in broad areas of Biology, and thus ensure students are well rounded in the discipline. The developed goals, specifically 1, 2 and 4 focus on knowledge of biological concepts, skills sets to critically think and communication of knowledge. These goals emphasize the scientific method and how to train students to understand science and how it works. Together these standards meet and align with national trends in Biology. Goal 3 effectively meets the mission of the University to include technology as part of the curriculum.

In the Fall of 2023, the Biology Program began the process of developing new Program Learning Outcomes (PLOs) based on curriculum mapping and new assessment processes. The development of the new goals is to accommodate the change in staff and to reflect the specific needs of students and faculty member's areas of focus. Their plan will be to annually review assessment data and make changes if necessary. This

will ensure the goals of the discipline are following national standards and aligning with the mission statement of the University.

While the new goals were not observed, it is recommended that they still emphasize the scientific method and focus on career-ready scholars that are able to apply biological knowledge to a wide range of professional and research endeavors. In addition, current students are broadly trained not only in Biology but also in a variety of topics such as Chemistry . It might be worthwhile to include a goal focused on the student's ability to integrate knowledge of Chemistry, Mathematics, and Computer Technology in a biological context. This will help emphasize well trained Biology students. To ensure the new goals of the program are in alignment with standard courses offered, course mapping to standard offered courses might also be useful. This will also help with assessment data and changes if needed.

II. Program resources

Faculty as a resource- the Biology Program currently consists of three full-time tenure-track professors, one-full time instructor and a lab instructor/ lab manager. Additional faculty in Chemistry , Mathematics, Physics, Exercise Science, teach math and science support courses. As for Biology faculty members, all hold advanced degrees and are trained in their specific specialties that align well with Biology. However, faculty members often teach courses outside their area of expertise to accommodate the limited number of staff and the courses that are required to maintain the Biology program. While this does seem somewhat of a concern, the proposed curriculum changes for 24/25 do reflect the course that best reflects the new hires of the program. As for teaching load, Biology faculty members are pushed to their max. The introductory and general education course, while essential to the University and specifically address the Regents General Education goal 6, these courses continue to consume a major portion of the faculty teaching load.

Regental General Education Goal (#6): Students will understand the fundamental principles of natural sciences and apply scientific methods of inquiry to investigate the natural world.

Moreover, faculty members up until recently, were responsible for lab prep, ordering supplies, recording keeping, ect. With the addition of a dedicated manager these tasks can be off loaded. Additionally the new lab manager serves as an instructor for several introductory lab sections. While the lab manager is essential it was noted that there is still a large load on faculty members to prepare for upper-level lab such as microbiology, genetics and molecular Biology.

It is impressive that the Biology department accomplishes so much with such few faculty members. In addition to their diverse teaching load, the faculty members are involved in numerous undergraduate research projects, serve on committees, mentor, advise and

support their students. From speaking with the students it is clear that the faculty members really care about their students in and out of the classroom. Furthermore, the Biology Program prides themselves on having all Biology students involved in independent research projects (Biol 498). While the current number of faculty members can accommodate this course, if there is any increase in enrollment there would need to be additional faculty members not only to mentor students in Biol 498, but also to help contribute to the upper-level courses that would need to be offered on a yearly basis.

Classroom, laboratory facilities and equipment

The C. Ruth Habeger Science Center is a modern facility that was remodeled in 2010. The facility has four teaching laboratories (one which is shared with Chemistry), dedicated prep rooms, instrumentation room, a green house, conference rooms, a large auditorium and faculty offices. Larger courses are taught in the auditorium, while smaller upper-level courses are taught in the teaching lab. The Science Center is also home to Chemistry, Mathematics and Physics, facilitating collaboration between the different disciplines. The Biology Program maximizes all spaces, especially the teaching labs. The advanced lab space is used for multiple courses at the same time, including for independent research (Biol 498). The Biology Program also takes full advantage of the storage and prep room space. For example a portion of the storage space has been converted to a projects room, which houses instrumentation for lab courses and student research projects. One major concern is the lack of space for independent research projects and dedicated research space for faculty members. Currently students have to work in the teaching lab spaces or in the prep rooms. The major issue is students need to repeatedly set-up and tear down components that are unique to their projects. If the University expects high-quantity research experience for students then they need to provide a physical space for this to happen.

The self-study indicates that current equipment and instrumentation meets the needs of students. The newly acquired Bio-Rad Gel Doc EZ Imager, Bio Tek Synergy H1 Microplate Reader and the Bio-Rad CFX Opus Real-time PCR system have provided additional resources to students for their upper-level course. These instruments provide students with the opportunity to work with equipment that is commonly found in larger research facilities. The newly acquired equipment is also useful for independent research projects and the support of high-quality research. In the self-study the program's support of equipment maintenance is an ongoing problem. While most of the equipment is in working order, there needs to be yearly maintenance on the equipment to prevent large expensive repairs. Having service contracts for yearly (or every other year) maintenance would lengthen the lifetime of the equipment and prevent costly expenses. What is the purpose of having these pieces of equipment if they are not maintained? These are yearly expenses that DSU should have year dedicated funds for. Furthermore, external equipment grants that can be applied for by the faculty members require institutional support for maintenance. Without dedicated funds to support maintenance of equipment the grants are unlikely to be funded.

Financial support

The two funding sources that support the Biology Program and those provided by the state to the College of Arts and Sciences, which are shared by all programs in the Science Center and through a discipline fee of \$21.20 per credit hour. These lab fees are placed in a local account and support courses in Biology and physical science courses. On average about \$35,000 per year is gained from the fees. The unspent funds are placed into a reserve account that is carried over. Because there are no in line funds directed towards equipment purchases, accrual of unspent funds can be used to purchase larger equipment if/when needed. While it is essential that equipment is purchased and maintained, it is unreasonable to ask students to pay a fee for items they are not actually using in the teaching labs. Lab fees should be earmarked for the consumables that directly benefit the students paying fees, this is particularly true for non-majors. In addition if the University does have funds to support the Biology program, there needs to be better transparency on these funds that can support student research and upgrade equipment.

Additional funding has been through SD-EPSCoR since 2019. DSU has been on a Track-1 project that funds have been used for equipment, consumables supplies, undergraduate student research stipends and travel. It is anticipated that DSU will be included in the next track of funding. DSU has also begun to become embedded in SD's Institutional Development Award (IDeA) Network of Biomedical Research Excellence (INBRE). Participation in this network would be excellent to help develop a stronger biomedical research program at DSU. This could also provide an opportunity to expand the Biology Program by hiring an additional faculty member to help reduce the number of credit hours each is currently teaching. This would give faculty members more time to commit to independent research and prepare external grants that would help the Biology Program long term.

The University also allocates funding to support faculty and student travel for professional development and conference attendance. This funding enables faculty members to stay updated on the latest research trends, network with peers, and present their work at conferences. Similarly, students benefit from these opportunities to enhance their academic and professional growth, gaining valuable experience and exposure to diverse perspectives in their field.

III. Program Curriculum

In the Fall of 2021, Biology Education and Biology degrees were merged into a single Biology (BS) degree, with two different tracks of specialization in Biology Education or Integrative Biology. Each track consists of the same 21 credit hours in core Biology classes. With the approved curriculum changes for 24-25 school year, these courses will include Introduction to Scientific Inquiry, General Biology I and II, Human Anatomy,

Principles of Ecology, microbiology, Introduction to Bioinformatics, Cell and Molecular Biology, Genetics and Undergraduate Research. All courses with the exception Human Anatomy, emphasize the scientific method and have a broad perspective in Biology. While Human Anatomy is the outlier in the course work, this course is popular for students pursuing health care and with the new development of the double major in Biology and Exercise Science.

Following the completion of the first year students are encouraged to take either Introduction of Biotechnology (BIOL 235) or General Botany (BIOL 201) over the summer. While this does seem ideal for students trying to graduate early or for students that are busy with athletics during the school, this might not be ideal for students who prefer in person courses or need summers off for whatever reason. Therefore this should not be the only time these courses are offered if you are looking for courses to reduce faculty teaching load during the regular academic year in the future. Once BIOL 235 and BIOL 201 are completed students should be prepared to take 300- level courses in the Biology core that will be completed during a student's 2-4 year at DSU. These courses include: Ecology (BIOL 311), microbiology (BIOL 331), Introduction to Bioinformatics (BIOL 335), Genetics (BIOL 371) and Cell and Molecular Biology (BIOL 343). To complete the Biology core course, students must also take Human Anatomy (BIOL 221), usually during their second year and finally an undergraduate research experience (BIOL 498). To complete the BS in Biology following Integrative Biology tracks, students must also take an additional 59 credits in Biology (19 credits), Science and Mathematics (22 credits) Science Technology (15 credits) and Social Science (3 credits). For the Biology Education specialization track students must still take the core Biology courses but have a reduced number of Biology, Math and Science electives because students also take nearly 30 credits of education classes and complete a one semester student teaching internship.

New for the 24-25 academic year is the possibility of earning a double major in Biology and Exercise Science. Because the Exercise Science program already requires students to take General Biology (BIOL 151), Human Anatomy (BIOL 221), Physiology (BIOL 325) and additional electives that support the Exercise Science major it is not a major stretch for students to earn the double major. I think this is an excellent track for students already looking to pursue advanced degrees in pre-health professional programs.

One major concern I have regarding the curriculum for the Biology Program is the prerequisites for the upper-level courses seems to only be the introductory general Biology course 151. While this course does lay the foundation for other courses I would suspect it fails to have the depth of course work that is required before entering an upper-level course. For example: in the student plan, students are taking microbiology their second year at DSU. They are taking this course before they have had general chemistry and cellular and molecular biology. Without these classes as the prerequisite this course may not be taught to the level that is expected for entry into a pre-health professional program. Another example is Ecology, again the only prerequisite is BIOL

151. What about the knowledge of statistics that is required for this course? In science the introductory classes have a large breadth to cover a full span of topics, while the upper-level courses focus on the depth of learning in a specific topic area. There should be a clear sequence of courses that are taken early and students can build on previous knowledge. However, having specific prerequisites (outside of BIOL 151) required for upper-level classes limits the flexibility for the Biology Program and frequency that class is offered (some are currently every other year). Because there are so few faculty members it would be very difficult to offer many upper-level courses and electives every year.

Another concern I have is with BIOL 498, while this course is excellent for a capstone course, will it be feasible for faculty members to mentor students one-on-one if enrollment increases? Faculty members are already stretched thin with course/lab prep, service, advising, etc. is it realistic to have faculty members take on multiple individual undergraduate research projects? While talking to the students they said numerous times how important the independent research they get to do with Biology faculty members is. Clearly this experience is making a very large impact on students and should be something the Biology Program continues. However if student enrollment increases even by 5 students staffing the Biology Program will also need to increase because if it doesn't this individual experience will not be feasible.

IV. Technology Integration

It is very clear that the Biology Program aligns with DSU's mission to integrate technology across all majors curriculum. The Biology Program chooses to integrate computer technology and train students in a broad manner with aims to facilitate transfer of computer science knowledge to the context of Biology. All Biology majors are required to take two computer science courses, including programming, which is frequently used in student capstone research projects. Students are also required to take a bioinformatics course (BIOL 235) and the skills learned in this course are integrated in other upper-level courses. Furthermore, the Biology Education Specialization track furthers students' learning in computer technology, and students graduate with a computer technology endorsement. Students that graduate from DSU in Biology are extremely well prepared for the use of technology making them more competitive for the job market following graduation.

V. Program Assessment

Currently, the common set of assessment measures includes course grades, national exam, graduate surveys, employer surveys and exit interviews. In 23-24, the Biology faculty began the process of developing new assessments that will be implemented in the next academic year. The Biology faculty have mapped their curriculum to help follow students through the Biology degree and identify when a student should master a particular learning goal.

Their goal is to prepare appropriate assessment activities that will provide direct measurements of student achievement of the new learning outcomes. They are also establishing a schedule to monitor the outcomes in courses to see if they correspond with the mastery of the outcomes. Faculty plan to annually review assessment data and make changes for improvement if necessary. One concern I do have is the frequency that courses are offered and the order which students take them. This might affect if the course is actually reinforced vs mastered. For example: in the student plan students will take cellular and molecular biology their eight semester at this point they will have goal 3 mastered. However in the sample plan students are taking the sixth semester and this is where goal 3 is reinforced. It is hard to master a topic before it is reinforced. I feel this will not set students up for success in upper-level courses. Again if upper-level courses

Appendix E: Program Assessment Plan

I = Concepts and skills for the outcome **introduced**.
 R = Concepts and skills for the outcome **reinforced**.
 M = Concepts and skills for the outcome **mastered**.

Biology students will:	Gen Biol I	Gen Biol II	General Botany	Environmental Biology	Intro. to Biotechnology	Human Anatomy	Ecology	Physiology	Microbiology	Cell and Molecular	Genetics	Vertebrate Biology	Conservation Biology	Immunology	Bioinformatics	Undergrad Research
Goal 1. Have a basic knowledge of the principles of biology. a. Important concepts and methods of the major disciplines within biology.	I	I	I	I	I		R	R	R	R	R	R	R	R		M
b. History and philosophy of science	I		R						R		M					M
c. Ethical and humanistic implications of the practice of science including issues in biology that are controversial in nature.	I			I	R		R				R	R	R	R		
Goal 2. Use their knowledge of concepts in biology to solve problems. a. Understand the process of science including the basic steps of the scientific method and use this ability to conduct research in biology.	I	I		I		R	R				R					M
Goal 3. will be proficient users of computer technology to find information, acquire and analyze data, and communicate results and conclusions.	I	I	I		I		R	R		M	R				M	M
Goal 4. Students will be able to communicate their knowledge and results effectively orally and in writing	I	I		I		I			R	R	R	R	R			M

were offered on a more regular basis (annually) this situation could be avoided and student learning would have a vertical vs horizontal learning experience.

VI. Student Support/ Student Enrollment

The number of students enrolled and the number of degrees awarded at DSU have trended upwards in the last five years. Focusing on the Biology program, the number of students entering the program has fluctuated over the past five years, with an average of ~30 students entering the program. Graduation rates with a BS in Biology have also fluctuated with an average graduation rate of 4.6 students. While the number of students graduating with a BS in Biology represents a very small percentage of the total number of degrees awarded, the enrollment for introductory courses and general education courses (BIOL 101, BIOL 103 and BIOL 151) and Human Anatomy (BIOL 221) have

remained high. Retention rates in the Biology Program have fluctuated greatly over the past five years (56%-80%), however these numbers are not significantly different from the overall University retention rates. The issue is there are still so few students graduating from the program. It was noted during my visit that a lot of student athletes enter the Biology Program but leave the school for various reasons related to athletics. It would be helpful to track the students that leave the Biology Program to figure out why the students are not completing the degree and if it really has to do with only student athletes. I see the possibility of dual majors in Biology and Exercise Science as a great incentive for students to get two degrees in the time that it takes to get one. I think this has the potential to greatly benefit the Biology program. For the students that are completing the Biology degree it is clear that the students are competitive for pre-health professional programs, graduate school and the workforce. Biology has done an excellent job of tracking student placement after graduation. This is really helpful when promoting the Biology Program to future students.

VII. Program Strengths and Area for Improvement

It is clear to me that the greatest strength the Biology Program has is the highly motivated faculty members and support staff. It was very evident when visiting DSU that each person in the Biology Program is passionate about teaching and the independent projects they work on with the students. At my visit the students overwhelmingly said their favorite thing about the Biology Program is the faculty members and how they care about them. The faculty members are continually looking for ways to build and strengthen their program. In addition they are supporting their students' learning goals and mentoring their independent research projects. Individually mentoring students is a very large time commitment on top of the already high teaching load. If DSU wants to continue having faculty members mentor students then additional faculty members may need to be hired if there is an increase in enrollment. If you want faculty members to be competitive for external research grants they need time, resources and equipment to work on their projects. Investment in your faculty members to prevent burnout, support their mental health and support their individual research programs should be a priority of the University.

Additional program strengthens

1. Support of the Biology Program from other programs (Chemistry, Physics, Mathematics and Exercise Science).
2. Dual degree with Exercise Science to support both programs and provide students with additional opportunities.
3. A curriculum that covers a wide breadth of topics so well trained biologists graduate from the program.
4. The roll out of new Program Learning Outcomes (PLOs) based on curriculum mapping and new assessment processes. The development of new goals will help support the recent hires and focus on their speciality.

Areas for improvement

1. A mechanism for faculty members to purchase equipment to support individual research projects that is not reliant on student fees.
2. Dedicated research space for faculty members. While this is more difficult to obtain without a major renovation, perhaps current storage spaces or prep rooms could be converted into a dedicated space in the short time.
3. Tracking students that do not complete the program. Having a better understanding of the “why” can be useful for recruiting strategies.
4. Define prerequisites for upper-level courses that go beyond BIOL 151 and build course work on the knowledge gained in previous courses.
5. Improve the order in which students are taking courses so they are not taking a class that is mastering a topic before it has been reinforced.
6. Per the students request- update the Human Anatomy lab with a cadaver to better prepare students for pre-health professional programs.

Part 4: Recommendations for Change

Supporting faculty members and their research programs is essential for fostering the growth and success of the Biology Program at DSU. By cultivating faculty enthusiasm and allocating adequate resources, DSU can attract ambitious students and elevate the standing of the Biology Program. While revisions to the curriculum and assessment are highly suggested, major changes need to be made at the institutional level to prioritize faculty members to mitigate burnout and strengthen their independent research initiatives.

Institutional changes

It was noted in the self report and at the campus visit that faculty members often find themselves stretched thin due to the demands of high teaching loads, administrative services, and individualized research mentoring. Balancing these responsibilities can be challenging, requiring meticulous time management and prioritization. Despite these challenges, faculty members remain dedicated to providing quality education and fostering meaningful research experiences for their students. In addition, faculty felt discouraged to apply for external grants because they already have limited time and energy. Institutional support plays a crucial role in empowering faculty members to pursue grant opportunities, especially when balancing heavy teaching loads. One effective strategy for facilitating grant writing amidst teaching commitments is to establish dedicated support structures within the institution. This could involve supporting grant writing workshops or seminars tailored to the specific needs and schedules of faculty members. Moreover, implementing policies that offer teaching load adjustments or course release time for faculty actively engaged in research and grant writing activities could provide the necessary flexibility and time needed to write competitive proposals. By fostering a supportive environment and offering practical assistance, institutions can empower faculty members to successfully pursue external funding opportunities while fulfilling their teaching obligations.

Enhancing support for acquiring large research equipment requires a comprehensive approach focused on maximizing fund utilization and ensuring transparent resource allocation. While maintaining and obtaining equipment is crucial, it's unreasonable to burden students with fees for unused items in teaching labs. Instead, lab fees should be directed towards consumables that directly enhance the educational experience, particularly for non-majors. One effective strategy could involve creating a dedicated fund exclusively for purchasing and maintaining research equipment within the Biology Program. By fostering collaboration among faculty, department administrators, and University leadership, DSU can develop a practical approach to prioritizing investments in equipment that directly enrich student learning and academic achievement.

Departmental changes

The current curriculum of the Biology Program only requires the introductory general biology course BIOL 151 as a prerequisite. While BIOL 151 provides a foundational understanding, it may lack the depth necessary for entry into upper-level courses. Establishing a clear sequence of courses that allows students to build upon previous knowledge effectively (i.e. additional prerequisites) will be essential for students to be introduced, reinforce and master the course material. It is recognized that imposing specific prerequisites beyond BIOL 151 could limit the Biology Program's flexibility and course availability due to limited faculty resources. Therefore this may not be feasible until there is growth in the Biology Program and more faculty members are hired and upper-level courses are taught every year. Balancing the need for prerequisites with program flexibility is crucial for optimizing student learning experiences.

Working together to support the Biology Program

To boost recruitment efforts, DSU can work with marketing to spotlighting the opportunity for one-on-one independent research available to students. By showcasing this unique aspect of the academic experience, prospective students can envision themselves actively engaged in meaningful research projects under the guidance of experienced faculty mentors. Highlighting the invaluable skills and experiences gained through hands-on research, DSU can attract ambitious students seeking a personalized and enriching educational journey. Furthermore, the University should strategically market the dual degree in Biology and Exercise Science, highlighting its unique benefits and career opportunities. The dual degree should emphasize the program's interdisciplinary courses and the program's hands-on learning experiences. Thus providing students with opportunities for a comprehensive understanding of both biological sciences and exercise physiology, preparing them for diverse career paths in healthcare, fitness, and research. Finally it would be useful to monitor students who do not finish the program to gain insight into the reason they departed thus providing valuable insight for refining recruitment strategies.

The Biology Program's greatest asset lies in its highly motivated faculty members and dedicated support staff. During my visit to DSU, it was evident that everyone in the Biology Program is deeply passionate about teaching and engaging in independent projects with students. Students

consistently cited faculty members as their favorite aspect of the program, emphasizing the care and support they receive. Faculty members are proactive in enhancing the program and supporting students' learning goals and research projects. However, individual student mentoring requires a significant time commitment alongside heavy teaching loads. To sustain faculty mentorship and competitiveness for external research grants, additional faculty members may be necessary with increased enrollment. Moreover, investing in faculty members to prevent burnout, support mental health, and foster their research programs should be a top priority for the University.