ACADEMIC AFFAIRS GUIDELINES

Section 2.3	Academic Programs	
Title:	Collaborative Biomedical Engineering Undergraduate Program Administration Guidelines	
Number (Current Format)	**Number (Prior Format)**	**Date Last Revised**
2.3.2.6.B(4)	2.19.D	05/2022
Reference:	AAC Guideline 2.3.2.6.A – Collaborative and Joint Agreement Guidelines	
Related Form(s):		

1. Collaborative Purpose

The ability to maintain a vibrant set of Biomedical Engineering undergraduate degree program options for students in South Dakota continues to be of critical interest to the South Dakota Board of Regents (SDBOR). As a result, the SDBOR has established a framework within both policy and guidelines to encourage institutions to identify collaborative opportunities that will allow for the sharing of faculty resources, expertise and infrastructure to improve efficiencies and reduce unnecessary duplication. Specifically Program Productivity[1] and Section Size[2] policies and guidelines have created exemptions to foster an environment for faculty across institutions to collaborate on common degree programs. Within this context, the purpose of the Collaborative Biomedical Engineering Program is to provide a framework for the common delivery of Biomedical Engineering programs (both face-to-face and via distance) for South Dakota Mines and University of South Dakota.

2. Partners & Institutional Leads

2.1. Participating Institutions: South Dakota Mines and University of South Dakota collaborate on the undergraduate Biomedical Engineering program. A student can elect to be degree seeking at either of the collaborating institutions.

2.2. Each participating institution will identify a designated institutional representative appointed by the Chief Academic Affairs Officer who will be responsible for coordinating activities with other partner institutions pursuant to the terms of this agreement.

2.3. Changes to the agreement may be made from time-to-time and must be agreed upon the designated institutional representatives.

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[1] Section 5.2.2.3 of the Program Productivity Review Guidelines establishes that degree programs flagged for review may explore options for degree program consolidation. When this coordination occurs and institutions can provide "Evidence that multi-institution collaboration will meet graduate production thresholds," benchmarks can be achieved by the sum of all graduates at the participating institutions.

[2] Section 2.6 of current AAC Section Size Guidelines established that "Collaborative courses with a selected instructional method code that result from a shared program agreement among Regental institutions shall be excluded."

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3. **Common Assessment Structure**

   3.1. Common Cross Curricular Skills

       3.1.1. BOR [Policy 2.3.9 – Assessment](#) specifies that all undergraduate degree programs within the Regental system will draw from a common set of cross curricular skills. Faculty shall select a minimum of five of the approved cross-curricular skills and develop learning outcomes specific to their program that align with the common definitions outlined in BOR policy.

       3.1.2. The participating institutions in the collaborative agreement (South Dakota Mines and University of South Dakota) will assess a common set of cross curricular skills to ensure greater coordination across the courses delivered to students in the program. The designated cross curricular skills include:

           3.1.2.1. *Critical & Creative Thinking*: A habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion. Both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking.

           3.1.2.2. *Inquiry and Analysis*: A systematic process of exploring issues, objects or works through the collection and analysis of evidence that results in informed conclusions or judgments. Analysis is the process of breaking complex topics or issues into parts to gain a better understanding of them.

           3.1.2.3. *Foundational Lifelong Learning Skills*: Involves purposeful activity, undertaking on an ongoing basis with the aim of improving knowledge, skills, and competence. (USD only)

           3.1.2.4. *Teamwork*: Behaviors under the control of individual team members-effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussion

           3.1.2.5. *Problem Solving*: The process of designing, evaluating and implementing a strategy to answer an open-ended question or achieve a desired goal.

           3.1.2.6. *Information Literacy:* The ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and convey that information to address the need or problem at hand. (SDSMT only)

       3.1.3. Participating institutions shall have the flexibility to identify and assess additional cross curricular skills that align with institutional priorities, but deviation from the five skills outlined in 3.1.2 of this agreement must be approved by the participating members of the consortium.

       3.1.4. Participating institutions agree to develop similar learning outcomes that align with each of the approved cross curricular skills, and maintain rubrics that evaluate student competency on three general levels.

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3.2. Individual Program Assessment

3.2.1. Participating institutions agree to assess student learning outcomes in a manner consistent with ABET accreditation standards. These program assessments must include:

3.2.1.1. ABET 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

3.2.1.2. ABET 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3.2.1.3. ABET 3: an ability to communicate effectively with a range of audiences.

3.2.1.4. ABET 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

3.2.1.5. ABET 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

3.2.1.6. ABET 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions

3.2.1.7. ABET 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

3.2.2. Participating institutions agree to provide assessment results of shared and common courses to the other participating institution for accreditation purposes. Assessment results will be discussed and exchanged annually.

3.2.3. Participating institutions wishing to change or modify assessment protocols of shared and common courses must seek approval from the other institution before implementation.

4. Curriculum

4.1. A common curriculum will be used by participating institutions that includes a core and elective options for students to achieve the degree program.

Biomedical Medical Engineering Core Coursework

BME 101/L Introduction to Biomedical Engineering
CSC 170/L Programming for Engineering and Science
BME/EM 214 Statics
BME 233 Property of Biomaterials
BME/IENG 301 Engineering Economics
BME/ISCI 335/L Biomedical Technologies

BME 303 Introduction to Biomechanics
BME 304 Biomedical Engineering Fluid Mechanics
BME 305 Biomedical Engineering Transport Phenomena
BME 306 Biomedical Engineering Thermodynamics
BME 401 Biomaterials
BME 463L Biomedical Engineering Lab
BME 464 Senior Design I
BME 465 Senior Design II

4.2. Shared Curriculum Matrix

4.2.1. Beginning with the Fall 2021 term the departments at South Dakota Mines and University of South Dakota manage the delivery of the curriculum. They agree which courses are to be offered and by whom following a multi-year plan and in according to processes established.

4.2.2. The shared collaborative curriculum will include, but may not be limited to:

4.2.2.1. Shared and/or common courses

4.2.2.2. Courses provided via remote modality between institutions

4.2.2.3. Shared and/or common course materials, including syllabi

4.2.2.4. ABET assessment tools and methods

4.2.2.5. ABET assessment data for student primary institutions

4.2.3. In addition to the common core curriculum to be completed by all students, an additional rotation of free electives will be provided, and students will be allowed to enroll depending on interest.

4.2.4. The rotation will include the delivery of courses offered during the Fall and Spring terms, and ensure equal distribution of course offerings across institutions that also ensures that students may successfully complete the degree requirements in a timely fashion.

5. Textbook & Instructional Resources

5.1. Consistent with BOR Policy 1.6.1 – Academic Freedom and Responsibility institutional faculty are given academic freedom to select textbook and instructional materials they deem appropriate for the upper division coursework delivered through the consortium.

5.2. Faculty from each institution teaching BME/ISCI courses required in the core curriculum will utilize a common set of textbooks and instructional materials. These instructional resources will be selected by a team of faculty with representation from each institution.

5.2.1. Once selected, an instructional resource committee will be tasked with routinely evaluating the viability of the resources for meeting established learning outcomes and/or cross curricular skills.

5.2.2. This committee will be tasked with identifying additional or new resources in the future if the need arises.

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6. **Funding Model**

   6.1. Tuition revenue generated by the home institution offering a course will remain with that home institution.

   6.2. For shared courses, separate sections will be created at each institution.

   6.3. Students pursuing the completion of the degree at a main campus location will be assessed the on-campus rate approved by the SDBOR.

   6.4. Students not enrolled in coursework at a main campus location will be assessed the established off-campus rate approved by the SDBOR.

7. **Revision Process**

   7.1. Representatives from each program will meet each semester to discuss assessment strategies, shared courses, and potential changes to this agreement.

   7.2. Any recommendations from these meetings would be forwarded to both institutions' Academic Affairs designees for approval and submission to the AAC.

SOURCE:

AAC May 2022.