SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

Substantive Program Modification Form

UNIVERSITY:	**SDSU**
CURRENT PROGRAM TITLE:	**Biotechnology (B.S.)**
CIP CODE:	**26.1201**
UNIVERSITY DEPARTMENT:	**Biology & Microbiology**
BANNER DEPARTMENT CODE:	**SBIM**
UNIVERSITY DIVISION:	**College of Natural Sciences**
BANNER DIVISION CODE:	**3T**

University Approval

To the Board of Regents and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.

Dennis D. Hedge — Vice President of Academic Affairs or President of the University

3/25/2020 — Date

1. This modification addresses a change in:

- ☒ Total credits required within the discipline
- ☒ Total credits of elective course work
- ☐ Program name
- ☐ CIP Code
- ☐ Total credits of supportive course work
- ☐ Total credits required for program
- ☐ Existing specialization
- ☐ Other (explain below)

2. **Effective date of change:** 2020-2021 Academic Year
3. **Program Degree Level:** Associate ☐ Bachelor's ☒ Master's ☐ Doctoral ☐
4. **Category:** Certificate ☐ Specialization ☐ Minor ☐ Major ☒
5. **If a name change is proposed, the change will occur:**
   ☐ On the effective date for all students
   ☐ On the effective date for students new to the program (enrolled students will graduate from existing program)
   Proposed new name:
6. **Primary Aspects of the Modification:**

Existing Curriculum				*Proposed Curriculum (Highlight Changes)*			
Pref	Num	Title	Cr Hrs	Pref	Num	Title	Cr Hrs
System General Education Requirement			**34**	**System General Education Requirement**			**32-34**
SGR 1 Written Communication:			6	SGR 1 Written Communication:			6
ENGL	101	English Composition I (3)		ENGL	101	English Composition I (3)	
ENGL	201	English Composition II (3)		ENGL	201	English Composition II (3)	
SGR 2 Oral Communication:				SGR 2 Oral Communication:			
SPCM	101	Fundamentals of Speech	3	SPCM	101	Fundamentals of Speech	3
SGR 3 Social Sciences/Diversity			6	SGR 3 Social Sciences/Diversity			6
SGR 4 Arts and Humanities/Diversity			6	SGR 4 Arts and Humanities/Diversity			6

Existing Curriculum				*Proposed Curriculum (Highlight Changes)*			
Pref	Num	Title	Cr Hrs	Pref	Num	Title	Cr Hrs
SGR 5 Mathematics: MATH 102 (3) and MATH 120 (3) or MATH 115 (5) or MATH 121-121L (5)			5	SGR 5 Mathematics: ~~MATH 102 (3) and MATH 120 (3)~~ ~~or MATH 115 (5)~~ ~~or MATH 121-121L (5)~~ MATH 115 Pre-Calculus or higher			3-5
SGR 6 Natural Sciences: BIOL 151-151L General Biology I & Lab (4) BIOL 153-153L General Biology II & Lab (4)			8	SGR 6 Natural Sciences: BIOL 151-151L General Biology I & Lab (4) BIOL 153-153L General Biology II & Lab (4)			8
Department Requirements			--	**Department Requirements**			--
–25 semester credits must be upper division (300 and above), with the exception that MATH 125 and 225, Calculus II and III, may be counted as five credits toward the total. –Students must complete a minimum of 33 credits from the natural sciences. Refer to departments offering the degree for specific course listings.			--	– 25 semester credits must be upper division (300 and above) with the exception that MATH 125 and 225, Calculus II and III, may be counted as five credits toward the total. – Students must complete a minimum of 33 credits from the natural sciences. Refer to departments offering the degree for specific course listings.			--
Major Requirements			**74-78**	**Major Requirements**			**73-75**
ABS	205	Biotechnology in Agriculture and Medicine	2	ABS	205	Biotechnology in Agriculture and Medicine	2
BIOL	119	First Year Seminar	2	BIOL	119	First Year Seminar	2
BIOL	202-202L	Genetics and Organismal Biology & Lab	4	BIOL	202-202L	Genetics and Organismal Biology & Lab	4
BIOL	204-204L	Genetics and Cellular Biology & Lab	4	BIOL	204-204L	Genetics and Cellular Biology & Lab	4
				BIOL	235-235L	Introductory Biotechnology & Lab	3
BIOL	383	Bioethics	4	BIOL	383	Bioethics	4
CHEM	112 -112L	General Chemistry I & Lab	4	CHEM	112 -112L	General Chemistry I & Lab	4
CHEM	114 -142L	General Chemistry II & Lab	4	CHEM	114 -142L	General Chemistry II & Lab	4
CHEM	326 -326L	Organic Chemistry I & Lab	4	CHEM	326 -326L	Organic Chemistry I & Lab	4
CHEM	328 -328L	Organic Chemistry II & Lab	4	CHEM	328 -328L	Organic Chemistry II & Lab	4
CHEM	464	Biochemistry I	3	CHEM	464	Biochemistry I	3
CHEM	466L	Laboratory Methods Biochemistry	1	CHEM	466L	Laboratory Methods Biochemistry	1
ENGL	379	Technical Communication	3	~~ENGL~~	~~379~~	~~Technical Communication~~ *(shifted to Capstone Requirement)*	~~3~~
MICR	233-233L	Introductory Microbiology & Lab	4	MICR	233-233L	Introductory Microbiology & Lab	4
MICR	448	Molecular Microbial Genetics	4	MICR	448	Molecular Microbial Genetics	4
MICR	450-550	Applied Microbiology and Biotechnology	3	MICR	450	Applied Microbiology and Biotechnology	3
MICR	438L	Techniques in Molecular Biology Lab	2	MICR	438L	Techniques in Molecular Biology Lab	2
PHYS	111-111L	Introduction to Physics I & Lab	4	~~PHYS~~	~~111-111L~~	~~Introduction to Physics I & Lab~~	~~4~~
PHYS	113-113L	Introduction to Physics II & Lab	4	~~PHYS~~	~~113-113L~~	~~Introduction to Physics II & Lab~~	~~4~~
						PHYS Electives	4
STAT	281	Introduction to Statistics	3	STAT	281	Introduction to Statistics	3
STAT	435-535	Applied Bioinformatics	3	STAT	435	Applied Bioinformatics	3
Advanced Fundamentals Requirements			**3-4**	**Advanced Fundamentals Requirements**			**3-4**
Select at least 3 credits from the following courses				Select at least 3 credits from the following courses			
BIOL	483-583	Developmental Biology	3	BIOL	483-583	Developmental Biology	3
MICR	332	Microbial Physiology	2	MICR	332	Microbial Physiology	2
MICR	332L	Microbial Physiology Lab	2	MICR	332L	Microbial Physiology Lab	2
MICR	439-539	Medical and Veterinary Immunology	3	MICR	439-539	Medical and Veterinary Immunology	3
MICR	424-524	Medical and Veterinary Virology	3	MICR	424-524	Medical and Veterinary Virology	3
VET	223-223L	Anatomy and Physiology of Domestic Animals	4	VET	223-223L	Anatomy and Physiology of Domestic Animals	4

Existing Curriculum				*Proposed Curriculum (Highlight Changes)*			
Pref	Num	Title	Cr Hrs	Pref	Num	Title	Cr Hrs
Applications Requirements			**3-4**	**Applications Requirements**			**3-4**
Select at least 3 credits from the following courses				Select at least 3 credits from the following courses			
ABE	343-343L	Engineering Properties of Biological Materials & lab	3	ABE	343-343L	Engineering Properties of Biological Materials & lab	3
AS	332	Livestock Breeding and Genetics	4	AS	332	Livestock Breeding and Genetics	4
AS	333-333L	Livestock Reproduction & Lab	3	AS	333-333L	Livestock Reproduction & Lab	3
DS	301-310L	Dairy Microbiology & Lab	4	DS	301-310L	Dairy Microbiology & Lab	4
DS	312-312L	Dairy Cattle Breeding & Evaluation & Lab	4	DS	312-312L	Dairy Cattle Breeding & Evaluation & Lab	4
HO	414-414L	Plant Propagation & Lab	3	HO	414-414L	Plant Propagation & Lab	3
HO/PS	383-383L	Principles of Crop Improvement & Lab	3	HO/PS	383-383L	Principles of Crop Improvement & Lab	3
MICR	440L	Infectious Disease Lab	3	MICR	440L	Infectious Disease Lab	3
Capstone Requirement			2-4	**Capstone Requirement**			**5**
Students will complete at least 2 credits from the following courses. Prefixes will vary with approval by program coordinator				~~Students will complete at least 2 credits from the following courses. Prefixes will vary with approval by program coordinator~~			
BIOL/ MICR	494	Internship	1-2	~~BIOL/ MICR~~	~~494~~	~~Internship~~	~~1-2~~
BIOL/ MICR	498	Undergraduate Research / Scholarship	1-2	~~BIOL/ MICR~~	~~498~~	~~Undergraduate Research / Scholarship~~	~~1-2~~
				BIOL	490	Seminar	2
				ENGL	379	Technical Communication – Biology & Microbiology	3
Electives				**Electives**			
Summary of Credits Biotechnology (B.S.)							
System General Education Requirement			**34**	**System General Education Requirement**			**32-34**
Department Requirements			**--**	**Department Requirements**			**--**
Major Requirements			**74-78**	**Major Requirements**			**73-75**
Electives			**8-12**	**Electives**			**11-15**
Total number of hours required for major			74-78	Total number of hours required for major			73-75
Total number of hours required for degree			120	Total number of hours required for degree			120

7. Explanation of the Changes:

The Department of Biology & Microbiology has identified the following changes to the Biotechnology major:

- Revise the requirement that students must complete MATH 115 or MATH 121 for SGR #5, to any Math course MATH 115 or higher. Some students enroll with a higher MATH course already completed.
- Replaced PHYS 111-111L Introduction to Physics I & Lab (4) and PHYS 113-113L Introduction to Physics II & Lab (4) with a PHYS elective. Students will complete a minimum of 4 credits in PHYS course(s). Not all healthcare programs require two semesters of physics for acceptance.
- Removed MATH 125 Calculus II. Modern biology is aided by large data sets so future professionals need a solid foundation in statistics. STAT 281 Introduction to Statistics will now be required.
- A third track was added for Pre-Vet students. We have had multiple students on pre-Vet track each year wanting a Biology degree. This third track is designed for Pre-Vet students wanting a Biology degree.

- The overall decrease in required course credits will free up credits for electives or towards a minor in another discipline area.