



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

Substantive Program Modification Form

UNIVERSITY:	SDSU
CURRENT PROGRAM DEGREE:	Bachelor of Science (B.S.)
CURRENT PROGRAM MAJOR/MINOR:	Biotechnology
CURRENT SPECIALIZATION:	N/A
CIP CODE:	26.1201
UNIVERSITY DEPARTMENT:	Biology & Microbiology
BANNER DEPARTMENT CODE:	SBIM
UNIVERSITY COLLEGE:	College of Natural Sciences
BANNER COLLEGE 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

4/3/2023

Date

1. This modification addresses a change in:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Total credits required within the discipline | <input checked="" type="checkbox"/> Total credits of supportive course work |
| <input checked="" type="checkbox"/> Total credits of elective course work | <input type="checkbox"/> Total credits required for program |
| <input type="checkbox"/> Program name | <input type="checkbox"/> Existing specialization |
| <input type="checkbox"/> CIP Code | <input type="checkbox"/> Other (explain below) |
| <input type="checkbox"/> Modification requiring Board of Regents approval | |

Must have prior approval from Executive Director or designee

2. Effective date of change: 2023-2024 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:

Reminder: Name changes may require updating related articulation agreements, site approvals, etc.

6. Is the program being modified associated with a current articulation agreement?

Yes ☐ No ☒

a. If yes, will the articulation agreement need to be updated with the partner institution following the approve of the program change? Please explain:

7. 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			32-34	System General Education Requirement			24-26
System General Education Requirement – Electives			12	System General Education Requirement – Electives			21
						SGR #1 Elective	3
						SGR #1 Elective	3
						SGR #2 Elective	3
		SGR #3 Elective	3			SGR #3 Elective	3
		SGR #3 Elective	3			SGR #3 Elective	3
		SGR #4 Elective	3			SGR #4 Elective	3
		SGR #4 Elective	3			SGR #4 Elective	3
System General Education Requirement – Required			20-22	System General Education Requirement – Required			3-5
ENGL	101	Composition I (SGR #1)	3	ENGL	101	Composition I (SGR #1)	3
ENGL	201	Composition II (SGR #1)	3	ENGL	201	Composition II (SGR #1)	3
CMST	101	Fundamentals of Speech (SGR #2)	3	CMST	101	Fundamentals of Speech (SGR #2)	3
MATH	115	Pre-Calculus or higher Consult advisor as some professional schools require calculus.	3-5	MATH	115	Pre-Calculus or higher Consult advisor as some professional schools require calculus.	3-5
BIOL	151	General Biology I (SGR #6)	4	BIOL	151	General Biology I (SGR #6) (Major Requirement)	--
BIOL	151L	General Biology I Lab (SGR #6)	0	BIOL	151L	General Biology I Lab (SGR #6) (Major Requirement)	--
BIOL	153	General Biology II (SGR #6)	4	BIOL	153	General Biology II (SGR #6) (Major Requirement)	--
BIOL	153L	General Biology II Lab (SGR #6)	0	BIOL	153L	General Biology II Lab (SGR #6) (Major Requirement)	--
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			74-76	Major Requirements			81-85
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	151	General Biology I (SGR #6)	--	BIOL	151	General Biology I (SGR #6)	4
BIOL	151L	General Biology I Lab (SGR #6)	--	BIOL	151L	General Biology I Lab (SGR #6)	0
BIOL	153	General Biology II (SGR #6)	--	BIOL	153	General Biology II (SGR #6)	4
BIOL	153L	General Biology II Lab (SGR #6)	--	BIOL	153L	General Biology II Lab (SGR #6)	0
BIOL	202	Genetics and Organismal Biology	3	BIOL	202	Genetics and Organismal Biology	3
BIOL	202L	Genetics and Organismal Biology Lab	1	BIOL	202L	Genetics and Organismal Biology Lab	1
BIOL	204	Genetics and Cellular Biology	3	BIOL	204	Genetics and Cellular Biology	3
BIOL	204L	Genetics and Cellular Biology Lab	1	BIOL	204L	Genetics and Cellular Biology Lab	1
BIOL	235	Introductory Biotechnology	3	BIOL	235	Introductory Biotechnology	3
BIOL	235L	Introductory Biotechnology Lab	0	BIOL	235L	Introductory Biotechnology Lab	0

Existing Curriculum

Proposed Curriculum (Highlight Changes)

Pref	Num	Title	Cr Hrs	Pref	Num	Title	Cr Hrs
BIOL	290	Seminar	1	BIOL	290	Seminar	1
BIOL	383	Bioethics	4	BIOL	383	Bioethics	4
CHEM	112	General Chemistry I	3	CHEM	112	General Chemistry I	3
CHEM	112L	General Chemistry I Lab	1	CHEM	112L	General Chemistry I Lab	1
CHEM	114	General Chemistry II	3	CHEM	114	General Chemistry II	3
CHEM	114L	General Chemistry II	1	CHEM	114L	General Chemistry II	1
CHEM	326	Organic Chemistry I	3	CHEM	326	Organic Chemistry I	3
CHEM	326L	Organic Chemistry I Lab	1	CHEM	326L	Organic Chemistry I Lab	1
CHEM	328	Organic Chemistry II	3	CHEM	328	Organic Chemistry II	3
CHEM	328L	Organic Chemistry II Lab	1	CHEM	328L	Organic Chemistry II Lab	1
CHEM	464	Biochemistry I	3	CHEM	464	Biochemistry I	3
CHEM	466L	Laboratory Methods Biochemistry	1	CHEM	466L	Laboratory Methods Biochemistry	1
MICR	233	Introductory Microbiology	4	MICR	233	Introductory Microbiology	3
MICR	233L	Introductory Microbiology Lab	0	MICR	233L	Introductory Microbiology Lab	1
MICR	448	Molecular Microbial Genetics	4	MICR	448	Molecular Microbial Genetics	4
MICR	450	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 Electives	4			PHYS Electives	4
STAT	281	Introduction to Statistics	3	STAT	281	Introduction to Statistics	3
STAT	435	Applied Bioinformatics	3	STAT	435	Applied Bioinformatics	3
Advanced Fundamentals Requirements			3-4	Advanced Fundamentals & Applications Requirements			12-16
Select at least 3 credits from the following courses				Select at least 12-16 credits from the following courses			
				ABE	343	Engineering Properties of Biological Materials	2
				ABE	343L	Engineering Properties of Biological Materials lab	1
				AS	332	Livestock Breeding and Genetics	4
				AS	333	Livestock Reproduction	2
				AS	333L	Livestock Reproduction Lab	1
				BIOL	470	Cancer Biology	3
BIOL	483	Developmental Biology	3	BIOL	483	Developmental Biology	3
				CEE	225	Principles of Environmental Science & Engineering	3
				CHEM	448	Biophysical Chemistry	3
				CHEM	448L	Biophysical Chemistry Lab	1
				CHEM	465	Biochemistry II	3
				DS	301	Dairy Microbiology	2
				DS	301L	Dairy Microbiology Lab	2
				DS	312	Dairy Cattle Breeding & Evaluation	2
				DS	312L	Dairy Cattle Breeding & Evaluation Lab	2
				HO	414	Plant Propagation	2
				HO	414L	Plant Propagation Lab	1
				HO/PS	383	Principles of Crop Improvement	2
				HO/PS	383L	Principles of Crop Improvement Lab	1
MICR	332	Microbial Physiology	2	MICR	332	Microbial Physiology	2
MICR	332L	Microbial Physiology Lab	2	MICR	332L	Microbial Physiology Lab	2
MICR	424	Medical and Veterinary Virology	3	MICR	424	Medical and Veterinary Virology	3
MICR	439	Medical and Veterinary Immunology	3	MICR	439	Medical and Veterinary Immunology	3
				MICR	440L	Infectious Disease Lab	3
				MICR or BIOL	494	Internship (max of 3 credits)	3
				MICR or BIOL	498	Research (max of 3 credits)	3

Existing Curriculum				Proposed Curriculum (Highlight Changes)			
Pref	Num	Title	Cr Hrs	Pref	Num	Title	Cr Hrs
VET	223	Anatomy and Physiology of Domestic Animals	4	VET	223	Anatomy and Physiology of Domestic Animals	3
VET	223L	Anatomy and Physiology of Domestic Animals Lab	0	VET	223L	Anatomy and Physiology of Domestic Animals Lab	1
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	Engineering Properties of Biological Materials	3	ABE	343	Engineering Properties of Biological Materials	3
ABE	343L	Engineering Properties of Biological Materials lab	0	ABE	343L	Engineering Properties of Biological Materials lab	0
AS	332	Livestock Breeding and Genetics	4	AS	332	Livestock Breeding and Genetics	4
AS	333	Livestock Reproduction	3	AS	333	Livestock Reproduction	3
AS	333L	Livestock Reproduction Lab	0	AS	333L	Livestock Reproduction Lab	0
DS	301	Dairy Microbiology	4	DS	301	Dairy Microbiology	4
DS	301L	Dairy Microbiology Lab	0	DS	301L	Dairy Microbiology Lab	0
DS	312	Dairy Cattle Breeding & Evaluation	4	DS	312	Dairy Cattle Breeding & Evaluation	4
DS	312L	Dairy Cattle Breeding & Evaluation Lab	0	DS	312L	Dairy Cattle Breeding & Evaluation Lab	0
HO	414	Plant Propagation	3	HO	414	Plant Propagation	3
HO	414L	Plant Propagation Lab	0	HO	414L	Plant Propagation Lab	0
HO/PS	383	Principles of Crop Improvement	2	HO/PS	383	Principles of Crop Improvement	2
HO/PS	383L	Principles of Crop Improvement Lab	1	HO/PS	383L	Principles of Crop Improvement Lab	1
MICR	440L	Infectious Disease Lab	3	MICR	440L	Infectious Disease Lab	3
Capstone Requirement			5	Capstone Requirement			5
BIOL	490	Seminar	2	BIOL	490	Seminar	2
ENGL	379	Technical Communication – Biology & Microbiology	3	ENGL	379	Technical Communication – Biology & Microbiology	3
Electives			10-14	Electives			9-15
Summary of Credits Biotechnology (B.S.)							
System General Education Requirement			32-34	System General Education Requirement			24-26
Department Requirements			--	Department Requirements			--
Major Requirements			74-76	Major Requirements			81-85
Electives			10-14	Electives			9-15
Total number of hours required for major			94-98	Total number of hours required for major			84-90
Total number of hours required for degree			120	Total number of hours required for degree			120

8. Explanation of the Change:

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

- Removed a specific course selection from SGR #1 and SGR #2 to allow students more flexibility in meeting their System General Education requirements.
- Removed BIOL 490 Seminar (2 cr.) & ENGL 379 Technical Communication (Capstone) (3 cr.) and replaced with 1 additional upper division elective from the listed courses. Through advising students will be strongly encouraged to engage in research and internship (BIOL 498 & BIOL 494) to gain research, hands on experiences, and science communication skills.
- Combined Advanced Fundamentals Requirements and Applications Requirements into one list. The previous separation of the two was somewhat arbitrary as many courses on both offer both advanced fundamentals and applications content.

- Add 4 elective course options pertinent to the learning outcomes and career goals highly sought out by Biotechnology students and the business and industry opportunities they will pursue post-graduation.
- Removed the department requirements to complete 25 upper division credits with the exception that five credits of MATH 125 and MATH 225 may be counted toward that total and that students were required to complete a minimum of 33 natural sciences courses. This language is redundant to current program requirements and SDSU and BOR graduation policy requirements. The requirements were carried over when the department transitioned from the College of Agriculture and Biological Sciences to the College of Natural Sciences.