

SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs

AGENDA ITEM: 4 – M (3)

DATE: March 30 – April 1, 2016

SUBJECT: Intent to Plan: SDSU BS in Human Biology

South Dakota State University (SDSU) has submitted an Intent to Plan requesting approval to develop a Bachelor of Science program in Human Biology. Approval or waiver of an Intent to Plan is required prior to submitting a formal program proposal. The proposed BS in Human Biology will replace the BS in Biology – Pre-professional Specialization to more accurately reflect the uniqueness and focus of the program. The program has a history and strategic intent to prepare future rural and primary care providers, including those who later receive graduate studies at University of South Dakota’s programs in medicine and chiropractic and osteopathic medicine.

University Mission and System Strategic Goals

The proposed major in Chemistry Education is within the statutory mission of SDSU as provided in SDSCL 13-58-1: *Designated as South Dakota’s land grant university, South Dakota State University, formerly the state college of agriculture and mechanical arts, shall be under the control of the Board of Regents and shall provide undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in agriculture, education, engineering, home economics, nursing and pharmacy, and other courses or programs as the Board of Regents may determine.*

(Continued)

RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

I move to authorize SDSU to develop a proposal for a B.S. in Human Biology with the following conditions:

1. The university will research existing curricula, consult with experts concerning the curriculum, and provide assurance in the proposal that the program is consistent with current national standards and with the needs of employers.
2. The proposal will define the specific knowledge, skills, and competencies to be acquired through the program, will outline how each will be obtained in the curriculum and will identify the specific measures to be used to determine whether individual students have attained the expected knowledge, skills, and competencies.
3. The university will not request new state resources and the program proposal will identify the sources and amounts of all funds needed to operate the program and the impact of reallocations on existing programs.

The proposed program aligns with Board of Regents' Strategic Plan 2014-2020 to grow the number of undergraduate degrees awarded, expand educational access, expand research opportunities, increase the number of graduates in STEM fields, and contribute to workforce development.

Related Programs in the System

The University of South Dakota offers a related BS in Medical Biology.

Workforce Need, Student Demand, Projected Graduates

SDSU's existing BS in Biology – Pre-professional Specialization has averaged 58 graduates annually in recent years, justifying a distinctly named bachelor's degree. The program will provide undergraduates with a background required for further graduate education in specialized health care delivery. The South Dakota Department of Health reports most counties within the State have a shortage of primary care providers. SDSU expects the program will graduate roughly 50 students per year after full implementation.

Board Policy

SDSU is not requesting any exceptions to Board Policy.

Off Campus and Distance Delivery

SDSU is not requesting authorization for off campus or distance delivery of the program.

Budget and Resources

SDSU is not requesting new funds or State resources to offer the program.

South Dakota Board of Regents
Intent to Plan for a B.S. in Human Biology

| | |
|---|--------------------------------------|
| UNIVERSITY: | South Dakota State University |
| DEGREE(S) AND TITLE OF PROGRAM: | B.S. in Human Biology |
| INTENDED DATE OF IMPLEMENTATION: | Fall 2016 |

University Approval

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

David L. Chicoine

 President of the University

February 17, 2016

 Date

After approval by the President, a signed copy of the proposal should be transmitted to the Executive Director. Only after Executive Director review should the proposal be posted on the university web site and the Board staff and the other universities notified of the URL.

1. What is the general nature of the proposed program? What is the expected demand for graduates in South Dakota? What is the need for the proposed program?

South Dakota State University (SDSU) requests authorization to plan a Bachelor of Science in Human Biology. The proposed B.S. in Human Biology will replace the B.S. in Biology - Pre-professional Specialization. This change will more accurately reflect the uniqueness and focus of this program. The program has a history and strategic intent to prepare future rural and primary care providers. This is shown through the graduate's choice of specialty and practice location and the department's strategic recruitment, advising, and mentoring of undergraduates to programs that align with this intent (e.g. University of South Dakota's doctorate in medicine (M.D.) and physician assistant programs, and chiropractic (D.C.) and osteopathic (D.O.) medical programs across the region and nation).

This new program will not replace the current career interests areas of Pre—Med, Dent, Chiro, Opt, PA or Mort. The continuation of this tracking mechanism is needed as some students seek to prepare for healthcare training through other undergraduate programs (e.g. chemistry, biochemistry, psychology, etc.)

SDSU does not intend to request new State resources to develop or implement this program.

Expected Workforce Demand for Graduates

The B.S. Human Biology is intended to help students become competitive for further professional training in an area of specialized health care delivery (e.g. M.D., D.O., O.D., D.C., physician assistant, etc.). The South Dakota Department of Health, shows that most counties within South Dakota currently have a shortage of primary care providers.¹ Increasing the professional primary care training pipeline is currently happening within the state and region.² This new bachelor's

¹ <https://doh.sd.gov/documents/Providers/RuralHealth/HPSA.pdf>

² <http://www.usd.edu/news/2014/usd-sanford-school-of-medicine-expanding-medical-class-sizes>

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

program will help to supply graduates to fill this shortage by providing opportunities for students to become more competitive for admission to professional training programs in and out of the state. Research conducted by ACT shows that in 2014, although interest in STEM careers is high in South Dakota, the student's academic preparedness in STEM needs to improve.³

Need for the Proposed Program

The proposed baccalaureate program is needed due to the increasingly competitive market for professional school admission in the health sciences (medicine, dentistry, etc.). In addition the new program provides a more delineated curriculum for students and thus will allow for the department and its graduates to more clearly communicate the content of this degree's curriculum to stakeholders.

2. What is the relationship of the proposed program to the University's mission as provided in South Dakota statute and Board of Regents Policy?

The proposed major in Human Biology is within the statutory mission of SDSU as provided in SDCL 13-58-1: *Designated as South Dakota's land grant university, South Dakota State University, formerly the state college of agriculture and mechanical arts, shall be under the control of the Board of Regents and shall provide undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in agriculture, education, engineering, home economics, nursing and pharmacy, and other courses or programs as the Board of Regents may determine.*

Board Policy 1:10:2 South Dakota State University Mission Statement provides: *The legislature established South Dakota State University as the Comprehensive Land Grant University to meet the needs of the State and region by providing undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in agriculture, education, engineering, human sciences, nursing, pharmacy, and other courses or programs as the Board of Regents may determine (SDCL 13-58-1).*

As the state's land-grant institution, SDSU provides opportunities for all students of the state and region to prepare themselves for successful admission to professional programs in healthcare. The Department of Biology and Microbiology has a long history of preparing students for careers as future leaders and professionals in healthcare and this program continues to build upon that previous success. This program is designed to help prepare and make competitive residents of the state, region, and nation to successfully be admitted and find success in professional programs in healthcare.

The proposed baccalaureate major in Human Biology supports the goals stated in the South Dakota Board of Regents Strategic Plan 2014-2020:

Goal 1 – Student Success

- Increase total undergraduate degrees awarded
- Improve retention and graduation rates

Goal 2 – Academic Quality and Performance

- Grow the number of students participating in experiential learning through undergraduate

³ <http://www.act.org/stemcondition/14/pdf/SouthDakota.pdf>

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

research experiences and/or industry internships

Goal 3 – Research and Economic Development

- STEM Education
- Economic Development

A major in Human Biology also supports South Dakota State University's strategic plan, IMPACT 2018⁴, specifically:

Goal 1 – Academic Excellence

- Promote academic excellence through quality programs, engaged learners and an innovative teaching and learning environment.

Goal 2 – Research and Innovation

- Generate new knowledge, encourage innovations and promote artistic and creative works that contribute to the public good and result in social, cultural or economic development for South Dakota, the region, the nation and the world.

3. Are there any related programs in the regental system? If there are related programs, why should the proposed program be added? If there are no related programs within the system, enter "None."

Yes. The University of South Dakota offers a related program in B.S. in Medical Biology. This bachelors degree prepares students for further training as health care professionals.

Over the past five years, SDSU's B.S. in Biology - Pre-professional Specialization has averaged an undergraduate annual graduation of 58. This large number of graduates justifies a distinctly named bachelor's degree. The strong history of South Dakota residents who chose to enroll in this program to prepare themselves for competitive admission to professional healthcare programs, has justified the proposal for a distinctly named major. The rationale for a specific curriculum for the program is to customize the requirements to the content needed for successful admission to medical school or other professional programs. The title of B.S. in Human Biology is modeled after several leading national universities like University of California at Los Angeles, University of Southern California, Stanford, Michigan State University, and Northwestern University.

4. Are there related programs at public colleges and universities in Minnesota, North Dakota, Montana, and Wyoming?⁵ If there are related programs in these states list below under each state and explain why the proposed program is needed in South Dakota. If there are no related programs in a state, enter "None" for that state.

Most institutions offering undergraduate programs in the natural sciences have a track, pathway or program (degree granting or not) to support Pre-professional students. Many of these are within biology departments and they may or may not have distinct titles.

⁴ <http://www.sdstate.edu/impact2018>

⁵ This question addresses opportunities available through Minnesota Reciprocity and the Western Undergraduate Exchange in adjacent states. List only programs at the same degree level as the proposed program. For example, if the proposed program is a baccalaureate major, then list only related baccalaureate majors in the other states and do not include associate or graduate programs.

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

Minnesota

University of Minnesota
B.S. + “Pre-Med Scholars” program
Minnesota State University
B.S. + “Pre-Med” program
B.S. in Biology (Biomedical Sciences Emphasis)
Gustavus Adolphus College
B.S. + “Pre-Med” program
Hamline University
B.S. + “Pre-Med” program

North Dakota

University of North Dakota
B.S. + “Pre-Med” program
B.S. in Biology (Pre-Health Emphasis)
North Dakota State University
B.S. + “Pre-Med” program

Montana

Montana State University
B.S. + “Pre-Med” program
B.S. in Cell Biology and Neuroscience (Biomedical Sciences option)
University of Montana
B.S. + “Pre-Med” program
B.A. Biology (Human Biological Sciences option)

Wyoming

University of Wyoming
B.S. + “Pre-Med” program
B.S. in Molecular Biology (Preprofessional option)

5. Are students expected to be new to the university or redirected from other programs? How many majors are expected in the first years of the program? How many graduates are expected?

Students from the existing Pre-professional Specialization will be redirected to the new program, and the specialization will be phased out. The program name will help SDSU to recruit additional students to the university who may have been interested in universities and pre-professional preparation outside of the state. Enrollment and graduation rates are expected to remain similar or slightly increase. The demand for the program will continue to be strong as 316 students were enrolled in the Pre-professional Specialization in the fall of 2015. An average of fifty-eight (58) degrees in the Pre-professional Specialization have been awarded in the last 5 academic years. The specialization has been very successful over the past 10 years in preparing applicants for admission to professional programs in healthcare. For example, in 2015 57 students gained admission to professional healthcare programs.

Current students seeking the B.S. in Biology – Pre-professional Specialization will continue in their current program of study.

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

6. Does the university intend to seek authorization to deliver this entire program at any off-campus locations? Does the university intend to seek authorization to deliver this entire program by distance technology?

| | |
|-------------------|----|
| Off-campus | No |
| Distance delivery | No |

7. What are the University's plans for obtaining the resources needed to implement the program? Indicate "yes" or "no" in the columns below.

| | Development/Start-up | Long-term Operation |
|---|----------------------|---------------------|
| Reallocate existing resources | No | No |
| Apply for external resources | No | No |
| Ask Board to seek new State resources | No | No |
| Ask Board to approve new or increased student fee | No | No |

As mentioned in section 1 above, SDSU will not request additional State resources to fund this program. The program will be developed to leverage existing faculty and course offerings.

8. Curriculum Example: Provide (as Appendix A) the curriculum of a similar program at another college or university. *The Appendix should provide the required and elective courses in the program. Catalog pages or web materials may be used. Identify the college or university and explain why the program may be used as one model when the proposed program is developed.*

The University of Southern California's (USC) B.S. in Human Biology is used as an example curriculum (see Appendix A). USC's Human Biology program, SDSU's current Pre-Professional Specialization, and the proposed Human Biology program core courses in introductory Biology, Chemistry, Organic Chemistry, Physics, and Math are similar.

USC offers multiple tracks within Human Biology (e.g. Applied Physiology, Biomedical Sciences, Nutrition, etc.). SDSU's current Pre-professional Specialization (see Appendix B) and proposed curriculum for the new program have only one track, but a similar "16 units of restricted electives" whereby SDSU's uses the terminology "Pre-professional Specialization Requirements".

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

Appendix A

Curriculum Example: University of Southern California's B.S. in Human Biology

Additional information regarding the B.S. in Human Biology may be found at:
<https://dornsife.usc.edu/bisc/heb-bs-human-biology/>

The section of Human and Evolutionary Biology within the Department of Biological Sciences introduces Human Biology (B.S.) as a new major at USC. This degree is designed for students seeking a focused course of study in human anatomy, physiology, metabolism, and/or evolution. Students will complete a general core (24 units) of fundamental coursework in biology, chemistry, physics, and math. From there, they will select one of four “tracks” (20 units) in the following areas of emphasis: Applied Physiology, Biomedical Sciences, Nutrition and Metabolism, or Human Evolutionary Biology. The restricted electives (16 units) will allow students to fulfill pre-health requirements from a very extensive list of courses.

Human Biology (B.S.) is an excellent option for students pursuing careers in medicine, physical therapy, dentistry, nursing, nutrition, human evolution, etc.

| General Core Courses - 24 units | | Units |
|--|---|--------------|
| BISC 120 or BISC 121L | General Biology: Organismal Biology and Evolution, or Advanced General Biology: Organismal Biology and Evolution | 4 |
| BISC 220L or BISC 221L | General Biology: Cell Biology and Physiology, or Advanced General Biology: Cell Biology and Physiology | 4 |
| CHEM 105abL or CHEM 115abL | General Chemistry, or Advanced General Chemistry | 4 + 4 |
| MATH 108* or MATH 125* | Precalculus, or Calculus I | 4 |
| PHYS 135aL* | Physics for the Life Sciences | 4 |

* Prerequisite is required.

Major Track Courses - 20 units

Choose one complete track module from below:

| Applied Physiology | | Units |
|---------------------------|---|--------------|
| EXSC 300L | Physiology of Exercise | 4 |
| EXSC 301L | Human Anatomy | 4 |
| EXSC 400L | Principles of Perceptual-Motor Learning | 4 |
| EXSC 405L* | Applied Systems Physiology | 4 |
| EXSC 408L* | Biomechanics | 4 |

* Prerequisite is required.

| Biomedical Science | | Units |
|---------------------------|---------------------------------|--------------|
| BISC 307L* | General Physiology | 4 |
| BISC 320L* | Molecular Biology | 4 |
| BISC 421* | Neurobiology | 4 |
| EXSC 301L | Human Anatomy | 4 |
| EXSC 406L* | Exercise and Energy Homeostasis | 4 |

* Prerequisite is required.

| Nutrition & Metabolism | | Units |
|-----------------------------------|--------------------|--------------|
| BISC 307L* | General Physiology | 4 |
| BISC 330L* | Biochemistry | 4 |

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

| | | |
|------------|---|---|
| EXSC 200L* | Nutrition: Macronutrients and Metabolism | 4 |
| EXSC 350* | Nutrition: Macronutrients and Homeostasis | 4 |
| EXSC 406L* | Exercise & Energy Homeostasis | 4 |

* Prerequisite is required.

| Human Evolutionary Biology | | Units |
|----------------------------|--|-------|
| ANTH 200L | Origins of Humankind | 4 |
| ANTH 300 | Evolution, Ecology, and Culture | 4 |
| ANTH 306 | Primate Social Behavior | 4 |
| ANTH 406 | Theory and Method in Biological Anthropology | 4 |
| BISC 313* | Evolution and Population Genetics | 4 |

* Prerequisite is required.

Restricted Electives - 16 units

A minimum of 16 units is required. Courses can be selected from the elective list below or from any other track in the major.

| | | |
|--------------|--|---|
| ANTH 308 | Origins and Evolution of Human Behavior | 4 |
| ANTH 405 | Evolutionary Medicine | 4 |
| BISC 305 | Introduction to Statistics for Biologists | 4 |
| BISC 325* | Genetics | 4 |
| BISC 371L* | Molecular Approaches to the Diversity of Life | 4 |
| BISC 403* | Advanced Molecular Biology | 4 |
| BISC 405L* | General Embryology | 4 |
| BISC 410* | Applications of Molecular Biology to Medicine | 4 |
| BISC 411* | Cell Biology | 4 |
| BISC 421* | Neurobiology | 4 |
| BISC 423* | Epilepsy to Ecstasy: Biological Basis Neurological Disorders | 4 |
| BISC 424* | Brain Architecture | 4 |
| BISC 426* | Principles of Neural Development | 4 |
| BISC 435* | Advanced Biochemistry | 4 |
| BISC 450L* | Principles of Immunology | 4 |
| BISC 490x | Directed Research | 4 |
| CHEM 322abL* | Organic Chemistry, or | 4 |
| CHEM 325abL* | Organic Chemistry | |
| CHEM 432* | Physical Chemistry for the Life Sciences | 4 |
| EXSC 409 | Metabolic Diseases | 4 |
| EXSC 439L | Human Performance and Bioenergetics | 4 |
| GERO 310* | Physiology of Aging | 4 |
| GERO 411L | Physiology, Nutrition, and Aging | 4 |
| GERO 414* | Neurobiology of Aging | 4 |
| GERO 440* | Biodemography of Aging | 4 |
| MATH 126* | Calculus II | 4 |
| PHYS 135bL | Physics for the Life Sciences | 4 |
| PSYC 274 | Statistics I | 4 |
| PSYC 320* | Principles of Psychobiology | 4 |
| PSYC 326* | Behavioral Neuroscience | 4 |
| PSYC 425* | Functional Imaging of the Human Brain | 4 |

* Prerequisite is required.

South Dakota State University
Intent to Plan: Bachelor of Science in Human Biology

Appendix B

Curriculum Example: SDSU's B.S. in Biology - Pre-professional Specialization

Additional information regarding the B.S. in Biology - Pre-professional Specialization may be found at:

http://catalog.sdstate.edu/preview_program.php?catoid=26&poid=5689&returnto=2691

The curriculum in the Biology Pre-professional Specialization is designed for students planning to apply to health-related pre-professional programs (i.e. pre-chiropractic, pre-dentistry, pre-medicine, pre-optometry, pre-occupational therapy, pre-physical therapy and pre-physician assistant.)

| | | | |
|--|-----------|--|--------------|
| Biology & Microbiology | | | 13 |
| BIOL | 202-202L | Genetics and Organismal Biology & Lab | 4 |
| BIOL | 204-204L | Genetics and Cellular Biology & Lab | 4 |
| BIOL | 290 | Seminar | 1 |
| MICR | 233-233L | Introductory Microbiology & Lab | 4 |
| Chemistry | | | 16 |
| CHEM | 112 -112L | General Chemistry I & Lab | 4 |
| CHEM | 114 -142L | General Chemistry II & Lab | 4 |
| CHEM | 326 -326L | Organic Chemistry I & Lab | 4 |
| CHEM | 328 -328L | Organic Chemistry II & Lab | 4 |
| Physics | | | 4-8 |
| PHYS 111-111L Introduction to Physics I & Lab (4) and PHYS 113-113L Introduction to Physics II & Lab (4) or PHYS 101-101L Survey of Physics & Lab (4) | | | 4-8 |
| Mathematics | | | 3-4 |
| MATH 125 Calculus II (4) or STAT 281 Introduction to Statistics (3) | | | 3-4 |
| Advanced Writing & Capstone | | | 5 |
| BIOL | 490 | Seminar | 2 |
| ENGL | 379 | Technical Communication (<i>Section: Biology & Microbiology</i>) | 3 |
| Pre-professional Specialization Requirements | | | 23-27 |
| BIOL | 221-221L | Human Anatomy & Lab | 4 |
| BIOL | 325-325L | Physiology & Lab | 4 |
| MICR | 439 | Medical and Veterinary Immunology | 3 |
| Select at least four courses from the list: <ul style="list-style-type: none"> • BIOL 383 Bioethics (4) • BIOL 494 Internship (3) or BIOL 498 Undergraduate Research/Scholarship (3) • CHEM 464 Biochemistry I (3) • MICR 424 Medical & Veterinary Virology (3) • MICR 433 Medical Microbiology (3) • MICR 436 Molecular and Microbial Genetics(4) • MICR 440L Infectious Disease Lab (3) • PE 454-454L Biomechanics & Lab (3) • BIOL 476-576 Advanced Mammalian Physiology (4) • BIOL 467-467L Parasitology & Lab (3) • BIOL 483-483L Developmental Biology & Lab (4) | | | 12-16 |