

**New Academic Degree Program
Full Proposal Application
South Dakota Board of Regents
Academic Affairs Forms**

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Use this form to propose a new degree program. The Board of Regents, Executive Director, and/or their designees may request additional information about the proposal. After the university President approves the proposal, submit a signed copy to the Executive Director through the System Academic Officer (through the online submission process).

Note: Within the proposal, all references to external sources should be documented with a footnote (including web addresses where applicable).

University SDSU - South Dakota State University

Degree BS : Bachelor of Science

Name of Major X999 : New Major Requested **Healthcare Systems
Engineering**

Specialization Required? No

Note: If the new proposed program includes specific specializations within it, complete and submit a New Specialization Form for each proposed specialization and attach it to this form. Since specializations appear on transcripts, they require Board approval.

College/Department 3E : SDSU JeromeJ Lohr College Engr/SMEC :
Mechanical Engineering

Planned CIP Code 14.2701

WICHE WRRGP Eligibility

Program Description

1. Provide the working program description that may appear in the university catalog.

Healthcare Systems Engineering is a multidisciplinary field that encompasses a wide range of technologies to enhance human health and well-being. Healthcare Systems Engineering integrates engineering, computer science, data science, and health sciences. The B.S. in Healthcare Systems Engineering program will prepare students for rapidly emerging technologies in artificial intelligence (AI) and machine learning (ML), big data and cybersecurity, health informatics, pharmaceutical development, genetic and tissue engineering, computational physiological modeling, imaging science, as well as healthcare infrastructure, environmental health and safety, rural health, e-health and telemedicine. This program will provide students with a mastery of incorporating engineering principles and mathematical methods and using cutting-edge tools and techniques to bridge knowledge gaps between healthcare professionals and engineers.

Additional information about the proposed program:

Healthcare systems engineering is a field that focuses on optimizing and improving healthcare delivery systems. As healthcare is becoming increasingly complex under technological, economic, social, and regulatory impacts, there is a pressing need for a holistic approach in addressing these challenges through convergent research and education and training future professionals who are ready to serve the healthcare industry. Professionals in this field use engineering principles and methodologies to enhance the efficiency, quality, and safety of healthcare processes and systems. Healthcare systems engineers analyze and design workflows, implement quality improvement initiatives, and work towards optimizing the overall performance of healthcare organizations. Through a systems approach, healthcare systems engineering focuses on the use of data, interoperability of systems, and improvement in patient safety and healthcare outcomes.

It is important to distinguish the proposed program from traditional biomedical engineering (BME) programs. Unlike traditional BME programs, which combine engineering sub-disciplines (typically electrical engineering, mechanical engineering, and material sciences) to develop prosthetics, medical devices, and instrumentation for the medical industry, the proposed program will prepare engineers who will adopt a systems approach – combining engineering and health sciences.

2. Does the university request any exceptions to any Board policy for this program?

Explain any requests for exceptions to Board Policy. If not requesting any exceptions, indicate “None.”

SDSU requests an exemption to the 120 credit hour maximum for a baccalaureate degree program as described in BOR Policy 2.6.1. Policy 2.6.1 notes that exceptions may be granted by the Executive Director in consultation with the Board of Regent’s president for programs that must “comply with specific standards established by external accreditation, licensure, or regulatory bodies or for other compelling reasons.” SDSU requests an exemption for the program to require 130 credit hours in order to meet the Accreditation Board for Engineering and Technology (ABET) accreditation criteria.

Strategic Impact

3. Describe how the program fits in with the institutional mission, strategic plan, existing institutional program array, and academic priorities.

SDBOR Policy 1.2.5 states South Dakota State University's mission is to offer academic programs in the liberal arts and sciences and professional education in agriculture, education, engineering, home economics, business economics, nursing, and pharmacy. The engineering and healthcare focus of this major fits within the mission of South Dakota State University.

The mission of South Dakota State University includes providing a rich academic experience through innovation, creative activities, and research that enhances the quality of life in South Dakota, the region, the nation, and the world. The proposed program aligns well with SDSU's mission and strategic plan, Pathway to Premier 2030. More specifically, it is a perfect fit for the strategic goal "Achieve Excellence Through Transformative Education" which calls for (a) investments in innovative undergraduate and graduate academic programs and (b) adapting pedagogical approaches by engaging learners in new and innovative ways to enhance student success and inspire current and future students. Technological breakthroughs like generative AI and computational modeling in high-resolution anatomic domains will revolutionize the healthcare industry. This is the most opportune time to invest in developing and offering this program to equip students with the skills to address future challenges using innovative science, engineering, and computational methods. Such a program does not exist in the institution's current program array or in the region. As South Dakota's land-grant university, SDSU is uniquely situated to pioneer this innovative Healthcare Systems Engineering program. SDSU has thriving programs in all areas to make it an innovative, unique, and successful program. The Jerome J. Lohr College of Engineering offers programs in statistics, data science, computer science, mechanical engineering, and electrical engineering that can be easily leveraged to offer the proposed engineering program. In addition, SDSU offers health-related programs from the College of Nursing, College of Natural Sciences, College of Pharmacy and Allied Health Professions, College of Education and Human Sciences, and College of Agriculture, Food & Environmental Sciences. Many of SDSU's professors are already engaged in healthcare-related research and projects. This existing strength aligns seamlessly with the proposed program, making it a logical and strategic addition to our offerings. This program will also strengthen a collaboration with Dakota State University.

If the program does not align to the strategic plan, provide a compelling rationale for the institution to offer the program.

N/A

4. How does the program connect to the Board of Regent's Strategic Plan?

The proposed B.S. in Healthcare Systems Engineering aligns with the SDBOR Strategic Plan Goal 4: Workforce and Economic Development which expects South Dakota public universities to create academic programming that responds to the changing educational and workforce skills needed to meet the demands through 2030 and ensure engagement designed to enhance the state's long-term economy. South Dakota and the US are the leaders and will continue to lead advancements in human and animal healthcare. As healthcare is becoming increasingly complex under technological, economic, social, and regulatory impacts[1], there is a pressing need for a holistic approach in addressing these challenges through convergent research and education and train future professionals who are ready to serve the healthcare industry. Healthcare systems engineering is a future focused program to equip students with the skills that will not only be needed to ensure the quality of healthcare to the public but will be critical for the continued growth of the healthcare industry in South Dakota and the US.

[1] Chyu, M-C, et. al (2015). "Healthcare Engineering Defined: A White Paper," Journal of Healthcare Engineering, Vol. 6, No. 4

Program Summary

5. If a new degree is proposed, what is the rationale?

This question refers to the type of degree, not the program. For example, if your university has authorization to offer the Bachelor of Science and the program requested is a Bachelor of Science, then the request is not for a new degree.

This is not a new degree.

6. What modality/modalities will be used to offer the new program?

Note: The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university to offer programs off-campus and through distance delivery.

| | Yes/No | Intended Start Date |
|------------------|--------|---------------------|
| On Campus | Yes | Fall 2025 |

| | Yes/No | Location(s) | Intended Start Date |
|----------------------------|--------|-------------|---------------------|
| Off Campus Location | No | | |

| | Yes/No | Delivery Method(s) | Intended Start Date |
|--------------------------|--------|--------------------|---------------------|
| Distance Delivery | No | | |

| | Yes/No | Identify Institutions |
|---|--------|-----------------------|
| Does another BOR institution already have authorization to offer the program online? | No | |

7. If the program will be offered through distance delivery, identify the planned instructional modality:

Not Applicable : Program will not be offered through distance delivery.

8. What are the student learning outcomes for this program?

Program accreditation is available through the Accreditation Board for Engineering and Technology (ABET). All engineering programs accredited by ABET must demonstrate achievement of the following student outcomes. Therefore, after completion of this program, students should have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
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. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
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.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. An ability to acquire and apply new knowledge as needed using appropriate learning strategies.

9. For associate's and bachelor's degree proposals, identify the 3-5 AAC&U Essential Learning Outcomes that have been selected for this program.

Use the chart below to indicate the student learning outcomes that align to the selected ELOs (See BOR Policy 2.11 and Guideline 8.5).

| Essential Learning Outcomes (AAC&U) | Student Learning Outcomes |
|---------------------------------------|---------------------------|
| Inquiry and Analysis | 6, 7 |
| Critical and Creative Thinking | |
| Information Literacy | |
| Teamwork | 5 |
| Problem Solving | 1, 2 |
| Civic Knowledge and Engagement | |
| Intercultural Knowledge | |
| Ethical Reasoning | 2, 4 |
| Foundational Lifelong Learning Skills | 7 |
| Integrative Learning | |

10. Enter the number of credit hours required to graduate

Credit Hours 130

11. Complete the following tables to provide a degree program curriculum summary.

A. Table 1 – Total Program Degree Credit Hours

| | Credit Hours In Program | |
|--|-------------------------|---------------|
| | Hours Per Requirement | % Total Hours |
| System General Education Requirements | 32-33 | |
| <i>Subtotal - Gen Ed Requirements</i> | 32-33 | % |
| Program Requirements | | |
| Required Support Courses | 0 | |
| Major Requirements | 82 | |
| Major Electives | 15-16 | |
| <i>Subtotal - Program Requirements</i> | 97-98 | % |
| Free Electives | 0 | |
| <i>Subtotal - Free Electives</i> | 0 | % |
| Degree Total | 130 | % |

**Board Policy 2:29 requires each baccalaureate level degree program to require 120 credit hours and each associate degree program to require 60 credit hours. Exceptions to this policy require documentation that programs must comply with specific standards established by external accreditation, licensure, or regulatory bodies or for other compelling reasons, and must receive approval by the Executive Director in consultation with the President of the Board of Regents.*

B. Table 2 – Insert Required Program Support Courses Impacting Other Programs (outside department). Do not include General Education courses.

*The individual curriculum tables should be included as a word document **attached** to the TDX ticket.*

C. Table 3 – Insert Major Requirements (within department)

*The individual curriculum tables should be included as a word document **attached** to the TDX ticket.*

D. Table 4 – Insert Major Electives

*The individual curriculum tables should be included as a word document **attached** to the TDX ticket.*

12. New Course Approval

New courses required to implement the new degree program may receive approval in conjunction with program approval or receive approval separately. Please check the appropriate statement:

Yes

Academic Quality

13. What peer institutions and current national standards will be referenced to develop the curriculum for this program?

Peer Institution: Regional and Competitive institutions. Include links to at least 3 comparable programs at peer institutions and links to national or accreditation standards, if any.

The proposed program is an innovative and transformative engineering program that is not currently being offered at any of the Regental universities or peer institutions. Healthcare systems engineers must complete an undergraduate, graduate, or certification program to be eligible for work in this field. Degree and certificate programs provide the knowledge and skills necessary to achieve such vital results in healthcare.

SDSU completed a review of other related systems engineering programs and the standards and requirements outlined by Accreditation Board for Engineering and Technology (ABET) to develop the curriculum.

- Accreditation Board for Engineering and Technology (ABET) -<https://www.abet.org/accreditation/>
- Industrial Engineering (B.S.) – Healthcare Systems Engineering Option, Oregon State University - <https://catalog.oregonstate.edu/college-departments/engineering/school-mechanical-industrial-manufacturing-engineering/industrial-engineering-bs-hbs/healthcare-systems-engineering-option/>
- Healthcare Systems Operations Minor, Northeastern University - <https://mie.northeastern.edu/academics/undergraduate-studies/minor-hsop/>
- Healthcare Systems Engineering Certificate (Undergraduate), University of Pittsburgh - <https://www.engineering.pitt.edu/departments/industrial/undergraduate/degrees/certificates/>
- Healthcare Systems Engineering (M.S.), Johns Hopkins University- <https://ep.jhu.edu/programs/healthcare-systems-engineering/>
- Healthcare Systems Engineering (M.S.), Lehigh University - <https://engineering.lehigh.edu/hse>
- Medical Sciences and Engineering (B.S.), Indian Institute of Technology, Madras (one of the premier engineering institutions of India) - <https://mst.iitm.ac.in/bs-in-medical-sciences-engineering/>

14. What program accreditation is available, if any?

Program accreditation is available through Accreditation Board for Engineering and Technology (ABET).

15. Will the proposed program pursue accreditation or certifications?

Yes

If no, why has the department elected not to pursue accreditation for the program?

N/A

16. Did the university engage any developmental consultants to assist with the development of the curriculum? Did the university consult any professional or accrediting associations during the development of the curriculum? What were the contributions of the consultants and associations to the development of the curriculum?

Developmental consultants are experts in the discipline hired by the university to assist with the development of a new program, including content, courses, and experiences, etc. Universities are encouraged to discuss the selection of developmental consultants with Board staff.

The university did not engage any developmental consultants or accrediting associations during the development of this program.

17. Inclusion of High Impact Practices (HIP) across all undergraduate programs is a strategic priority of the Board of Regents to enhance academic quality and increase student engagement. For associate's and bachelor's degree proposals, which HIPs will faculty embed into the program?

Mark all that apply. To be considered as a HIP program, two or more should be selected and required in the program.

| High Impact Practices | Included |
|--|----------|
| Capstone courses and projects | Yes |
| Collaborative assignments and projects | Yes |
| Common intellectual experiences | No |
| Diversity/global learning | No |
| ePortfolios | No |
| First year experiences | Yes |
| Internships | Yes |
| Learning communities | No |
| Service learning, community-based learning | No |
| Writing intensive courses | No |
| Undergraduate research | No |

18. For associate’s and bachelor’s degree proposals, discuss how HIPs will be embedded into the program

Your discussion should provide examples and include whether the HIP is required or an optional component. It should also indicate at what point the experience is offered or required. (eg “students will be required to participate in an internship during their third year of enrollment in order to develop skills in...”).

- Capstone courses and projects - All students will take a two-semester capstone course GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II. Students will be working on healthcare systems engineering projects as a team using their academically acquired skills and knowledge to solve real-world problems.
- Collaborative assignments and projects - Courses in the Healthcare Systems Engineering major have assignments that involve working in teams or groups to solve problems including EM 214 Statics, EM 321 Mechanics of Materials, GE 385 Introduction to Systems Engineering and Management, and others. Collaborative assignments occur at various levels within the program.
- First year experience - Student are required to enroll in GE 101 Introduction to Engineering and Technical Professions which will provide an introduction to technical professions and student success skills necessary for STEM degrees.
- Internships - Students are highly encouraged, but not required, to do an internship. The internship can be taken for academic credit if the student chooses, but this is not required. Most students do an internship in the summer between their junior and senior years. Many do multiple internships.

Student Success

This section outlines the university's plan to assess student achievement of the program learning outcomes.

19. Complete the table below to provide evidence of a preliminary assessment plan. Place an asterisk next to assessments that are national or state-level instruments.

Note: It is only necessary to indicate the summative assessment for each outcome, not the formative assessments used throughout the program.

| Program Learning Outcome | Course | Summative Assessment |
|---|---|---|
| An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. | GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II | Fundamentals of Engineering exam* Students will demonstrate proficiency by applying principles of engineering, science, and mathematics |
| 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. 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. | GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II | Students will prepare a proposal for their solution to a real world problem that takes into account all the listed factors. |
| An ability to communicate effectively with a range of audiences. | GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II | Students will be presenting reports both in writing and orally as part of communicating their proposed and final solution to their real-world problem. |
| 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. | GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II | Students will be solving a real-world problem using the engineering design process to create a proposal for solution and then to create a prototype for the proposed solution. The proposal must include sections on contexts for the solution. |

| Program Learning Outcome | Course | Summative Assessment |
|---|---|--|
| An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. | GE 478 Healthcare Systems Engineering Capstone I and GE 479 Healthcare Systems Engineering Capstone II | Exit interviews, employer, and post-graduate surveys |

20. How will outcomes for graduates of the program be assessed?

Outcomes may include employment and placement rates, licensure examination pass rates, acceptance rates to graduate school, student or employer surveys, or other assessments of graduate outcomes.

Program outcomes will be assessed through the Fundamentals of Engineering (FE) exam results, employment rates, and post-graduate surveys.

Duplication and Competition

21. Do any related programs exist at other public universities in South Dakota?

*A list of existing programs is available through the university websites and the RIS Reporting: Academic Reports Database. If there are no related programs within the Regental system, indicate **none**.*

The proposed Healthcare Systems Engineering program is an innovative and transformative engineering program that is not currently being offered at any of the six Regental universities. It is important to distinguish the proposed program from traditional biomedical engineering (BME) programs. The University of South Dakota (USD) and South Dakota School of Mines and Technology (SDSMT) offer a B.S. in Biomedical Engineering and SDSU offers a minor in Biomedical Engineering. Unlike these traditional BME programs, which combine engineering sub-disciplines (typically electrical engineering, mechanical engineering, and material sciences) to develop prosthetics, medical devices, and instrumentation for the medical industry, the proposed program will prepare engineers who will adopt a systems approach – combining engineering and health sciences. Healthcare systems engineering is a field that focuses on optimizing and improving healthcare delivery systems. Through a systems approach, healthcare systems engineering focuses on the use of data, interoperability of systems, and improvement in patient safety and healthcare outcomes.

A. If yes, defend the need for an additional program within the state, Include IPEDS enrollment data and additional data as needed.

N/A

B. If yes, would this program be a candidate for Regental system collaboration?

To ensure the success of the program, the foundation has been laid for collaboration across a broad spectrum of institutions and industry partners. Within SDSU, the Jerome J. Lohr College of Engineering will collaborate with the College of Nursing, College of Natural Sciences, College of Pharmacy and Allied Health Professions, College of Education and Human Sciences, and College of Agriculture, Food & Environmental Sciences. The university will collaborate with Dakota State University and industry partners. SDSU's overarching goal is to harness the strengths and expertise within the Regental system and in South Dakota's healthcare systems, ensuring the development and delivery of a truly groundbreaking program.

22. Do any related programs exist at any non-Regental college or university within 150 miles of the university?

List those programs here:

No

A. If yes, use IPEDS to identify the enrollment in those programs.

N/A

B. What evidence suggests there is unmet student demand for the proposed program, or that the proposed program would attract students away from the existing program?

No programs exist at any non-Regental college or university within 100 miles of SDSU. The proposed program, Healthcare Systems Engineering, would serve an emerging industry and is not currently available in the region. SDSU's major would be one of a few in the nation. The Jerome J. Lohr College of Engineering conducted a student interest survey. Of the 63 participants that completed the survey, 18 students (28.5%) indicated if they were starting their education today, based on the program description, they would be interested in majoring in Healthcare Systems Engineering.

Market Demand

This section establishes the market demand for the proposed program (eg Regental system need, institutional need, workforce need). Use the following sources for your data:

- [South Dakota Department of Labor & Regulation](#)
- [O-Net](#)
- [US Department of Labor Projections Central](#)
- SDBOR Workforce and Degree Gap Analysis Report

23. What is the expected growth of the industry or occupation in South Dakota and nationally?

Include the number of openings, as well as the percentage of growth when possible.

Many career fields fall under the umbrella of healthcare systems engineers.[1] After completion of a program, jobs a candidate could apply for include the following positions below:

- Applied biomedical engineer
- Continuous improvement specialist
- Healthcare analyst
- Healthcare management engineer
- Healthcare manager
- Health systems engineer
- Hospital process engineer
- Industrial healthcare engineer
- Medical Imaging Engineer
- Public health engineer
- Healthcare engineering faculty
- Systems engineer

The healthcare industry is the fastest growing industry in the world. The B.S. in Healthcare Systems Engineering program will prepare students for rapidly emerging technologies in artificial intelligence (AI) and machine learning (ML), big data and cybersecurity, health informatics, pharmaceutical development, genetic and tissue engineering, computational physiological modeling, imaging science, healthcare infrastructure, environmental health and safety, rural health, e-health and telemedicine. This program will provide students with a mastery of incorporating engineering principles and mathematical methods and using cutting-edge tools and techniques to bridge knowledge gaps between healthcare professionals and engineers. Just the AI segment of the healthcare industry alone is projected to grow to nearly \$200B by 2030.[2] The Fourth Industrial Revolution is poised to unlock new business opportunities, shape innovations, and boost economic productivity.

An estimate of employment opportunities for graduates within the state of South Dakota was determined using the CIP code for systems engineering 14.2701 and its translation to SOC (Standard Occupational Classification) codes: 11-9041 Architects and Engineering Managers, 17-2112 Industrial Engineers, and 17-2199 Engineering, all others. The South Dakota current employment numbers and projected growth for these occupations is (in order) 247 (8.9%), 744 (19.1%), and 96 (2.1%). The weighted projected increase in these occupations is 15.3% or a change from 1087 current jobs to 1253 projected jobs in 2030. [3][4]

[1] Healthcare Degree, Healthcare Systems Engineer, <https://www.healthcaredegree.com/administration/healthcare-systems-engineer> (visited September 10, 2024)

[2] Stewart, C. (2024). AI in healthcare -statistics & facts., <https://www.statista.com/topics/10011/ai-in-healthcare/#topicOverview> (visited September 5, 2024)

[3] CIP SOC Crosswalk from National Center for Education Statistics <https://nces.ed.gov/ipeds/cipcode/post3.aspx?y=56>

[4] SD Dept of Labor & Regulations Occupational Employment Projections – Long Term, 2022-2032, https://dlr.sd.gov/lmic/menu_projections_occupation_statewide.aspx (visited September 4, 2024)

24. What evidence, if any, suggests there are unfilled openings in South Dakota or nationally?

Healthcare systems engineering is an emerging field that does not have a specific occupation code. The broad field of systems engineering is in high demand within the state of South Dakota. As described in question #23,

the annual openings in the occupations related to systems engineering are 18 (11-9041 Architects and Engineering Managers), 59 (17-2112 Industrial Engineers), and 5 (17-2199 Engineering) for a total of 82 annual openings. Each of these areas is also listed as rapidly growing in demand.[1]

Healthcare engineers at the U.S. Department of Veterans Affairs are involved with project planning, design, and documentation, and provide oversight and project management for construction and maintenance efforts. Supervisory healthcare engineers manage engineering groups, oversee budgeting, provide expert advice on complex projects, and oversee facility maintenance and operations ensuring accreditation standards are met. Their healthcare engineers frequently collaborate with biomedical engineers to integrate technology and plan site layouts, ensuring that their medical centers and clinics have the right infrastructure and equipment to best meet the needs of the Veterans they serve. The VA currently has 27 jobs posted for healthcare engineering.[2]

Throughout history, science and engineering have continually evolved, branching out to address the ever-changing demands of society. The swift pace of modern technological progress is reshaping the future of healthcare. This creates a significant gap in preparing a workforce tailored for the imminent needs of engineers in the healthcare industry. This gap is particularly pronounced in South Dakota, where the potential to make transformative strides in the healthcare market is immense.

The proposed Healthcare Systems Engineering program not only addresses this gap but also aligns perfectly with SDSU's emphasis on "rural wellness." This program will meet the multifaceted need of the workforce by modern healthcare systems in South Dakota. In addition, this program is poised to significantly benefit the state by harnessing the power of telemedicine and remote patient monitoring, potentially reducing healthcare costs, and promoting the well-being of South Dakotans. While its primary focus is on human health, the program will also play a pivotal role in advancing animal healthcare.

[1] SD Dept of Labor & Regulations Occupational Employment Projections – Long Term, 2022-2032 data, https://dlr.sd.gov/lmic/menu_projections_occupation_statewide.aspx (visited September 4, 2024)

[2] U.S. Department of Veterans Affairs, Create and innovate as a healthcare engineer at VA, <https://vacareers.va.gov/job-news-advice/create-and-innovate-as-va-healthcare-engineer/> (visited August 1, 2024)

25. What salaries can program graduates expect to earn in South Dakota and nationally?

Healthcare systems engineering is an emerging field that does not have a specific occupation code. The B.S. in Healthcare Systems Engineering program will prepare students for rapidly emerging technologies in artificial intelligence (AI) and machine learning (ML), big data and cybersecurity, health informatics, pharmaceutical development, genetic and tissue engineering, computational physiological modeling, imaging science, healthcare infrastructure, environmental health and safety, rural health, e-health and telemedicine.

GlassDoor.com estimates the average salary for a Healthcare Systems Engineer is \$125,277 per year in the United States.[1] As a systems engineer, Industrial Engineers' average salary in South Dakota is \$87,210 and nationally \$99,380.[2]

[1]GlassDoor.com

[2] O*NET OnLine, National Center for O*NET Development, www.onetonline.org/. Accessed 16 August 2024. South Dakota source: Projections Central 2020-2030 long-term projections external site.

<https://projectionscentral.org/Projections/LongTerm>; United States source: Bureau of Labor Statistics 2022-2032 employment projections <https://www.bls.gov/emp/>

26. Optional: Provide any additional evidence of regional demand for the program.

e.g. prospective student interest survey data, letters of support from employers, community needs...

Student Demand

27. Provide evidence of student completers/graduates at that degree level at peer institutions that offer the same/similar program using data obtained from IPEDS.

Peer Institution: Regional and Competitive institutions. Choose programs not already listed in question 11. Use the most recent year available.

| University Name | State | Program Name | Number of Degrees Conferred in Program | Total Number of Conferrals at Level (Undergrad or Grad) |
|-----------------------------------|----------------|---|--|---|
| Oregon State University | OR : Oregon | Industrial Engineering (B.S.) - Healthcare Systems Engineering | 43 | 5829 |
| University of Wisconsin - Madison | WI : Wisconsin | Industrial Engineering (B.S.) - Healthcare Systems Engineering | 95 | 8121 |
| Northern Illinois University | IL : Illinois | Industrial and Systems Engineering (B.S.) - Health Systems Engineering Emphasis | 11 | 2582 |

28. What evidence suggests there is interest from prospective students for this program at the university?

The proposed Healthcare Systems Engineering program is an innovative and transformative engineering program. The program would serve an emerging industry and is not currently available in the region. SDSU's major would be one of a few programs in the nation. Healthcare Systems Engineering integrates engineering, computer science, data science, and health sciences. In fall 2023, over 980 students were enrolled in the related undergraduate engineering programs at SDSU. The College of Engineering Joint Engineering Council was told about the proposed program during initial planning, and they expressed support and interest in the proposed program. The college also conducted a student interest survey. Of the 63 participants that completed the survey, 18 students (28.5%) indicated if they were starting their education today, based on the program description, they would be interested in majoring in Healthcare Systems Engineering.

Enrollment

29. Are students enrolling in this program expected to be new to the university or redirected from existing programs at the university?

The university anticipates that the program will include both new students to the university, especially from western Minnesota and South Dakota, and others redirected from existing SDSU programs. They will be attracted to the Healthcare Systems Engineering program by the unique nature and state-of-the-art facilities. Existing students would be redirected from the Computer Science (B.S.), Data Science (B.S.), Electrical Engineering (B.S.), and Mechanical Engineering (B.S.) programs.

30. Complete the enrollment worksheet to provide an enrollment projection for the next six academic years

Worksheet Completed

Yes

31. What is the minimum number of students required in this program to break even, with respect to the budget?

The estimated number of students required to break even in the program was estimated to be 7 new students each year or 19 total students in the program each year. This estimate is based on the baseline expenses (excluding one-time expenses for start-up packages or equipment) and the tuition net of HEFF plus discipline fees which equals \$285.10. There would need to be 529 credit hours annually to cover the costs and this calculates to 19 total students. Using a retention rate year over year of 80%, the number of first year students was estimated to be 7 each year to cover the program costs.

32. Discuss the assumptions informing your enrollment estimates.

(e.g. current enrollment and trends in similar programs, IPEDS data, recruitment strategies, partnerships)

Enrollment estimates were based on self-reported survey interest noted by present students in Mechanical Engineering, Electrical Engineering, and Computer Science and inquiries from potential students for academic programs that incorporate engineering and healthcare. As noted in question #28 the Healthcare Systems Engineering major would serve an emerging industry and is not currently available in the region. SDSU's major would be one of a few in the nation. Healthcare Systems Engineering integrates engineering, computer science, data science, and health sciences. In fall 2023, over 980 students were enrolled in the related undergraduate engineering programs at SDSU. The college also looked at the number of students enrolled in the biomedical engineering minor which ranges between 13 and 22 students per year. Based on student feedback and current enrollment, the Jerome J. Lohr College of Engineering anticipates growing the Healthcare Systems Engineering program to 25 new students per year by year 6. Retention rates of 80% year to year were used to estimate continuing student enrollment.

33. If projected program enrollment is not realized in year two, what actions is the university prepared to take?

Possible tools to grow program enrollment include:

- Work with University Marketing and Communications on target ads for students interested in this major.
- Communicate with key stakeholders to raise awareness of this major.
- Work with the SDSU Foundation to grow scholarships for majors.

34. Discuss the marketing and recruitment plan for the program

Include information on partnerships and pipelines (e.g. articulation agreements with BOTE, collaboration with partner university, community partnerships).

SDSU will leverage different resources within the university including current marketing efforts used for other majors within the Jerome J. Lohr College of Engineering

- News release announcing new program following SDBOR approval
- Digital marketing campaign
- Academic fact sheet development and production
- Communication series sent to all prospective and admitted students in program or related program areas

- Communicate with key stakeholders (admissions office, advisors, school counselors)
- Recruitment through Junior Days, Senior Days, Jackrabbit Engineering Days
- SDState.edu Explore Majors and Careers program page
- Potential articulation agreements will be explored

Upon approval by the SDBOR of any new academic major, the Office of Admissions and University Marketing and Communications will provide to the academic department the following baseline support to assist in marketing the new program offering.

University Marketing & Communications

- News Release announcing new program following South Dakota Board of Regents approval.
 - o Release posted to university social media accounts.
 - o Potential earned media opportunities with local/regional media.
 - o Inclusion in bi-weekly Updates with State digital newsletter sent to SDSU employee and key stakeholders throughout the region.
 - o Inclusion in college/department publications and/or digital communications.
- Website updates to reflect new program.
 - o Update college/department pages with links to new program as needed.
 - o Update faculty directory as needed.
 - o Coordinate with Office of Academic Affairs new program information in the degree finder on sdstate.edu.
- Film and edit program video.
 - o Video to be approximately 90 seconds highlighting new program, faculty and potentially students.
- Coordinate digital marketing campaign through Click Rain, Inc.
 - o Recommend minimum \$25,000 campaign that includes:
 - HubSpot landing page.
 - Digital ad creation.
 - Media buy. Length/timing TBD
- Design and print promotional materials at the request of the college/department.

Office of Admissions

- Meeting with Admissions leadership team to discuss program approval and launch schedule.
 - o Includes work that can begin before program approval is finalized, as appropriate.
 - o Offers opportunity for department to provide insight into program approval, audience to target, etc.
 - o Admissions provides insight into academic appointments during campus visits for the new academic program, best practices for coverage and content, potential visit program connections, etc.
 - o Admissions provides insight into development and timeline of communication and marketing pieces noted below.
- Academic fact sheet development and production
 - o Admissions provides template for department to create initial draft, offers editing, design, and development support from initial draft, and finalizes factsheet.
 - o Admissions provides a factsheet supply for the department to have in their area, provides factsheets for all Admissions events, and provides factsheets for the department as needed for recruitment related events they attend.
 - o The Academic Department can utilize factsheet when appropriate, covering the cost of printing, for non-recruitment related events.
 - o Admissions provides an opportunity for factsheet updates each summer with new factsheets in place on Sept 1 for the academic year.
- Communication series sent to all prospective and admitted students in program or related program areas.
 - o Communication is sent to all suspects, prospects, admitted students (and parents for all groups, when email addresses available) in the Admissions database.
 - o Communication series includes two email communications designed/developed by Admissions working with the department, and one text message.
- Addition of program/major in all Admissions recruitment print materials
 - o Addition will happen at next printing of Admissions related piece – Annual printing happens in August of each calendar year with additional calendar year adjustments possible as supply is refreshed.
- Addition of program/major to admissions application selections, visit program academic area selections, etc.

- Admissions will provide weekly exports of prospective and admitted student data, as appropriate and desired, and training/guidance on best practices to a designated individual in the program/unit leading program specific outreach/recruitment efforts.
- Time scheduled with Admissions professional staff and with Admissions Ambassadors to provide insight and details about program addition to use in recruitment outreach and communication.

Financial Health

35. Complete the budget worksheet to provide a budget projection for the next six academic years.

| | |
|---------------------|-----|
| Worksheet Completed | Yes |
|---------------------|-----|

| Financial Health Summary | | | | | | |
|---------------------------|--------------|---------------|---------------|---------------|---------------|---------------|
| | 1st FYxx | 2nd FYxx | 3rd FYxx | 4th FYxx | 5th FYxx | 6th FYxx |
| Tuition & Fee Revenues | 42765 | 142494 | 246248 | 360834 | 445649 | 506006 |
| Program Expenses | 25000 | 5190 | 79327 | 219386 | 225783 | 150783 |
| NET | 17765 | 137304 | 166921 | 141448 | 219866 | 355223 |
| Other Supporting Revenues | 0 | 0 | 0 | 0 | 0 | 0 |
| NET (Other) | 17765 | 137304 | 166921 | 141448 | 219866 | 355223 |

36. Explain the amount and source(s) of any one-time and continuing investments in personnel, professional development, release time, time redirected from other assignments, instructional technology and software, other operation and maintenance expenses, facilities, etc., needed to implement the proposed major.

Address off-campus or distance delivery separately.

SDSU is not seeking additional state resources for the Healthcare Systems Engineering major. The university already provides most of the necessary courses for this interdisciplinary program. The new courses, with the exception of the capstone courses, will also be offered in other programs. Initial costs will involve reallocating faculty workloads to develop and deliver courses. As the program expands in years 3 and 4, there may be a need to hire additional faculty. The budget includes funds for start-up and typical expenses associated with a tenure-track faculty member, as needed based on the level of instruction required.

37. If new faculty are not requested, describe how existing faculty will be utilized and indicate whether this action will impact other existing programs.

N/A

38. Is the university requesting or intending to request permission for a new fee or to attach an existing fee to the program?.

| | |
|--------------------------------|-------------------|
| Requesting Permission for Fee? | Yes, existing fee |
|--------------------------------|-------------------|

| | |
|-------------|--|
| Explanation | Students will complete courses in prefixes that have an existing fee including AS, BIOL, CHEM, CSC, ECON, EE, EM, GE, HSC, INFO, MATH, ME, NURS, PHA, PHYS, STAT, and VET. |
|-------------|--|

39. Use the table below to describe potential risks to the program's implementation over the next four years.

For each risk, identify the severity (low, medium, high), probability of occurrence (low, medium, high) and the institution's mitigation strategy for each risk.

| Risk | Severity | Probability | Mitigation Strategy |
|---|----------|-------------|--|
| Not meeting enrollment projections | Low | Low | The marketing plan will be adjusted based on student enrollment. |
| Balancing growth of the program with available resources | Medium | Medium | Active communication with college deans, provost, and vice president of finance to ensure needs for instructional resources are satisfied. |

External Review

40. If this proposal is for a graduate program, provide information below for at least five potential consultants who may be considered to conduct the external review.

| Reviewer Name | Title | Institution |
|---------------|-------|-------------|
| / | | |
| / | | |
| / | | |
| / | | |
| / | | |

Additional Information

41. (Optional) Use this space to provide pertinent information not requested above that may assist the Board in understanding the proposal.

Approvals

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.*

| | |
|-----------------------------|------|
| President of the University | Date |
|-----------------------------|------|

1/1/1970

| | |
|---------------------------|------|
| Academic Affairs, Provost | Date |
|---------------------------|------|

10/16/2024

Dennis D. Hedge

| | |
|--|------|
| Finance and Administration, Vice President | Date |
|--|------|

1/1/1970

| | |
|---------------------------------------|------|
| Enrollment Management, Vice President | Date |
|---------------------------------------|------|

10/16/2024

Michaela L. Willis



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

Proposed Curriculum Summary

| | |
|--------------------------|--|
| UNIVERSITY: | SDSU |
| PROPOSED PROGRAM: | Healthcare Systems Engineering (B.S.) |

Summary of the degree program:

| Healthcare Systems Engineering (B.S.) | Credit Hours | Credit Hours | Percent |
|--|---------------------|---------------------|----------------|
| System General Education Requirements | 32-33 | | 25% |
| Subtotal, Degree Requirements | | 32-33 | 25% |
| Major Requirements | 82 | | 63% |
| Major Electives | 15-16 | | 12% |
| Supporting Coursework | 0 | | 0% |
| Subtotal, Program Requirements | | 97-98 | 75% |
| Free Electives | | 0 | 0% |
| Degree Total | | 130 | 100% |

Required General Education Courses Specific to Major

| Prefix | Number | Course Title | General Education Goal |
|--------------------|--------------------------|---|-------------------------------|
| INFO | 102 | Data Ethics (3 cr.) | SGR #3 |
| MATH | 123 | Calculus I (Major Requirement) (4 cr.) | SGR #5 |
| CHEM OR CHEM | 106-106L 112-112L | Chemistry Survey and Lab (3, 1 cr.) General Chemistry I and Lab (3, 1 cr.) | SGR #6 |
| BIOL OR BIOL | 235-235L 153-153L | Introduction to Biotechnology and Lab (2, 1 cr.) General Biology II and Lab (3, 1 cr.) | SGR #6 |

Major Requirements

| Prefix | Number | Course Title | Credit Hours | New (yes, no) |
|-------------------|--------------------------|---|---------------------|----------------------|
| BIOL | 151 | General Biology I | 3 | No |
| BIOL | 151L | General Biology I Lab | 1 | No |
| BIOL OR VET | 221-221L 223-223L | Human Anatomy and Lab (4, 0 cr.) Anatomy and Physiology of Domestic Animals and Lab (3, 1 cr.) | 4 | No |
| BIOL | 325 | Physiology | 3 | No |
| BIOL | 325L | Physiology Lab | 1 | No |
| CSC | 201 | Introduction to Modern Computing | 2 | Yes |
| CSC | 150 | Computer Science I | 3 | No |

| Prefix | Number | Course Title | Credit Hours | New (yes, no) |
|-------------------|------------|---|--------------|---------------|
| EE | 300 | Basic Electrical Engineering I | 2 | No |
| EE | 300L | Basic Electrical Engineering I Lab | 1 | No |
| EE | 302 | Basic Electrical Engineering II | 2 | No |
| EE | 302L | Basic Electrical Engineering II Lab | 1 | No |
| EE | 422 | Engineering Economics and Management | 2 | No |
| EM | 214 | Statics | 3 | No |
| EM | 215 | Dynamics | 3 | No |
| EM | 321 | Mechanics of Materials | 3 | No |
| EM | 331 | Fluid Mechanics | 3 | No |
| GE | 101 | Introduction to Engineering and Technical Professions | 1 | No |
| GE | 310 | Thinking in Systems | 1 | Yes |
| GE | 385 | Introduction to Systems Engineering and Management | 3 | No |
| GE | 478 | Healthcare Systems Engineering Capstone I | 3 | Yes |
| GE | 479 | Healthcare Systems Engineering Capstone II | 3 | Yes |
| HIM | 150 | Introduction to Digital Health Informatics and Information Management (DSU) | 3 | No |
| HIM | 169 | Legal Aspects of Health Information Management (DSU) | 1 | No |
| HIM | 225 | Digital Health Information Systems (DSU) | 3 | No |
| HSC | 452 | Interprofessional Issues in Health Care | 3 | No |
| MATH | 125 | Calculus II | 4 | No |
| ME | 212 | Mechanical Engineering Design Technologies | 2 | No |
| ME | 314 | Thermodynamics | 3 | No |
| NURS OR VET | 201 183 | Medical Terminology (1 cr.) OR Veterinary Medical Terminology (1 cr.) | 1 | No |
| PHA | 470 | Drug Discovery and Development | 3 | No |
| PHYS | 207 | Fundamentals of Physics I | 3 | No |
| PHYS | 207L | Fundamentals of Physics I Lab | 1 | No |
| PHYS | 209 | Fundamentals of Physics II | 3 | No |
| PHYS | 209L | Fundamentals of Physics II Lab | 1 | No |
| STAT | 381 | Introduction to Probability and Statistics | 3 | No |
| Subtotal | | | 82 | |

Major Electives: List courses available as electives in the program. Indicate any proposed new courses added specifically for the major.

Students must select 15-16 credits from the following courses including at least 6 credits from CSC, EE, or ME prefix. Students will be able to complete coursework in different emphasis areas including AI/Data, Animal Industry, Pre-Med, and Sensors and Devices. It is strongly recommended that students choose one of the emphasis areas. Credits: 15-16

Emphasis Areas:

¹ AI/Data

² Animal Industry

³ Pre-Med

⁴Sensors and Devices

| Prefix | Number | Course Title | Credit Hours | New (yes, no) |
|------------------|--------|--|--------------|---------------|
| AS | 101 | Introduction to Animal Science ² | 3 | No |
| AS | 101L | Introduction to Animal Science Lab ² | 1 | No |
| CHEM | 108 | Organic and Biochemistry ² | 4 | No |
| CHEM | 108L | Organic and Biochemistry Lab ² | 1 | No |
| CHEM | 114 | General Chemistry II ³ | 3 | No |
| CHEM | 114L | General Chemistry II Lab ³ | 1 | No |
| CHEM | 326 | Organic Chemistry I ³ | 3 | No |
| CHEM | 326L | Organic Chemistry I Lab ³ | 1 | No |
| CHEM | 328 | Organic Chemistry II ³ | 3 | No |
| CHEM | 328L | Organic Chemistry II Lab ³ | 1 | No |
| CHEM | 464 | Biochemistry ³ | 3 | No |
| CSC | 422 | Computer Vision and Pattern Recognition ¹ | 3 | Yes |
| CSC | 485 | AI Assisted Medical Image Processing ¹ | 3 | Yes |
| EE | 360 | Electronic Devices ⁴ | 3 | No |
| EE | 454 | Biomaterials and Medical Devices ⁴ | 3 | No |
| EE | 460 | Sensor and Measurements ⁴ | 2 | No |
| EE | 460L | Sensor and Measurements Lab ⁴ | 1 | No |
| HSC OR VET | 445 | Epidemiology (3 cr.) ² | 3 | No |
| | 403 | Animal Diseases and Their Control (3 cr.) ² | | |
| MATH | 250 | Introduction to Linear Algebra and Proof ¹ | 3 | No |
| ME | 321 | Fundamentals of Machine Design ⁴ | 3 | No |
| ME | 442 | Computational Fluid Dynamics ³ | 3 | No |
| ME | 446 | Engineering Mechanics for Biomedical Applications ^{3,4} | 3 | No |
| ME | 448 | Mechanical Behavior of Biomaterials ^{3,4} | 3 | No |
| NURS | 462 | Systems Based Practice in Healthcare ³ | 3 | No |
| STAT | 415 | R Programming ¹ | 3 | No |
| STAT | 415 | Predictive Analytics I ¹ | 3 | No |
| STAT | 435 | Applied Bioinformatics ¹ | 3 | No |
| STAT | 442 | Exploratory and Cloud-Based Data Analysis ¹ | 3 | No |
| | | Other courses with department approval | | |

| ESTIMATES | FISCAL YEARS* | | | | | |
|--|---------------|-----------|-----------|-----------|-----------|-----------|
| | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | 6th Year |
| | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | 2030-31 |
| Students new to the university | 3 | 10 | 12 | 15 | 17 | 20 |
| Students from other university programs | 3 | 5 | 5 | 5 | 5 | 5 |
| Students off-campus or distance continuing students | | 5 | 16 | 26 | 35 | 39 |
| Total students in the program (fall) | 6 | 20 | 33 | 46 | 57 | 64 |
| Program credit hours (major Courses)** | 180 | 594 | 990 | 1380 | 1710 | 1920 |
| Graduates | | | 2 | 4 | 12 | 20 |
| <p><i>*Do not include current fiscal year.</i></p> <p><i>**This is the total number of credit hours generated by students in the program in the required or elective program courses. Use the same numbers in Appendix B – Budget.</i></p> | | | | | | |

SOUTH DAKOTA STATE UNIVERSITY, HEALTHCARE SYSTEMS ENGINEERING (B.S.)

| FINANCIAL HEALTH SUMMARY | | | | | | |
|---|---------------|----------------|----------------|----------------|----------------|----------------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th |
| | FY26 | FY27 | FY28 | FY29 | FY30 | FY31 |
| TUITION & FEE REVENUES | 42,765 | 142,494 | 246,248 | 360,834 | 445,649 | 506,006 |
| PROGRAM EXPENSES | 25,000 | 5,190 | 79,327 | 219,386 | 225,783 | 150,783 |
| NET (T&F REVENUES LESS PROGRAM EXPENSES) | 17,765 | 137,304 | 166,921 | 141,449 | 219,865 | 355,223 |
| OTHER SUPPORTING REVENUES | - | - | - | - | - | - |
| NET AFTER OTHER SUPPORTING REVENUES | 17,765 | 137,304 | 166,921 | 141,449 | 219,865 | 355,223 |

FINANCIAL HEALTH SUMMARY - EXPANDED

| | 1st | 2nd | 3rd | 4th | 5th | 6th |
|---|---------------|----------------|----------------|----------------|----------------|----------------|
| | FY26 | FY27 | FY28 | FY29 | FY30 | FY31 |
| PROGRAM TUITION AND FEE REVENUES | | | | | | |
| <i>Estimated # of Students Enrolled</i> | 6 | 20 | 33 | 46 | 57 | 64 |
| Tuition (Net of HEFF) | 34,396 | 114,606 | 198,054 | 290,214 | 358,429 | 406,973 |
| Program Fees | 8,370 | 27,888 | 48,194 | 70,620 | 87,220 | 99,032 |
| Total Program Tuition and Fee Revenues | 42,765 | 142,494 | 246,248 | 360,834 | 445,649 | 506,006 |
| PROGRAM EXPENSES | | | | | | |
| <i>Personal Services</i> | | | | | | |
| FTE - Faculty | - | - | 0.50 | 1.00 | 1.00 | 1.00 |
| FTE - NFE / CSA | - | - | - | - | - | - |
| # of Adjunct Course | - | - | - | - | - | - |
| # of GA's | - | 0.14 | 0.25 | 0.25 | 0.49 | 0.49 |
| Salary | - | 5,180 | 59,250 | 109,250 | 118,130 | 118,130 |
| Benefits | - | 10 | 13,077 | 26,136 | 26,153 | 26,153 |
| Sub-Total Personal Services | - | 5,190 | 72,327 | 135,386 | 144,283 | 144,283 |
| Chk | - | - | - | - | - | - |
| <i>Operating Expenses (OE)</i> | | | | | | |
| Travel | - | - | 2,000 | 4,000 | 4,000 | 4,000 |
| Contractual Services | 25,000 | - | 500 | 500 | 500 | 500 |
| Supplies and Materials | - | - | 2,000 | 2,000 | 2,000 | 2,000 |
| Grants and Contracts | - | - | - | - | - | - |
| Capital Assets | - | - | 2,500 | 2,500 | - | - |
| Faculty Start-Up | - | - | - | 75,000 | 75,000 | - |
| Sub-Total Personal Services | 25,000 | - | 7,000 | 84,000 | 81,500 | 6,500 |
| Chk | - | - | - | - | - | - |
| Total Program Expenses | 25,000 | 5,190 | 79,327 | 219,386 | 225,783 | 150,783 |
| Chk | - | - | - | - | - | - |
| NET (T&F Revenues less Program Expenses) | 17,765 | 137,304 | 166,921 | 141,449 | 219,865 | 355,223 |
| OTHER SUPPORTING REVENUES | | | | | | |
| General Funds - New | - | - | - | - | - | - |
| General Funds - Redirect | - | - | - | - | - | - |
| Institutional Support | - | - | - | - | - | - |
| Private / Gifts | - | - | - | - | - | - |
| Industry Support | - | - | - | - | - | - |
| Other | - | - | - | - | - | - |
| Total Other Supporting Revenues | - | - | - | - | - | - |
| NET AFTER OTHER SUPPORT REVENUES | 17,765 | 137,304 | 166,921 | 141,449 | 219,865 | 355,223 |
| Chk | - | - | - | - | - | - |

**SOUTH DAKOTA STATE UNIVERSITY, HEALTHCARE SYSTEMS ENGINEERING (B.S.)
NEW TUITION AND FEE REVENUE PROJECTIONS**

1st 2nd 3rd 4th 5th 6th
FY26 FY27 FY28 FY29 FY30 FY31

ENROLLMENT PROJECTIONS

Full-Time

| | | | | | | |
|------------------|----------|-----------|-----------|-----------|-----------|-----------|
| Pgy 1 | 6 | 15 | 17 | 20 | 22 | 25 |
| Pgy 2 | - | 5 | 12 | 14 | 16 | 18 |
| Pgy 3 | - | - | 4 | 10 | 11 | 13 |
| Pgy 4 | - | - | - | 3 | 8 | 9 |
| Sub-Total | 6 | 20 | 33 | 46 | 57 | 64 |

Part-Time

| | | | | | | |
|------------------|----------|----------|----------|----------|----------|----------|
| Pgy 1 | - | - | - | - | - | - |
| Pgy 2 | - | - | - | - | - | - |
| Pgy 3 | - | - | - | - | - | - |
| Pgy 4 | - | - | - | - | - | - |
| Pgy 5 | - | - | - | - | - | - |
| Sub-Total | - | - | - | - | - | - |

| | | | | | | |
|--------------|----------|-----------|-----------|-----------|-----------|-----------|
| Total | 6 | 20 | 33 | 46 | 57 | 64 |
|--------------|----------|-----------|-----------|-----------|-----------|-----------|

PROGRAM CREDITS TAKEN (MAJOR, IN DISCIPLINE)

Full-Time

| | | | | | | |
|--------------|-----------|-----------|-----------|------------|------------|------------|
| Pgy 1 | 25 | 25 | 25 | 25 | 25 | 25 |
| Pgy 2 | - | 26 | 26 | 26 | 26 | 26 |
| Pgy 3 | - | - | 33 | 33 | 33 | 33 |
| Pgy 4 | - | - | - | 31 | 31 | 31 |
| Total | 25 | 51 | 84 | 115 | 115 | 115 |

Part-Time

| | | | | | | |
|--------------|----------|----------|----------|----------|----------|----------|
| Pgy 1 | - | - | - | - | - | - |
| Pgy 2 | - | - | - | - | - | - |
| Pgy 3 | - | - | - | - | - | - |
| Pgy 4 | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |

TOTAL CREDIT HOURS GENERATED (MAJOR, IN DISCIPLINE)

Full-Time

| | | | | | | |
|------------------|------------|------------|------------|--------------|--------------|--------------|
| Pgy 1 | 150 | 375 | 425 | 500 | 550 | 625 |
| Pgy 2 | - | 125 | 312 | 354 | 416 | 458 |
| Pgy 3 | - | - | 127 | 317 | 359 | 422 |
| Pgy 4 | - | - | - | 95 | 238 | 270 |
| Sub-Total | 150 | 500 | 864 | 1,266 | 1,563 | 1,775 |

Part-Time

| | | | | | | |
|------------------|----------|----------|----------|----------|----------|----------|
| Pgy 1 | - | - | - | - | - | - |
| Pgy 2 | - | - | - | - | - | - |
| Pgy 3 | - | - | - | - | - | - |
| Pgy 4 | - | - | - | - | - | - |
| Sub-Total | - | - | - | - | - | - |

| | | | | | | |
|--------------|------------|------------|------------|--------------|--------------|--------------|
| Total | 150 | 500 | 864 | 1,266 | 1,563 | 1,775 |
|--------------|------------|------------|------------|--------------|--------------|--------------|

SOUTH DAKOTA STATE UNIVERSITY, HEALTHCARE SYSTEMS ENGINEERING (B.S.)

PROGRAM EXPENDITURES - PERSONAL SERVICES

1st 2nd 3rd 4th 5th 6th
FY26 FY27 FY28 FY29 FY30 FY31

FACULTY

Faculty / Administrator - 12 Mos

Annualized

| | | | | | | | |
|--------------|------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - | - |
| Total | - | - | - | - | - | - | - |

Faculty - 12 Mos

Annualized

| | | | | | | | |
|--------------|------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - | - |
| Total | - | - | - | - | - | - | - |

Faculty - 9 Mos

Annualized

| | | | | | | | |
|--------------|---------|------|------|---------------|----------------|----------------|----------------|
| FTE | 0.00 | 0.00 | 0.00 | 0.50 | 1.00 | 1.00 | 1.00 |
| Salary | 100,000 | - | - | 50,000 | 100,000 | 100,000 | 100,000 |
| Benefits | - | - | - | 13,059 | 26,117 | 26,117 | 26,117 |
| Total | - | - | - | 63,059 | 126,117 | 126,117 | 126,117 |

Adjunct

Avg Per Course

| | | | | | | | |
|--------------|---|---|---|---|---|---|---|
| # of Courses | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Salary | - | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - | - |
| Total | - | - | - | - | - | - | - |

Faculty Sub-Total

| | | | | | | |
|----------------------|------|------|---------------|----------------|----------------|----------------|
| FTE | 0.00 | 0.00 | 0.50 | 1.00 | 1.00 | 1.00 |
| Adjunct Course Count | 0 | 0 | 0 | 0 | 0 | 0 |
| Salary | - | - | 50,000 | 100,000 | 100,000 | 100,000 |
| Benefits | - | - | 13,059 | 26,117 | 26,117 | 26,117 |
| Total | - | - | 63,059 | 126,117 | 126,117 | 126,117 |

NFE / CSA

Program Advisor

Annualized

| | | | | | | |
|--------------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |

Program Assistant

Annualized

| | | | | | | |
|--------------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |

Other

Annualized

| | | | | | | |
|--------------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |

NFE / CSA Sub-Total

| | | | | | | |
|--------------|------|------|------|------|------|------|
| FTE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Salary | - | - | - | - | - | - |
| Benefits | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |

GA's

Avg Stipend Amount

| | | | | | | |
|--------------|--------|------|--------------|--------------|--------------|---------------|
| # of GA's | 0.00 | 0.14 | 0.25 | 0.25 | 0.49 | 0.49 |
| Salary | 37,000 | - | 5,180 | 9,250 | 9,250 | 18,130 |
| Benefits | - | - | 10 | 19 | 19 | 36 |
| Total | - | - | 5,190 | 9,269 | 9,269 | 18,166 |

TOTAL PERSONAL SERVICES

| | | | | | | |
|---------------------|------|--------------|---------------|----------------|----------------|----------------|
| FTE - Faculty | 0.00 | 0.00 | 0.50 | 1.00 | 1.00 | 1.00 |
| FTE - NFE / CSA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| # of Adjunct Course | 0 | 0 | 0 | 0 | 0 | 0 |
| # of GA's | 0.00 | 0.14 | 0.25 | 0.25 | 0.49 | 0.49 |
| Salary | - | 5,180 | 59,250 | 109,250 | 118,130 | 118,130 |
| Benefits | - | 10 | 13,077 | 26,136 | 26,153 | 26,153 |
| Total | - | 5,190 | 72,327 | 135,386 | 144,283 | 144,283 |

SOUTH DAKOTA STATE UNIVERSITY, HEALTHCARE SYSTEMS ENGINEERING (B.S.)

PROGRAM EXPENDITURES - OPERATING EXPENSES (OE)

| | 1st FY26 | 2nd FY27 | 3rd FY28 | 4th FY29 | 5th FY30 | 6th FY31 |
|--------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| TRAVEL | | | | | | |
| Travel | - | - | 2,000 | 4,000 | 4,000 | 4,000 |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | - | - | 2,000 | 4,000 | 4,000 | 4,000 |
| CONTRACTUAL SERVICES | | | | | | |
| Program Marketing | 25,000 | - | - | - | - | - |
| Software/etc. | - | - | 500 | 500 | 500 | 500 |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | 25,000 | - | 500 | 500 | 500 | 500 |
| SUPPLIES AND MATERIALS | | | | | | |
| Supplies | - | - | 2,000 | 2,000 | 2,000 | 2,000 |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | - | - | 2,000 | 2,000 | 2,000 | 2,000 |
| GRANTS AND CONTRACTS | | | | | | |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |
| CAPITAL ASSETS | | | | | | |
| Computer needs | - | - | 2,500 | 2,500 | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | - | - | 2,500 | 2,500 | - | - |
| FACULTY START-UP | | | | | | |
| Description | - | - | - | 75,000 | 75,000 | - |
| Description | - | - | - | - | - | - |
| Description | - | - | - | - | - | - |
| Total | - | - | - | 75,000 | 75,000 | - |
| TOTAL OPERATING EXPENSES (OE) | | | | | | |
| TRAVEL | - | - | 2,000 | 4,000 | 4,000 | 4,000 |
| CONTRACTUAL SERVICES | 25,000 | - | 500 | 500 | 500 | 500 |
| SUPPLIES AND MATERIALS | - | - | 2,000 | 2,000 | 2,000 | 2,000 |
| GRANTS AND CONTRACTS | - | - | - | - | - | - |
| CAPITAL ASSETS | - | - | 2,500 | 2,500 | - | - |
| FACULTY START-UP | - | - | - | 75,000 | 75,000 | - |
| Total | 25,000 | - | 7,000 | 84,000 | 81,500 | 6,500 |

SOUTH DAKOTA STATE UNIVERSITY, HEALTHCARE SYSTEMS ENGINEERING (B.S.)

OTHER RESOURCE IMPLICATIONS

PLEASE PROVIDE NARRATIVE REGARDING ANY NEW NEEDS OR IMPACT TO THE FOLLOWING SUPPORT AREAS

CLASSROOMS:

OTHER PHYSICAL FACILITIES: Faculty offices, student space, labs, seminar rooms, etc.

TECHNOLOGY RESOURCES: Computer labs, software, network/internet, Audio-visual / telecommunications, wireless connectivity, etc.

LIBRARY SERVICES: Staffing, collections (books, ebooks, journals, subscriptions), study space, etc.

REGISTRAR: Student records support, classroom scheduling support, etc.

MARKETING & ENROLLMENT SERVICES: program marketing, program recruitment, etc.

STUDENT SUPPORT: International student support, health counseling, career services, housing, scholarship, etc.

OTHER