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|  | **SOUTH DAKOTA BOARD OF REGENTS**ACADEMIC AFFAIRS FORMS |
| New Specialization |
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Use this form to propose a new specialization within an existing degree program. Specializations provide students with an alternative to the primary format of the major or it may be one of several tracks within a broad major. Specializations contain courses within the discipline(s) of the existing program. Specializations appear in the institutional catalog and on the transcript. Majors that offer specializations typically have one-third to two-thirds of the credits in common with the remaining course work fulfilling the requirements of the specialization(s) offered. 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 Chief Academic Officer. Only post the New Specialization Form to the university website for review by other universities after approval by the Executive Director and Chief Academic Officer.

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| **UNIVERSITY:** | DSU |
| **TITLE OF PROPOSED SPECIALIZATION:** | Biomechanics |
| **NAME OF DEGREE PROGRAM IN WHICH SPECIALIZATION IS OFFERED:** | Master of Science in Artificial Intelligence |
| **BANNER PROGRAM CODE:** | DMS.AI |
| **INTENDED DATE OF IMPLEMENTATION:** | 5/12/2025 |
| **PROPOSED CIP CODE:** | 11.0102 |
| **UNIVERSITY DEPARTMENT:** | Beacom College of Computer and Cyber Sciences |
| **BANNER DEPARTMENT CODE:** | DCOC |
| **UNIVERSITY DIVISION:** | Artificial Intelligence |
| **BANNER DIVISION CODE:** | DSCI |

[x] **Please check this box to confirm that:**

* The individual preparing this request has read [AAC Guideline 2.3.2.2.B](https://public.powerdms.com/SDRegents/documents/1677061), which pertains to new specialization requests, and that this request meets the requirements outlined in the guidelines.
* This request will not be posted to the university website for review of the Academic Affairs Committee until it is approved by the Executive Director and Chief Academic Officer.

**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.*

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| A picture containing text  Description automatically generated |  | 1/28/2025 |
| Institutional Approval Signature*President or Chief Academic Officer of the University* |  | Date |

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Note: In the responses below, references to external sources, including data sources, should be documented with a footnote (including web addresses where applicable).

1. **Level of the Specialization (*place an “X” in the appropriate box*):**

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| Baccalaureate |[ ]  Master’s |[x]  Doctoral |[ ]

1. **What is the nature/purpose of the proposed specialization? Please include a brief (1-2 sentence) description of the academic field in this specialization.**

This Biomechanics specialization combines AI with the study of human movement to enhance performance, rehabilitation, and health. By applying AI-driven insights to biomechanics, graduates will solve complex movement challenges through data analysis and modeling.

1. **Provide a justification for the specialization, including the potential benefits to students and potential workforce demand for those who graduate with the credential.** *For workforce related information, please provide data and examples. Data may include, but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc. Please cite any sources in a footnote.*

The integration of artificial intelligence with cutting-edge biomechanical data collection offers an unprecedented opportunity for our students to revolutionize athletic performance, rehabilitation, and health optimization. By combining the precision of AI with advanced motion analysis, our graduates will not only be able to enhance athletic performance by analyzing individual movement patterns, but they will also bring innovative solutions to rehabilitation. Unlike traditional physical therapy, which focuses on manual assessment and intervention, biomechanics with AI empowers practitioners to make data-driven decisions, refining treatments to suit each patient's unique biomechanics. Furthermore, health optimization refers to leveraging AI and biomechanics to tailor everyday movement patterns—such as jumping or lifting—to an individual’s physical attributes, reducing injury risk and enhancing long-term well-being. For instance, by analyzing the specific biomechanics of a person’s body (e.g., relative torso and leg length), graduates will be able to determine the most efficient and safe way for that individual to perform tasks like jumping, improving both performance and safety. Our MSAI program graduates, with a biomechanics specialization, will stand at the forefront of these AI-driven advancements, shaping the future of movement science.

The occupation title of “biomechanist” is not recognized within the US Department of Labor Statistics (USDLS) or the South Dakota Department of Labor & Regulation (SDDLR). However, industry jobs applying biomechanical principles to “…the design, development, and evaluation of biological… and health systems…” is the definition of bioengineers and biomedical engineers[[1]](#footnote-1). Thus, biomechanists are considered bioengineers or biomedical engineers. Based on recent data, the USDLS projects a faster than average growth rate of 7% nationally for bioengineers and biomedical engineers by 2033[[2]](#footnote-2). While no data is presented for the State of South Dakota, our neighboring states of Minnesota and Iowa are projected to experience an average growth of 12% by 2030[[3]](#footnote-3)[[4]](#footnote-4).

Technological advances are resulting in a robust national job market, with an expected growth rate of 26% by 2033 for computer and information research scientists[[5]](#footnote-5). As artificial intelligence continues to improve, it is expected that more sectors of industry will incorporate AI in their operations to enhance their outreach and competitive position in the marketplace. This is of unique importance to the State of South Dakota as it pertains to health and rehabilitation due to its rural population. The union of AI with biomechanics will allow health care providers, health coaches, and strength and conditioning specialists to interact with patients and clients across the entire state.

1. **List the proposed curriculum for the specialization (including the requirements for completing the major – *highlight courses in the specialization*):**

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| **MS Artificial Intelligence Core** |
| **Prefix** | **Number** | **Course Title***(add or delete rows as needed)* | **Credit Hours** | **New****(yes, no)** |
| CSC | 502 | Mathematical Foundations of Artificial Intelligence | 3 | No |
|  |  | OR |  |  |
| CSC | 702 | Mathematics of AI |  | No |
|  |  |  |  |  |
| CSC | 722 | Machine Learning Fundamentals | 3 | No |
| CSC | 727 | Professional Applications and Ethics of AI | 3 | No |
| CSC | 789 | Capstone | 3 | No |
| CSC |  | 2 AI Electives (CSC 761 required if insufficient AI background) | 6 | No |

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| Total number of hours required for completion of core |  | 18 |

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| **Biomechanics Specialization** |
| **Prefix** | **Number** | **Course Title***(add or delete rows as needed)* | **Credit Hours** | **New****(yes, no)** |
| EXS | 754 | Advanced Biomechanics | 3 | Yes |
| EXS | 762 | Biomechanical Instrumentation and Measurement | 3 | Yes |
| EXS | 764 | Sport Biomechanics | 3 | Yes |
| EXS | 766 | Scientific Methods of Biomechanics | 3 | Yes |
| Total number of hours required for completion of specialization |  | 12 |
| Total number of hours required for completion of major |  | 30 |
| Total number of hours required for completion of degree |  | 30 |

1. **Delivery Location**

*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.*

**A. Complete the following charts to indicate if the university seeks authorization to deliver the entire program on campus, at any off campus location (e.g., UC Sioux Falls, Capital University Center, Black Hills State University-Rapid City, etc.) or deliver the entire specialization through distance technology (e.g., as an on-line program)?**

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|  | **Yes/No** | ***Intended Start Date*** |
| **On campus** | Yes | **August, 2025**Click here to enter text. |

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|  | **Yes/No** | ***If Yes, list location(s)*** | ***Intended Start Date*** |
| **Off campus** | No |  | Choose an item.Choose an item. |

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|  | **Yes/No** | ***If Yes, identify delivery methods****Delivery methods are defined in AAC Guideline* [*2.4.3.B*](https://public.powerdms.com/SDRegents/documents/1677940)*.* | ***Intended Start Date*** |
| **Distance Delivery (online/other distance delivery methods)** | No |  | Choose an item.Choose an item. |

**B. Complete the following chart to indicate if the university seeks authorization to deliver more than 50% but less than 100% of the specialization through distance learning (e.g., as an on-line program)?** *This question responds to HLC definitions for distance delivery.*

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|  | **Yes/No** | ***If Yes, identify delivery methods*** | ***Intended Start Date*** |
| **Distance Delivery (online/other distance delivery methods)** | No |  | Choose an item.Choose an item. |

1. **Additional Information:** *Additional information is optional. Use this space to provide pertinent information not requested above. Limit the number and length of additional attachments. Identify all attachments with capital letters. Letters of support are not necessary and are rarely included with Board materials. The University may include responses to questions from the Board or the Executive Director as appendices to the original proposal where applicable. Delete this item if not used.*

The Biomechanics specialization within the AI master’s program provides students with a unique skill set that combines advanced biomechanics with artificial intelligence, opening up new possibilities in movement science. Students will gain expertise in analyzing complex human movements using AI-driven tools such as motion capture systems, computational modeling, and biomechanical instrumentation. This interdisciplinary approach allows graduates to address real-world challenges in sports performance, injury prevention, and rehabilitation, using data-driven insights for individualized solutions. Whether optimizing athletic performance through kinematic analysis or refining rehabilitation strategies for patients with movement disorders, graduates will be prepared to lead in fields where biomechanics and AI intersect. With hands-on experience and exposure to cutting-edge technologies, this specialization prepares students to push the boundaries of human movement science in innovative ways, and the new Beacom PREMIER Complex at Brian Kern Family Stadium.

1. https://www.onetonline.org/link/details/17-2031.00 [↑](#footnote-ref-1)
2. https://www.bls.gov/ooh/architecture-and-engineering/biomedical-engineers.htm [↑](#footnote-ref-2)
3. https://www.onetonline.org/link/localtrends/17-2031.00?st=MN [↑](#footnote-ref-3)
4. https://www.onetonline.org/link/localtrends/17-2031.00?st=IA [↑](#footnote-ref-4)
5. https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm [↑](#footnote-ref-5)