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| S:\Communications\Logos and photos\SDBORLogos\final_sdbor_webreadyBW_trans.gif | **SOUTH DAKOTA BOARD OF REGENTS**  ACADEMIC AFFAIRS FORMS |
| Substantive Program Modification Program |
|  |  |

Use this form to request minor changes in existing programs (majors, minors, certificates, or specializations).

|  |  |
| --- | --- |
| **UNIVERSITY:** | **DSU** |
| **CURRENT PROGRAM TITLE:** | **BS in Computer Science** |
| **CIP CODE:** | **11.0101** |
| **UNIVERSITY DEPARTMENT:** | **Beacom College of Computer & Cyber Sciences** |
| **UNIVERSITY DIVISION:** | **Beacom College of Computer & Cyber Sciences** |

**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.*

|  |  |  |
| --- | --- | --- |
| C:\Users\slaughts\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Dr. McKay Signature.jpg |  | 2/13/2018 |
| Vice President of Academic Affairs or  President of the University |  | Date |

|  |
| --- |
|  |

1. **This modification addresses a change in (*place an “X” in the appropriate box*):**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total credits required within the discipline |  | Total credits of supportive course work |
|  |  |  |  |
|  | Total credits of elective course work |  | Total credits required for program |
|  |  |  |  |
|  | Program name |  | Existing specialization |
|  |  |  |  |
|  | CIP Code |  | Other (explain below): Added two new specializations |

1. **Effective date of change: Fall 2018**
2. **Program Degree Level (*place an “X” in the appropriate box*):**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Associate |  | Bachelor’s |  | Master’s |  | Doctoral |  |

1. **Category (*place an “X” in the appropriate box*):**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Certificate |  | Specialization |  | Minor |  | Major |  |

1. **If a name change is proposed, the change will occur (*place an “X” in the appropriate box*):**

|  |  |
| --- | --- |
|  | On the effective date for all students |

|  |  |
| --- | --- |
|  | On the effective date for students new to the program (enrolled students will graduate from existing program) |
|  |

|  |  |
| --- | --- |
| **Proposed new name:** |  |
|  | *Reminder: Name changes may require updating related articulation agreements, site approvals, etc.* |

1. **Primary Aspects of the Modification (*add lines or adjust cell size as needed*):**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Existing Curriculum* | | | | *Proposed Curriculum (highlight changes)* | | | | | |
| **Pref.** | **Num.** | **Title** | **Cr.**  **Hrs.** |  | **Pref.** | | **Num.** | **Title** | **Cr. Hrs.** |
|  |  |  |  |  |  | |  |  |  |
| General Education | | | 30 |  | General Education | | | | 30 |
| \*Majors who test directly into MATH 123 or MATH 201 will not need to complete MATH 102 but must take 3 credits of general electives. | | |  |  | \*Majors who test directly into MATH 123 or MATH 201 will not need to complete MATH 102 but must take 3 credits of general electives. | | | |  |
|  | | |  |  |  | |  |  |  |
| Required Courses | | | 57 |  | Required Courses | | | | 57 |
| CSC | 105 | Intro to Computers | 3 |  | CSC | | 105 | Intro to Computers | 3 |
| CSC | 150 | Computer Science I | 3 |  | CSC | | 150 | Computer Science I | 3 |
|  |  |  |  |  | **CSC** | | **234** | **Software Security** | **3** |
| ~~CSC~~ | ~~245~~ | ~~Info Sec Fund~~ | ~~3~~ |  |  | |  |  |  |
| CSC | 250 | Computer Science II | 3 |  | CSC | | 250 | Computer Science II | 3 |
| CSC | 260 | Object Oriented Design | 3 |  | CSC | | 260 | Object Oriented Design | 3 |
| CSC | 300 | Data Structures | 3 |  | CSC | | 300 | Data Structures | 3 |
|  |  |  |  |  | **CSC** | | **310** | **Adv Data Structures** | **3** |
| CSC | 314 | Assembly Language | 3 |  | CSC | | 314 | Assembly Language | 3 |
| CSC | 383 | Networking I | 3 |  | CSC | | 383 | Networking I | 3 |
|  |  |  |  |  | CSC | | 404 | Foundation of Computation | 3 |
| CSC | 410 | Parallel Computing | 3 |  | CSC | | 410 | Parallel Computing | 3 |
| CSC | 456 | Operating Systems | 3 |  | CSC | | 456 | Operating Systems | 3 |
| CSC | 461 | Programming Languages | 3 |  | CSC | | 461 | Programming Languages | 3 |
| ~~CSC~~ | ~~466~~ | ~~Language Processing~~ | ~~3~~ |  |  | |  |  |  |
| CSC | 470 | Software Engineering | 3 |  | CSC | | 470 | Software Engineering | 3 |
| CSC | 482 | Algorithms & Optimization | 3 |  | CSC | | 482 | Algorithms & Optimization | 3 |
| ~~CIS~~ 321 Information Security Management  **or**  CIS 332 Systems Analysis & Design | | | 3 |  | **CSC** 321 Information Security Management  **or**  CIS 332 Systems Analysis & Design | | | | 3 |
| ~~CIS~~ | ~~484~~ | ~~Database Management Sys~~ | ~~3~~ |  |  | |  |  |  |
| CIS/CSC 300-400 electives | | | 9 |  | CIS/CSC 300-400 electives | | | | 9 |
| Select three 300-400 level CIS/CSC courses. (~~CSC 234,~~ CIS 275 allowed) | | |  |  | Select three 300-400 level CIS/CSC courses. (**CIS 275 allowed; CIS 350 not allowed**) | | | |  |
| **Support Courses** | | | 19 |  | **Support Courses** | | | | 19 |
| MATH | 123 | Calculus I | 4 |  | MATH | | 123 | Calculus I | 4 |
| MATH | 201 | Intro to Discrete Math | 3 |  | MATH | | 201 | Intro to Discrete Math | 3 |
| MATH | 281  **or**  381 | Intro to Statistics  **or**  Intro to Probability & Stats | 3 |  | MATH | | 281  **or**  381 | Intro to Statistics  **or**  Intro to Probability & Statistics | 3 |
| MATH | 316 | Discrete Mathematics | 3 |  | MATH | | 316 | Discrete Mathematics | 3 |
| **Math Electives** | | | 6 |  | **Math Electives** | | | | 6 |
| Math 125 or Math 200-level or above (except Math 341/342) | | |  |  | Math 125 or Math 200-level or above (except Math 341/342) | | | |  |
|  |  |  |  |  | **Students may choose the Specialization below or 12 additional credits of Electives** | | | | |
|  |  |  |  |  | **Artificial Intelligence/Machine Learning Specialization** | | | | **12** |
|  |  |  |  |  | **CSC** | | **447** | **Artificial Intelligence** | **3** |
|  |  |  |  |  | **CSC** | | **483** | **Machine Learning Fund** | **3** |
|  |  |  |  |  | **Pick 6 credits from this list** | | | | **6** |
|  |  |  |  |  | **CIS** | | **368** | **Predictive Analytics** | **3** |
|  |  |  |  |  | **CIS** | | **372** | **Programming for Analytics** | **3** |
|  |  |  |  |  | **CIS** | | **474** | **Business Intelligence and Big Data** | **3** |
|  |  |  |  |  | **CSC** | | **486** | **Data Mining Methods** | **3** |
| Electives | | | ~~14~~ |  | Electives | | | | **2-14** |
|  |  |  |  |  |  | |  |  |  |
| Total number of hours required for major, minor, or specialization | | | 57 |  | | Total number of hours required for major, minor, or specialization | | | 57 |
| Total number of hours required for degree | | | 120 |  | | Total number of hours required for degree | | | 120 |

1. **Explanation of the Change:**

The Beacom College of Computer and Cyber Sciences seeks to add a new specialization in Artificial Intelligence/Machine Learning, to the BS in Computer Science. The current faculty recruiting cycle will result in hiring faculty able to offer the courses necessary in the specialization.

Given the mission specificity within the Beacom College, and its programs (Computer Game Design, Computer Science, Cyber Operations, and Network and Security Administration), DSU and the Beacom College is the appropriate place to offer this specialization. All courses listed in the specialization are existing courses, so no new courses are required.

Adding the Artificial Intelligence/Machine Learning specialization to the curriculum of the Beacom College is consistent with the board-designated mission of the college and of Dakota State University and supports our system, university and college goals pertaining to student success as well as contributing to the state’s workforce and economic development as this program aligns nicely with existing and future state workforce needs. This addition will allow the faculty of the Beacom College to provide the modern applications for machine learning, including recommendation systems, streaming analytics, deep learning and cognitive computing. DSU students will be the recipients of navigating both organizational and technological challenges to adopt machine learning and embark on their own analytics evolution.

In the Computer Science core, several course additions and deletions are noted. CSC 234 Software Security is a better fit for the degree than CSC 245 Information Security Fundamentals. CSC 310 Advanced Data Structures is a new course and replaces CIS 484 Database Management Systems in the core. This change ensures that all graduates are expose to advanced data structures. We also are proposing to replace CSC 466 Language Processing with CSC 404 Foundation of Computation. CIS 350 Computer Hardware, Data Communications and Networking is excluded from the 300/400 level electives because it is designed for non-majors and has content overlap with CSC 363 Hardware, Virtualization, and Data Communication content which students can take.