# SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS
## Substantive Program Modification Program

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|---|---|
| **UNIVERSITY:** | **University of South Dakota** |
| **CURRENT PROGRAM TITLE:** | **Computer Science, M.S. (Plan A and Plan B) [U.MS.CSCI]** |
| **CIP CODE:** | **11.0101** |
| **UNIVERSITY DEPARTMENT:** | **Computer Science** |
| **UNIVERSITY DIVISION:** | **Arts & 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.*

*Elizabeth M. Freeburg* — 2/21/19

Vice President of Academic Affairs or President of the University — Date

**1. This modification addresses a change in:**

| | | | |
|---|---|---|---|
| [ ] | Total credits required within the discipline | [ ] | Total credits of supportive course work |
| [X] | Total credits of elective course work | [X] | Total credits required for program |
| [ ] | Program name | [ ] | Existing specialization |
| [ ] | CIP Code | [ ] | Other (explain below) |

**2. Effective date of change:** Catalog 2019-2020

**3. Program Degree Level:**

Associate [ ] Bachelor's [ ] Master's [X] Doctoral [ ]

**4. Category:**

Certificate [ ] Specialization [ ] Minor [ ] Major [X]

**5. If a name change is proposed, the change will occur:**

[ ] On the effective date for all students

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

**Proposed new name:** _____

*Reminder: Name changes impact require updating any related articulation agreements, site approvals, etc.*

## 6. Primary Aspects of the Modification (*add lines as needed*):

| *Existing Curriculum* | | | | *Proposed Curriculum (highlight changes)* | | | |
|---|---|---|---|---|---|---|---|
| **Pref.** | **Num.** | **Title** | **Cr. Hrs.** | **Pref.** | **Num.** | **Title** | **Cr. Hrs.** |
| **Master of Science, Computer Science Plan A (thesis): Total 30 credit hours*** | | | | **Master of Science, Computer Science Plan A (thesis): Total 30 credit hours** | | | |
| Major Area Core Coursework | | | | Major Area Core Coursework | | | |
| CSC | 798 | THESIS | 6 | CSC | 798 | THESIS | 6 |
| **Select 18 credit hours from the following core courses:** | | | | **Select 18 credit hours from the following core courses:** | | | |
| CSC | 705 | DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS | 3 | CSC | 705 | DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS | 3 |
| CSC | 721 | DISTRIBUTED SYSTEMS | 3 | CSC | 721 | DISTRIBUTED SYSTEMS | 3 |
| | | | | CSC | 722 | MACHINE LEARNING FUNDAMENTALS | 3 |
| CSC | 725 | OPERATING SYSTEMS & ARCHITECTURE | 3 | CSC | 725 | OPERATING SYSTEMS & ARCHITECTURE | 3 |
| CSC | 731 | COMPILER CONSTRUCTION | 3 | CSC | 731 | COMPILER CONSTRUCTION | 3 |
| | | | | CSC | 751 | PROGRAMMING SCIENCE | 3 |
| | | | | CSC | 752 | COMPUTER VISION | 3 |
| | | | | CSC | 761 | ADV ARTIFICIAL INTELLIGENGE | 3 |
| CSC | 762 | ADVANCED COMPUTER NETWORKS AND SECURITY | 3 | CSC | 762 | ADVANCED COMPUTER NETWORKS AND SECURITY | 3 |
| CSC | 765 | SOFTWARE DESIGN AND DEVELOPMENT | 3 | CSC | 765 | SOFTWARE DESIGN AND DEVELOPMENT | 3 |
| CSC | 785 | INFORMATION STORAGE AND RETRIEVAL | 3 | CSC | 785 | INFORMATION STORAGE AND RETRIEVAL | 3 |
| CSC | 790 | GRADUATE SEMINAR | 3 | CSC | 790 | GRADUATE SEMINAR | 3 |
| | | | | CSC | 791 | INDEPENDENT STUDY | 3 |
| | | | | CSC | 792 | TOPICS | 3 |
| | | | | CSC | 7XX | Any graduate coursework in Computer Science with departmental approval | 3 |
| Select 6 hours of electives | | | 6 | Select 6 hours of electives | | | 6 |
| | | **Subtotal:** | **30** | | | **Subtotal:** | **30** |
| **Master of Science, Computer Science Plan B (non–thesis): Total 33 credit hours*** | | | | **Master of Science, Computer Science Plan B (non-thesis): Total 30 credit hours** | | | |
| **Major Area Core Coursework** | | | | **Major Area Core Coursework** | | | |
| **Select 18 credit hours from the following core courses:** | | | | **Select 18 credit hours from the following core courses:** | | | |
| CSC | 705 | DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS | 3 | CSC | 705 | DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS | 3 |
| CSC | 721 | DISTRIBUTED SYSTEMS | 3 | CSC | 721 | DISTRIBUTED SYSTEMS | 3 |
| | | | | CSC | 722 | MACHINE LEARNING FUNDAMENTALS | 3 |
| CSC | 725 | OPERATING SYSTEMS & ARCHITECTURE | 3 | CSC | 725 | OPERATING SYSTEMS & ARCHITECTURE | 3 |
| CSC | 731 | COMPILER CONSTRUCTION | 3 | CSC | 731 | COMPILER CONSTRUCTION | 3 |
| | | | | CSC | 751 | PROGRAMMING SCIENCE | 3 |
| | | | | CSC | 752 | COMPUTER VISION | 3 |
| | | | | CSC | 761 | ADV ARTIFICIAL INTELLIGENGE | 3 |
| CSC | 762 | ADVANCED COMPUTER NETWORKS AND SECURITY | 3 | CSC | 762 | ADVANCED COMPUTER NETWORKS AND SECURITY | 3 |
| CSC | 765 | SOFTWARE DESIGN AND DEVELOPMENT | 3 | CSC | 765 | SOFTWARE DESIGN AND DEVELOPMENT | 3 |
| CSC | 785 | INFORMATION STORAGE AND RETRIEVAL | 3 | CSC | 785 | INFORMATION STORAGE AND RETRIEVAL | 3 |
| CSC | 790 | GRADUATE SEMINAR | 3 | CSC | 790 | GRADUATE SEMINAR | 3 |
| | | | | CSC | 791 | INDEPENDENT STUDY | 3 |
| | | | | CSC | 792 | TOPICS | 3 |
| | | | | CSC | 7XX | Any graduate coursework in Computer Science with departmental approval | 3 |
| Select 15 hours of electives or Informatics Specialization | | | 15 | Select 12 hours of electives | | | 12 |
| | | **Subtotal:** | **33** | | | **Subtotal:** | **30** |
| **Elective Work: Plan A takes 6 credit hours; Plan B takes 15 credit hours from the following:** | | | | **Elective Work: Plan A takes 6 credit hours; Plan B takes 12 credit hours from the following:** | | | |
| | | | | CSC | 501 | RICH INTERNET APPLICATIONS | 3 |
| | | | | CSC | 505 | ANALYTICS PROGRAMMING FUNDAMENTALS | 3 |
| CSC | 511 | SIMULATION | 3 | CSC | 511 | SIMULATION | 3 |
| CSC | 525 | HIGH PERFORMANCE COMPUTING | 3 | CSC | 525 | HIGH PERFORMANCE COMPUTING | 3 |
| CSC | 535 | HUMAN FACTORS IN COMPUTER SYSTEMS | 3 | CSC | 535 | HUMAN FACTORS IN COMPUTER SYSTEMS | 3 |
| CSC | 545 | INTRODUCTION TO THEORY OF COMPUTATION | 3 | CSC | 545 | INTRODUCTION TO THEORY OF COMPUTATION | 3 |
| CSC | 547 | ARTIFICIAL INTELLIGENCE | 3 | CSC | 547 | ARTIFICIAL INTELLIGENCE | 3 |
| | | | | CSC | 555 | ALGORITHMS | 4 |
| CSC | 556 | OPERATING SYSTEMS | 3 | CSC | 556 | OPERATING SYSTEMS | 3 |
| CSC | 561 | PROGRAMMING LANGUAGES | 3 | CSC | 561 | PROGRAMMING LANGUAGES | 3 |
| CSC | 570 | SOFTWARE ENGINEERING | 3 | CSC | 570 | SOFTWARE ENGINEERING | 3 |
| CSC | 571 | NUMERICAL ANALYSIS I | 3 | CSC | 571 | NUMERICAL ANALYSIS I | 3 |
| CSC | 575 | OPERATIONS RESEARCH | 3 | CSC | 575 | OPERATIONS RESEARCH | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CSC | 581 | SYSTEMS ANALYSIS | 3 | CSC | 581 | SYSTEMS ANALYSIS | 3 |
| CSC | 584 | DATABASE MANAGEMENT SYSTEMS | 3 | CSC | 584 | DATABASE MANAGEMENT SYSTEMS | 3 |
| | | | | CSC | 586 | DATA MINING | 3 |
| | | | | CSC | 591 | INDEPENDENT STUDY | 3 |
| | | | | CSC | 592 | TOPICS | 3 |
| | | | | CSC | 594 | INTERNSHIP | 1-3 |
| CSC 5XX, 6XX, or 7XX-Graduate coursework in Computer Science with the department's approval | | | | CSC | 5XX/6XX/7XX | CSC 5XX, 6XX, or 7XX-Graduate coursework in Computer Science with the department's approval | |
| XXXX 5XX, 6XX, or 7XX-Graduate coursework in another discipline with the department's approval | | | | | | | |
| **Informatics Specialization optional (12 credit hours plus 3 credit hours specified in the core)** | | | | **Informatics Specialization optional (12 credit hours plus 3 credit hours specified in the core)** | | | |
| CSC | 525 | High Performance Computing **OR** | 3 | CSC | 525 | High Performance Computing **OR** | 3 |
| CSC | 6XX/7XX | Elective course with High Performance Computing content | | CSC | 6XX/7XX | Elective course with High Performance Computing content | |
| CSC | 586 | Data Mining **OR** | 3 | CSC | 586 | Data Mining **OR** | 3 |
| CSC | 6XX/7XX | Elective course with Advanced Data Mining | | CSC | 6XX/7XX | Elective course with Advanced Data Mining | |
| CSC | 785* | Information Storage and Retrieval **OR** | 3 | CSC | 785* | Information Storage and Retrieval **OR** | 3 |
| CSC | 6XX/7XX | Elective course with Advanced Information Storage and Retrieval content | | CSC | 6XX/7XX | Elective course with Advanced Information Storage and Retrieval content | |
| **3 credit hours elective-Graduate coursework in Computer Science or in another discipline with the department's approval.**<br>**Select one course from the following:** | | | | **3 credit hours elective-Graduate coursework in Computer Science or in another discipline with the department's approval.**<br>**Select one course from the following:** | | | |
| CSC | 601 | Introduction to Bioinformatics | 3 | CSC | 601 | Introduction to Bioinformatics | 3 |
| CSC | 6XX/7XX | Elective course with Bioinformatics content | | CSC | 6XX/7XX | Elective course with Bioinformatics content | |
| CPHD | 601 | Introduction to Bioinformatics | | CPHD | 601 | Introduction to Bioinformatics | |
| **Statistics course (3 credit hours):** | | | | **Statistics course (3 credit hours):** | | | |
| BIOL | 520/L | Introduction to Biostatistics and computational Biology | 3/0 | BIOL | 520/L | Introduction to Biostatistics and computational Biology | 3/0 |
| Other graduate-level statistics class approved by the Computer Science Department. | | | 3 | Other graduate-level statistics class approved by the Computer Science Department. | | | 3 |
| | | **Subtotal:** | **15** | | | **Subtotal:** | **15** |
| * Course counts towards core coursework. | | | | * Course counts towards core coursework. | | | |
| **Accelerated Program Master of Science, Computer Science: BS/MS** | | | | **Accelerated Program Master of Science, Computer Science: BS/MS** | | | |
| Up to 9 credits applied toward the B.S. program may be used to satisfy graduate credits. The following restrictions apply:<br>The courses must be taken at the 500/600 level as an undergraduate. Courses taken at the 500/600-level can be applied to both the B.S. and M.S. degrees. Dual-listed courses must be taken at the 500-level.<br>The student must apply to, and be admitted to, the accelerated program prior to taking courses to be credited toward the accelerated program.<br>No courses taken prior to admission to the accelerated program may be counted toward an accelerated graduate degree. No exceptions to this policy will be approved.<br>Courses that are "double counted" must be approved by the department chair for inclusion in the program of study prior to registration for the course or the credits will not be applied toward the accelerated graduate degree. No exceptions to this policy will be approved.<br>Only courses taken at the student's home institution are eligible for dual credit. No transferred courses from other institutions will be allowed to count toward the accelerated master's degree.<br>To fulfill the undergraduate required courses, graduate courses on the same topic areas must be taken. | | | | Up to 9 credits applied toward the B.S. program may be used to satisfy graduate credits. The following restrictions apply:<br>The courses must be taken at the 500/600 level as an undergraduate. Courses taken at the 500/600-level can be applied to both the B.S. and M.S. degrees. Dual-listed courses must be taken at the 500-level.<br>The student must apply to, and be admitted to, the accelerated program prior to taking courses to be credited toward the accelerated program.<br>No courses taken prior to admission to the accelerated program may be counted toward an accelerated graduate degree. No exceptions to this policy will be approved.<br>Courses that are "double counted" must be approved by the department chair for inclusion in the program of study prior to registration for the course or the credits will not be applied toward the accelerated graduate degree. No exceptions to this policy will be approved.<br>Only courses taken at the student's home institution are eligible for dual credit. No transferred courses from other institutions will be allowed to count toward the accelerated master's degree.<br>To fulfill the undergraduate required courses, graduate courses on the same topic areas must be taken. | | |
| No credit will be granted on the Program of Study for a core course with a grade of 'C' or lower. | | | | No credit will be granted on the Program of Study for a core course with a grade of 'C' or lower. | | | |
| Total number of hours required for Plan A (thesis) | | | **30** | Total number of hours required for Plan A (thesis) | | | **30** |
| Total number of hours required for Plan B (non-thesis) | | | **33** | Total number of hours required for Plan B (non-thesis) | | | **30** |
| Total number of hours required for specialization | | | **15** | Total number of hours required for specialization | | | **15** |
| Total number of hours required for degree | | | **30-33** | Total number of hours required for degree | | | **30** |

*** Note: No credit will be granted on the Program of Study for a core course with a grade of 'C' or lower.**

7. **Explanation of the Change:** The department of Computer Science (CS) proposes an upgrade to the Graduate program to a more dynamic catalog which permits flexibility in the course offerings considering the specialties of the existing faculty. The current CS catalog includes a very limited number of core courses, some of them cannot be offered as the faculty teaching those courses retire or leave USD. We propose to augment the number of core course offerings without changing the number of required credit hours (18) of core courses in both plans. At the same time, we are reducing the number of elective credit hours in Plan B from 15 to 12. Hence, CS proposes offering the two plans of the graduate program in the 30 credit hours format with the expectation that students (90% foreign) graduate in at most three semesters, and with the conviction that an extra elective course in Plan B will not produce a significant effect in the academic growth of the students.