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| For Academic Affairs and Research Use Only |
| CIP Code:  |  |
| Degree Code: |  |

**Reconfiguration of Existing Degree Program Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

Email completed proposals to curriculum@astate.edu for inclusion in curriculum committee agenda.

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| Edward Hammerand | 9/27/2017 |

**Department Curriculum Committee Chair** |

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| Rob Williams | 10/25/2017 |

**COPE Chair (if applicable)** |
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| Hung-Chi Su  | 9/27/2017 |

**Department Chair:**  |

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |

**Head of Unit (If applicable)**   |
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| David F. Gilmore | 10/6/2017 |

**College Curriculum Committee Chair** |

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**Undergraduate Curriculum Council Chair** |
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| Anne A. Grippo  | 10/6/2017 |

**College Dean** |

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**Graduate Curriculum Committee Chair** |
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**General Education Committee Chair (If applicable)**   |

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**Vice Chancellor for Academic Affairs** |

1. **Proposed Program Title**

Master of Science in Education in Computer Science

1. **Contact Person** (Name, Email Address, Phone Number)

 Dr. Hung-Chi Su, suh@astate.edu, 870-680-8119

1. **Proposed Starting Date**

8/15/2018

1. **Is there differential tuition requested?** *If yes, please fill out the New Program/Tuition and Fees Change Form.*

No

**Bulletin Changes**

|  |
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| **Instructions**  |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Follow the following guidelines for indicating necessary changes.** **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.** - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)- New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font). - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)*You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.* *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

 ***\*For new programs, please insert copy of all sections where this is referenced.\****

On page 51 of 2017-18 Graduate Bulletin

**Master of Science in Education (M.S.E.)**

|  |
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| Biology  |
| Chemistry |
| Computer Science |
| Curriculum and Instruction—Curriculum Director Track—Gifted, Talented and Creative Director Track—Special Education Director Track |
| Early Childhood Education |
| English |
| Educational Theory and Practice |
| Educational Leadership |
| Mathematics |
| Middle Level Education |
| Physical Education |
| Reading |
| Social Science |
| Special Education—Gifted, Talented, and Creative—Instructional Specialist K-12 |

On page 244 of 2017-18 Graduate Bulletin:

PROGRAMS OF STUDY

The College of Sciences and Mathematics offers work leading to the Master of Arts degree in biology; to the Master of Science degree with majors in biology, chemistry, computer science, environmental sciences, and mathematics; to the Master of Science in molecular biosciences; to the Master of Science in Education degree with majors in biology, chemistry, computer science, and mathematics.

After page 274 of 2017-2018 Graduate Bulletin:

**Program of Study for the Master of Science in Education Degree**
**in Computer Science**

**ADMISSION REQUIREMENTS**

 Students seeking admission into the Master of Science in Education degree program in Computer Science must meet the admission requirements of Graduate Admissions and the specific program requirements. In addition, applicants must have completed a minimum of 18 hours of professional education courses including the requirements for a valid teaching certificate based on a four-year teacher education program. Applicants who do not meet the requirements for a valid teaching certificate based on a four-year teacher education program will be required to complete the undergraduate courses required for such a certificate. These courses may be completed concurrently with the graduate work, but must be completed before the degree is awarded. (This program does not lead to licensure.)

 For unconditional admission, academic proficiency must be established through satisfaction of either of the following admission selection criteria:

* A minimum cumulative undergraduate grade point average of 3.00 (or 3.25 on the last 60 hours) or a minimum score of 300 on the combined verbal and quantitative sections of the Graduate Record Examination (GRE).

 For conditional admission, academic proficiency must be established through satisfaction of either of the following admission selection criteria:

* A minimum cumulative undergraduate grade point average of 2.75 (or 3.00 on the last 60 hours) and a minimum score of 295 on the combined verbal and quantitative sections of the GRE.

**Computer Science**
**Master of Science in Education**

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| --- | --- |
| **University Requirements:**  |  |
| See Graduate Degree Policies for additional information (p. 35)  |  |
| **Professional Education Core Courses:**  | Sem. Hrs. |
| ELFN 6763, Philosophies of Education OR PSY 6513, Advanced Educational Psychology  | 3 |
| ELFN 6773, Introduction to Statistics and Research  | 3 |
| Select one of the following: ELCI 5523, Middle School Curriculum ELCI 6063, Curriculum Management ELCI 6523, Secondary School Curriculum ELFN 6763, Philosophies of Education *(if not taken previously)* PSY 6513, Advanced Educational Psychology *(if not taken previously)*  | 3 |
| Sub-total  | 9 |
| **Program Requirements:**  | Sem. Hrs. |
| CSED 5043 Principles of Computer Programming | 3 |
| CSED 5731 Principles of Abstract Structures | 1 |
| CSED 5231 Principles of Operating Systems | 1 |
| CSED 5241 Principles of Computer Organization | 1 |
| CSED 6113 Principles of Software Engineering | 3 |
| CSED 6713 Principles of Analysis of Algorithms | 3 |
| CSED 6723 Principles of Automata Theory | 3 |
| CS Electives (select two of the following): | 6 |
|  CS 5223 UNIX Systems Programming |
|  CS 5313 Computer Networks |
|  CS 5543 Database Systems |
| Sub-total  | 21 |
| **Total Required Hours:**  | 30 |

**LETTER OF NOTIFICATION – 11**

**RECONFIGURATION OF EXISTING DEGREE PROGRAMS**

**(Consolidation or Separation of Degrees to Create New Degree)**

\*Please include the documents to be submitted found throughout this LON at the end of the form.

1. Institution submitting request: *Arkansas State University*
2. Contact person/title: *Dr. Hung-Chi Su, Chair of Computer Science Department*
3. Title(s) of degree programs to be consolidated/reconfigured:

 *Master of Science in Computer Science*

1. Current CIP Code(s)/Current Degree Code(s): *11.0101*
2. Proposed title of consolidated/reconfigured program:
 *Master of Science in Education in Computer Science*
3. Proposed CIP Code for new program: *13.1321*
4. Proposed Effective Date: *8/15/2018*
5. Reason for proposed program consolidation/reconfiguration:

 *(Indicate student demand (projected enrollment) for the proposed program and document that the program meets employer needs)*

 *The program has been designed to accommodate an anticipated initial enrollment at launch of five to ten students with a slow increase after that. This is in part due to the logistical demands of pursuing the degree placed on in-service teachers, who make up the potential student body. As the program develops, methods of offering at least some of the course work online are being considered to grow the program further.*

 *Documenting that the program meets employer needs:*

 *“Arkansas Governor Hutchinson has overseen passage of the first truly comprehensive law requiring all public and charter high schools to offer computer sciences courses to students, beating better known tech centers like California and New York to the punch.”*[*https://www.wired.com/2015/03/arkansas-computer-science/*](https://www.wired.com/2015/03/arkansas-computer-science/)

 *“Arkansas, for example, is scrambling to hire and train enough qualified teachers. As Arkansas Governor Asa Hutchinson stated at the time the new mandate became law, only 20 high school teachers across the entire state were actually prepared to teach computer science.“*

[*http://fortune.com/2015/10/22/u-s-students-computer-science/*](http://fortune.com/2015/10/22/u-s-students-computer-science/)

 *The Arkansas Department of Education designated the following as critical academic shortage areas for the 2016-2017 school year: Computer Science.*

[*http://www.arkansased.gov/public/userfiles/HR\_and\_Educator\_Effectiveness/HR\_Educator\_Licensure/CSA\_PPT\_from\_Dec\_2015\_FINAL\_with\_Notes-11266.pdf*](http://www.arkansased.gov/public/userfiles/HR_and_Educator_Effectiveness/HR_Educator_Licensure/CSA_PPT_from_Dec_2015_FINAL_with_Notes-11266.pdf)

 *“Successful implementation of computer science standards may hinge on one thing: teacher capacity.* *Without enough qualified teachers and the resources to support them, states will be hard pressed to make computer science a part of every student’s education—something that industry leaders say is critical to career readiness.”*

[*http://www.nasbe.org/state-innovation/preparing-computer-science-teachers-in-maryland-and-arkansas/*](http://www.nasbe.org/state-innovation/preparing-computer-science-teachers-in-maryland-and-arkansas/)

 *U.S. Department of Education Teacher Shortage Areas Nationwide Listing 2016-2017 Arkansas: Computer Science*

[*https://www2.ed.gov/about/offices/list/ope/pol/tsa.pdf*](https://www2.ed.gov/about/offices/list/ope/pol/tsa.pdf)

1. Provide current and proposed curriculum outline by semester.

*For undergraduate programs, please also fill out 8-semester plan at end of document.*

 *Indicate total semester credit hours required for the proposed program. Underline new courses and provide new course descriptions. (If existing courses have been modified to create new courses, provide the course name/description for the current/existing courses and indicate the related new/modified courses.) Identify required general education core courses with an asterisk.*

|  |  |
| --- | --- |
| Current M.S. in Computer Science Curriculum | Credit Hours |
| Algorithms: | 3 |
| CS 5713 | Algorithms |
| Theory (select one of the following): | 3 |
| CS 5133 | Compilers |
| CS 5723 | Automata Theory |
| Systems (select one of the following): | 3 |
| CS 5313 | Computer Networks |
| CS 6213 | Parallel Processing |
| CS 6223 | High Performance Computing |
| CS 6233 | Distributed Systems |
| Computer Science Electives (Choose 18 hours) |
|  | including courses such as: CS 5223 UNIX Systems Programming CS 5313 Computer Networks CS 5543 Database Systems | 18 |
| Computer Science, Mathematics, and/or Statistics Electives | 6 |
| Total Credit Hours | 33 |

|  |  |
| --- | --- |
| Proposed M.S.E. in Computer Science Curriculum  | Credit Hours |
| Professional Education Core Courses: | 9 |
| ELFN 6773 | Introduction to Statistics and Research |
| Professional Education Core Courses (select one of the following): |
| ELFN 6763 | Philosophies of Education |
| PSY 6513 | Advanced Educational Psychology |
| Professional Education Core Courses (select one of the following): |
| ELCI 6063 | Curriculum Management |
| ELCI 6523 | Secondary School Curriculum |
| ELFN 6763 | Philosophies of Education (if not taken previously) |
| PSY 6513 | Advanced Educational Psychology (if not taken previously) |
| Computer Science Core Courses: | 15 |
| CSED 5043 | Principles of Computer Programming |
| CSED 5731 | Principles of Abstract Structures |
| CSED 5231 | Principles of Operating Systems |
| CSED 5241 | Principles of Computer Organization |
| CSED 6113 | Principles of Software Engineering |
| CSED 6713 | Principles of Analysis of Algorithms |
| CSED 6723 | Principles of Automata Theory |
| Computer Science electives (select two of the following):  | 6 |
| CS 5223 | UNIX Systems Programming |
| CS 5313 | Computer Networks |
| CS 5543 | Database Systems |
| Total Credit Hours | 30 |

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| Proposed M.S.E. in Computer Science Curriculum by semester  | Credit Hours |
| Fall Semester | 3 |
| CSED 5043 | Principles of Computer Programming |
| Spring Semester | 6 |
| CSED 5731 | Principles of Abstract Structures |
| CSED 5231 | Principles of Operating Systems |
| CSED 5241 | Principles of Computer Organization |
| ELFN 6773 | Introduction to Statistics and Research |
| Summer Semester | 6 |
| CSED 6723 | Principles of Automata Theory |
| ELFN 6763 or PSY 6513 | Philosophies of Education Advanced Educational Psychology |
| Fall Semester (2019) | 6 |
| CSED 6113 | Principles of Software Engineering |
| CSED 6713 | Principles of Analysis of Algorithms |
| Spring Semester (2020) | 6 |
| CS elective (one of three) |
| Professional Education Core Course (one of four) |
| Summer Semester (2020) | 3 |
| CS elective (one of three) |
| Total Credit Hours | 30 |

New courses:

* CSED 5043. Principles of Computer Programming (*originated as subject in CS5012 & CS5022 & CS5032 accelerated programming and data structures courses*)

Programming methodology, procedural abstraction, top-down design, object-oriented programming techniques, fundamental data structures such as linked lists, stacks, queues and binary trees, searching and sorting techniques, and an introduction to algorithm analysis, all with an emphasis on pedagogy in the secondary school.

* CSED 5731, Principles of Abstract Structures (*originated as subject in undergraduate special course CS482V*)

Foundational computer science concepts, including algorithm complexity and structures such as sets, trees, and graphs, with an emphasis on pedagogy in the secondary school.

* CSED 5231, Principles of Operating Systems (*originated as subject in undergraduate special course CS482V*)

Policies, design issues, and implementation techniques for operating system software with an emphasis on pedagogy in the secondary school.

* CSED 5241, Principles of Computer Organization

Basic principles of computer architectural design with an emphasis on pedagogy in the secondary school.

* CSED 6113. Principles of Software Engineering (*originated as subject in CS5113 Software Engineering*)

Techniques of design, implementation, quality assurance, and maintenance for large scale software systems with an emphasis on pedagogy in the secondary school.

* CSED 6713. Principles of Analysis of Algorithms (*originated as subject in CS5713 Analysis of Algorithms* )

The analysis of space and time requirements of algorithms with an emphasis on pedagogy in the secondary school.

* CSED 6723. Principles of Automata Theory (*originated as subject in CS5723 Automata Theory*)

Study formal languages and equivalent models of computation with an emphasis on pedagogy in the secondary school.

1. Provide program budget. Indicate amount of funds available for reallocation.

 *See end of document.*

1. Provide current and proposed organizational chart. *See end of document.*

1. Institutional curriculum committee review/approval date: Enter text...
2. Are the existing degrees offered off-campus or via distance delivery?

*No*
3. Will the proposed degree be offered on-campus, off-campus, or via distance delivery?

*On-campus*

1. Identify mode of distance delivery or the off-campus location for the proposed program.

*N/A*

1. Provide documentation that proposed program has received full approval by licensure/certification entity, if required.

 *(A program offered for teacher/education administrator licensure must be reviewed/approved by the Arkansas Department of Education prior to consideration by the Coordinating Board; therefore, the Education Protocol Form also must be submitted to ADHE along with the Letter of Notification).*

 *N/A, program does not lead to licensure/certification*

1. Provide copy of e-mail notification to other institutions in the area of the proposed program and their responses; include your reply to the institutional responses. *See end of document.*
2. List institutions offering similar program and identify the institutions used as a model to develop the proposed program.

*University of Nebraska Omaha*

*Nova Southeastern University*

*Model used to develop program was the A-State M.S.E. in Mathematics program*

1. Provide scheduled program review date (within 10 years of program implementation).

*Spring 2028*

1. Provide additional program information if requested by ADHE staff.

Enter text...

President/Chancellor Approval Date: Click here to enter a date.

Board of Trustees Notification Date: Click here to enter a date.

Chief Academic officer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: Enter date.

 Name (printed):

**8-Semester Plan**

(**referenced in #9** - **Undergraduate Proposals Only)**

*Instructions: Please identify new courses in italics*.

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|  **Arkansas State University-Jonesboro Degree:** **Major:** **Year:**  |
| Students requiring developmental course work based on low entrance exam scores (ACT, SAT, ASSET, COMPASS) may not be able to complete this program of study in eight (8) semesters. Developmental courses do not count toward total degree hours. **Students having completed college level courses prior to enrollment will be assisted by their advisor in making appropriate substitutions. In most cases, general education courses may be interchanged between semesters.** A minimum of 45 hours of upper division credit (3000-4000 level) is required for this degree. |
| **Year 1** |  | **Year 1** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Year 2** |  | **Year 2** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Year 3** |  | **Year 3** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Year 4** |  | **Year 4** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
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| **Total Hours** |  |  |  |  | **Total Hours** |  |  |  |
| **Total Jr/Sr Hours \_\_\_ Total Degree Hours \_\_\_** |
| **Graduation Requirements:** |

**Program Budget**

**(referenced in # 10)**

Provide program budget. Indicate amount of funds available for reallocation.

*The program is based on the successful model used for the Master of Science in Education in Mathematics. Courses required will consist of existing education courses utilized by other education degrees, existing computer science (CS) courses, and some new computer science education (CSED) courses. While enrollment in the program is small, all of these new CSED courses save one hour (CSED 5241: Principles of Computer Organization) may be taught largely in conjunction with graduate CS courses already in the course rotation. This coupled with a slight adjustment to the regular course rotation will result in no new resources or faculty being required.*

**Organizational Chart**

**(referenced in # 11)**

Provide current and proposed organizational chart. Include where the proposed program will be housed (department/college).

*Organizational Chart will remain the same.*



*The proposed program will be housed in the Department of Computer Science in the College of Sciences and Mathematics.*

**Written Notification to Other Institutions**

**(referenced in # 17)**

This should include a copy of written notification to other institutions in area of proposed program and responses

Enter text...

**Student Learning Outcomes**

Provide outcomes that students will accomplish during or at completion of this reconfigured degree. Fill out the following table to develop a continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

***Note: Best practices suggest 4-7 outcomes per program; minors would have 1 to 4 outcomes.***

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| **Outcome 1** | Students will have a broad exposure to concepts in computer science. |
| Assessment Measure | Comprehensive examinations and employer surveys  |
| Which courses are responsible for this outcome? | CSED 5043, Principles of Computer ProgrammingCSED 5731, Principles of Abstract StructuresCSED 5231, Principles of Operating SystemsCSED 5241, Principles of Computer OrganizationCSED 6113, Principles of Software EngineeringCSED 6713, Principles of Analysis of AlgorithmsCSED 6723, Principles of Automata TheoryCS 5223, UNIX Systems ProgrammingCS 5313, Computer NetworksCS 5543, Database Systems |
| Assessment Timetable | Comprehensive exams will be conducted each semester, reviewed annually, and reported on every three years; employer surveys will be conducted each fall and reported on every four years. |
| Who is responsible for assessing and reporting on the results? | Department of Computer Science assessment committee |

|  |  |
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| **Outcome 2** | Students will be able to think analytically in terms of understanding the nature of problems, crafting computer solutions for them, and evaluating those solutions. |
| Assessment Measure | Comprehensive examinations, student exit interview, and employer surveys  |
| Which courses are responsible for this outcome? | CSED 5043, Principles of Computer ProgrammingCSED 5731, Principles of Abstract StructuresCSED 5231, Principles of Operating SystemsCSED 5241, Principles of Computer OrganizationCSED 6113, Principles of Software EngineeringCSED 6713, Principles of Analysis of AlgorithmsCSED 6723, Principles of Automata TheoryCS 5223, UNIX Systems ProgrammingCS 5313, Computer NetworksCS 5543, Database Systems |
| Assessment Timetable | Comprehensive exams will be conducted each semester, reviewed annually, and reported on every three years; student exit interviews will be conducted each semester, reviewed annually, and reported on every three years; employer surveys will be conducted each fall and reported on every four years. |
| Who is responsible for assessing and reporting on the results? | Department of Computer Science assessment committee |

|  |  |
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| **Outcome 3** | Students will be able to communicate computer science concepts with clarity and effective exposition. |
| Assessment Measure | Comprehensive examinations, student exit interview and employer surveys  |
| Which courses are responsible for this outcome? | CSED 5043, Principles of Computer ProgrammingCSED 5731, Principles of Abstract StructuresCSED 5231, Principles of Operating SystemsCSED 5241, Principles of Computer OrganizationCSED 6113, Principles of Software EngineeringCSED 6713, Principles of Analysis of AlgorithmsCSED 6723, Principles of Automata Theory |
| Assessment Timetable | Comprehensive exams will be conducted each semester, reviewed annually, and reported on every three years; student exit interviews will be conducted each semester, reviewed annually, and reported on every three years; employer surveys will be conducted each fall and reported on every four years. |
| Who is responsible for assessing and reporting on the results? | Department of Computer Science assessment committee |

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| **Outcome 4** | Students will understand how educational philosophies impact teaching and student learning. |
| Assessment Measure | Comprehensive examinations and employer surveys  |
| Which courses are responsible for this outcome? | ELFN 6763, Philosophies of EducationPSY 6513, Advanced Educational PsychologyELCI 6063, Curriculum ManagementELCI 6523, Secondary School Curriculum |
| Assessment Timetable | Comprehensive exams will be conducted each semester, reviewed annually, and reported on every three years; employer surveys will be conducted each fall and reported on every four years. |
| Who is responsible for assessing and reporting on the results? | Department of Computer Science assessment committee |

|  |  |
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| **Outcome 5** | Students will understand the basic principles of learning and their applications to classroom management and instructional design. |
| Assessment Measure | Comprehensive examinations and employer surveys  |
| Which courses are responsible for this outcome? | ELFN 6763, Philosophies of EducationPSY 6513, Advanced Educational PsychologyELCI 6063, Curriculum ManagementELCI 6523, Secondary School Curriculum |
| Assessment Timetable | Comprehensive exams will be conducted each semester, reviewed annually, and reported on every three years; employer surveys will be conducted each fall and reported on every four years. |
| Who is responsible for assessing and reporting on the results? | Department of Computer Science assessment committee |

 *Please repeat as necessary.*