NOTE: Changes to programs may require course changes, which must be processed electronically. Any questions should be directed to Associate Provost David Reinhold at 7-4564 or david.reinhold@wmich.edu

DEPARTMENT: CS
PROPOSED EFFECTIVE FALL YEAR: 2019

COLLEGE: CEAS

PROPOSED IMPROVEMENTS: Academic Program Proposed Improvements
☐ New degree*
☐ New major*
☐ New curriculum*
☐ New concentration*
☐ New certificate*

☐ New minor*
☐ Deletion*
☐ Revised major
☐ Revised minor

☐ Admission requirements
☐ Graduation requirements
☐ Change in Title
☐ Transfer

☐ Other (explain**)

** Other:

Title of degree, curriculum, major, minor, concentration, or certificate: Bachelor of Computer Science

Chair, Department Curriculum Committee: ___________________________ Date 10/15/2018

CHECKLIST FOR DEPARTMENT CHAIRS/DIRECTORS

☐ For new programs and other changes that have resource implications, the dean has been consulted.
☐ When appropriate, letters of support from department faculty are attached.
☐ When appropriate, letters of support from other departments in the same college are attached.
☐ The proposal has been reviewed by HIGE for possible implications for international student enrollment.
☐ The proposal is consistent with the departmental assessment plan, and identifies measurable learning outcomes for assessment.
☐ Detailed resource plan is attached where appropriate.
☐ All questions attached have been completed and supporting documents are attached.
☐ The proposal is written and complete as outlined in the Faculty Senate guidelines and the curriculum change guides.

Chair/Director: ___________________________ Date 10/15/18

CHECKLIST FOR COLLEGE CURRICULUM COMMITTEE

☐ The academic quality of the proposal and the faculty involved has been reviewed.
☐ Detailed resource plan is attached where appropriate.
☐ Consistency between the proposal and the relevant catalog language has been confirmed.
☐ The proposal has been reviewed for effect on students transferring from Michigan community colleges. Detailed information on transfer articulation must be included with undergraduate proposals.
☐ Consistency between the proposal and the College and department assessment plans has been confirmed.
☐ Consistency between the proposal and the College and department strategic plans has been confirmed.
☐ All questions attached have been completed and supporting documents are attached.
☐ The proposal is written and complete as outlined in the Faculty Senate guidelines and the curriculum change guides.

Chair, College Curriculum Committee: ___________________________ Date 10/26/18

Revised Sept. 2018. All previous forms are obsolete and should not be used.
**CHECKLIST FOR COLLEGE DEANS**

- [ ] For new programs and proposed program deletions, the provost has been consulted.
- [ ] For new programs, letter of support from University Libraries Dean indicating library resource requirements have been met.
- [ ] When appropriate, letters of support from other college faculty and/or chairs are attached.
- [ ] When appropriate, letters of support from other college deans, whose programs/courses may be affected by the change, are attached.
- [ ] The proposal has been reviewed for implications for accreditation, certification, or licensure.
- [ ] Detailed resource plan is attached where appropriate.
- [ ] All questions attached have been completed and supporting documents are attached.
- [ ] The proposal is written and complete as outlined in the Faculty Senate guidelines and the curriculum change guides.

**Dean:**

![Signature]

**Date:** 10/26/2018

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**FOR PROPOSALS REQUIRING REVIEW BY:**

GSC/USC, EPGC, GRADUATE COLLEGE, and/or FACULTY SENATE EXECUTIVE BOARD

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1. Explain briefly and clearly the proposed improvement:
Reduce the elective credits required for graduation by 1 credit hour.

2. Rationale. Give your reason(s) for the proposed improvement.
Due to increasing the credit hours for the CS4910 Senior Design II class, we must reduce the available elective credits.

3. Effect on other colleges, departments, or programs. If consultation with others is required, attach evidence of consultation and support. If objections have been raised, document the resolution. Demonstrate that the program you propose is not a duplication of an existing one.
None.

4. Effect on your department’s programs. Show how the proposed change fits with other departmental offerings.
This ensures our total credits required to graduate stay the same while we increase the credit hours of the CS4910 Senior Design II class.

5. Alignment with college’s and department’s strategic plan, mission, and vision.
This change aligns with our mission in that it adds elements of ethics and leadership to the learning outcomes of CS 4910.

6. Effects on enrolled students: Are program conflicts avoided? Will your proposal make it easier or harder for students to meet graduation requirements? Can students complete the program in a reasonable time? Show that you have considered scheduling needs and demands on students’ time.
Currently enrolled students will not be affected. New students will be able to graduate with the same number of credits as currently enrolled students, and utilize the new CS 4910 as a WES course if it is accepted as such.

7. Student or external market demand. What is your anticipated student audience? What evidence of student or market demand or need exists? What is the estimated enrollment? What other factors make your proposal beneficial to students?
Not applicable

8. Effects on resources. Explain how your proposal would affect department and University resources, including faculty, equipment, space, technology, and library holdings. If proposing a new program, include a letter and/or email of support from the university libraries affirming that the library resource issues have been reviewed. Tell how you will staff additions to the program. If more advising will be needed, how will you provide for it? What will be the initial one-time costs and the ongoing base-funding costs for the proposed program? (Attach additional pages, as necessary.)
See the CS4910 proposal for needed resources for this class.

9. List the learning outcomes for the revised or proposed major, minor, or concentration. The department will use these outcomes for future assessments of the program.
No change to program learning objectives.

10. Describe how this change is a response to assessment outcomes that are part of a department or college assessment plan or informal assessment activities.
CS 4910 change form specifies how this change will positively affect both ABET accreditation assessments and allow CS 4910 to be used for WES credit.

11. (Undergraduate proposals only) Describe in detail how this change affects transfer articulation for Michigan community colleges. For new majors or minors, describe transfer guidelines to be developed with Michigan community colleges. For revisions to majors or minors, describe necessary revisions to Michigan community college guidelines. Department chairs should seek assistance from college advising directors or from the admissions office in completing this section.
We are only changing the available elective credits, not the content nor transferability of community colleges’ equivalent courses. This proposed change has no effect.

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12. Please offer both "Current Catalog Language" and "Proposed Catalog Language" if there is to be a change in the catalog description for a given program. For the "current" language, please copy and paste relevant language from the most current catalog and for the "proposed" language, please share the exact proposed new catalog language. As possible, bold or otherwise note the key changes in the new proposed catalog language.

No change.
Requirements

Students enrolling in the Computer Science Program are required to own a laptop computer with minimum specifications set by the department. These specifications will be posted on the department website.

Candidates for the Bachelor of Science in Computer Science must satisfy the following requirements in addition to those required by Western Michigan University:

1. Mathematics/Statistics and Laboratory Science

To satisfy CAC/ABET accreditation requirements, all students must complete at least thirty credit hours of mathematics, statistics and laboratory science requirements which must include one approved laboratory science and a minimum of 15 credit hours in mathematics/statistics. Mathematics/statistics course work must include:

MATH 1220 - Calculus I Credits: 4 hours
OR
MATH 1700 - Calculus I, Science and Engineering Credits: 4 hours
MATH 2300 - Elementary Linear Algebra Credits: 4 hours
STAT 2600 - Data Analysis Using R Credits: 4 hours
CS 1310 - Foundations of Computer Science Credits: 4 hours
(1 of the CS 1310 credits counts towards the 15 hour Math/Stat minimum)

Approved Mandatory Laboratory Science Courses

Students may meet the laboratory science requirement by taking one of the following:

BIOS 1610 - Molecular and Cellular Biology Credits: 4 hours
CHEM 1100 - General Chemistry I Credits: 3 hours
And
CHEM 1110 - General Chemistry Laboratory I Credits: 1 hour
GEOS 1300 - Physical Geology Credits: 4 hours
PHYS 2050 - University Physics I Credits: 4 hours
And
PHYS 2060 - University Physics I Laboratory Credits: 1 hour

Remaining Mathematics/Statistics and Laboratory Science

The remaining 10-11 credit hours of Mathematics/Statistics/LabScience courses must be approved by a department advisor.

2. General Education

A list of approved General Education courses can be found in the “Graduation and Academic Advising” section in this catalog.

General Education requirements include one course from each of the distribution areas I, II, III, IV, V, VII, and VIII with no more than two courses in the same department and at least two courses at the 3000-4000 level. A writing course is also required to satisfy

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Proficiency 1. The required lab science course (CHEM, GEOS and PHYS, though not BIOS) currently also satisfies distribution area VI.

3. Minimum Grades

Students may receive at most two grades below a “C” in the following courses:

All courses with a CS prefix
ECE 2500
Courses used for the Math/Stat/Science 30 credit hour requirement including required Math/Stat courses, the required Science course and any courses included as the Math/Stat/Science electives

4. Complete 122 Semester Credit Hours

The schedule below is an example of one leading to graduation in eight semesters, beginning with the fall semester.

First Semester (14 hours)

General Education Credits: 3 hours
CS 1110 - Computer Science | Credits: 4 hours
EE 1020 - Technical Communication Credits: 3 hours
MATH 1220 - Calculus | Credits: 4 hours
OR
MATH 1700 - Calculus I, Science and Engineering Credits: 4 hours

Second Semester (15 hours)

General Education Credits: 4 hours
CS 1120 - Computer Science II | Credits: 4 hours
ECE 2500 - Digital Logic Credits: 3 hours
STAT 2600 - Data Analysis Using R Credits: 4 hours

Third Semester (16 hours)

General Education Credits: 3 hours
COM 1040 - Public Speaking Credits: 3 hours
CS 1310 - Foundations of Computer Science Credits: 4 hours
CS 2500 - Introduction to Web Technologies Credits: 3 hours
CS 4430 - Database Management Systems Credits: 3 hours

Fourth Semester (16 hours)

General Education Credits: 3 hours
Free WMU Elective Credits: 3 hours
CS 2230 - Computer Organization and Assembly Language Credits: 3 hours
CS 3310 - Data and File Structures Credits: 3 hours
MATH 2300 - Elementary Linear Algebra Credits: 4 hours

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Fifth Semester (16 hours)

General Education  Credits: 2 hours
MATH/STAT/SCIENCE Approved Elective  Credits: 4 hours
Laboratory Science Requirement (satisfies General Education Area VI)  Credits: 4 hours
CS 3240 - System Programming Concepts  Credits: 3 hours
CS 4310 - Design and Analysis of Algorithms  Credits: 3 hours

Sixth Semester (16 hours)

General Education  Credits: 3 hours
MATH/STAT/SCIENCE Approved Elective  Credits: 4 hours
Free WMU Elective  Credits: 3 hours
Free WMU Elective  Credits: 3 hours
CS 4540 - Operating Systems  Credits: 3 hours

Seventh Semester (16 hours)

Free WMU Elective  Credits: 3 hours
Free WMU Elective  Credits: 3 hours
Approved CS Elective  Credit: 3 hours
MATH/STAT/SCIENCE Approved Elective  Credits: 4 hours
CS 4900 - Software Systems Development I: Requirements and Design  Credits: 3 hours

Eighth Semester (13 hours)

Approved CS Elective  Credits: 3 hours
DELETE: Free WMU Elective  Credits: 3 hours
ADD: Free WMU Elective  Credits: 2 hours
Free WMU Elective  Credits: 2 hours
General Education  Credits: 3 hours
DELETE: CS 4910 - Software Systems Development II: Implementation and Testing  Credits: 2 hours
ADD: CS 4910 - Software Systems Development II: Implementation and Testing  Credits: 3 hours

Approved CS Elective

The two CS Elective courses must be taken from the set of CS 5000-level courses covering specific computing topics described earlier. Students should consult with a departmental advisor before enrolling in one of these courses, as certain 5000-level offerings are not appropriate for undergraduates. No more than one lower-level elective CS course (e.g., CS 2000 or CS 2100) may be included as an elective.

Free WMU Elective

Free Elective means the student may choose without restriction any course offered at the University. That is, the course need not be a General Education course nor a course in

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computer science. Given the total number of free electives, a student may often be able to concentrate these into one discipline and earn a minor in that department.