



**NOT FOR USE FOR CURRICULAR COURSE CHANGES  
REQUEST FOR PROGRAM IMPROVEMENTS**

**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](mailto:david.reinhold@wmich.edu)**

**DEPARTMENT:** CCE

**COLLEGE:** CEAS

**PROPOSED EFFECTIVE FALL YEAR:** 2021

**PROPOSED IMPROVEMENTS:** *Academic Program Proposed Improvements*

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> New degree*        | <input type="checkbox"/> New minor*               | <input type="checkbox"/> Admission requirements  |
| <input type="checkbox"/> New major*         | <input type="checkbox"/> Deletion*                | <input type="checkbox"/> Graduation requirements |
| <input type="checkbox"/> New curriculum*    | <input checked="" type="checkbox"/> Revised major | <input type="checkbox"/> Change in Title         |
| <input type="checkbox"/> New concentration* | <input type="checkbox"/> Revised minor            | <input type="checkbox"/> Transfer                |
| <input type="checkbox"/> New certificate*   |   |  |

Other (explain\*\*)    \*\* Other:

**Title of degree, curriculum, major, minor, concentration, or certificate:** Civil Engineering Major (CIVJ)

<b>Chair, Department Curriculum Committee:</b> <i>Xi Wynslow</i>	<b>Date</b> <i>10/12/2020</i>
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**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.
- 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 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.

<b>Chair/Director:</b>	<b>Date</b> 10-12-2020
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**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.

<b>Chair, College Curriculum Committee:</b>	<b>Date</b>
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**NOT FOR USE FOR CURRICULAR COURSE CHANGES  
REQUEST FOR PROGRAM IMPROVEMENTS**

**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.

<b>Dean:</b>	<b>Date</b>
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**FOR PROPOSALS REQUIRING REVIEW BY:**

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

<input type="checkbox"/> Return to Dean		
<input type="checkbox"/> Forward to:	Curriculum Manager:	Date:
<input type="checkbox"/> Approve <input type="checkbox"/> Disapprove	*needs review by Chair, GSC/USC:	Date
<input type="checkbox"/> Approve <input type="checkbox"/> Disapprove	Chair, EPGC:	Date
<input type="checkbox"/> Approve <input type="checkbox"/> Disapprove	Graduate College Dean:	Date:
<input type="checkbox"/> Approve <input type="checkbox"/> Disapprove	Faculty Senate President:	Date
<input type="checkbox"/> Approve <input type="checkbox"/> Disapprove	*needs review by Provost:	Date

**NOT FOR USE FOR CURRICULAR COURSE CHANGES  
REQUEST FOR PROGRAM IMPROVEMENTS**

1. Explain briefly and clearly the proposed improvement:

**Updated program content based on change to introductory courses. Specifically,**

- **CCE1001 is replaced with CCE1100 for 2 credit hours**
- **Eliminated CS1022/1023- content/computer applications from these courses included in CCE1100. CS1022/1023 are no longer offered.**
- **1<sup>st</sup> Semester becomes 16 credit hours**
- **CCE1001 eliminated- content included in CCE1100 (actual course CCE1001 will be deleted in future year to allow for transition)**
- **CCE1002 eliminated- content included in revised CCE1100 (actual course CCE1002 will be deleted in future year to allow for transition)**
- **WMU Essential Studies Inquiry and Engagement moved from 4<sup>th</sup> to 2<sup>nd</sup> Semester**
- **WMU Essential Studies Personal Wellness moved from 8<sup>th</sup> to 4<sup>th</sup> Semester**
- **Added Engineering Science or Design Elective in 8<sup>th</sup> Semester**
- **Adds 1 credit hour to the program**
- **Changed title of CCE4830 and CCE4850 (see course proposals for details)**

2. Rationale. Give your reason(s) for the proposed improvement.

**Provides a more focused introduction to the CCE program in a new 2-credit hour course that includes specific content and computer applications from CS1022/1023 courses which are no longer offered. By eliminating CS1022/1023, and adding a credit hour to the program, students now have one more engineering elective which deepens and enriches their engineering specific content in the major.**

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.

**No effect.**

4. Effect on your department's programs. Show how the proposed change fits with other departmental offerings.

**None.**

5. Alignment with college's and department's strategic plan, mission, and vision.

**The department seeks to promote a better sense of belonging with its students and having a more focused, 2-credit hour introductory course and an additional elective, advances this plan and better aligns with our mission and vision. The movement of the WMU Essential Studies courses also better aligns with the WMU Essential Studies program intent.**

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.

**No effect on enrolled students as they will continue under the catalog year with which they entered.**

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. Although exit surveys conducted with graduating seniors consistently included requests for these changes. Graduating seniors often specifically stated that a 2-credit hour introductory course in one semester would have been preferred to two, 1-credit hours courses in two semesters. They also suggested that the computer software applications be taught in a more discipline-specific setting. These program changes directly address these concerns.**

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.)

**None. New 2-credit hour course (CCE1100) replaces two, 1-credit hour courses. Enrollment in elective courses will likely increase resulting in a better efficiency and use of resources as well as a better experience for students.**

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 outcomes.**

1. **an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.**
2. **an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.**
3. **an ability to communicate effectively with a range of audiences.**
4. **an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.**
5. **an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.**
6. **an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.**
7. **an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.**

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.

**The changes were in response to both faculty analysis and student feedback from exit surveys.**

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.

**No effect. However, we reason that transfer students will be more easily able to transfer because the introductory course material will be taught in one semester versus two, allowing students to begin follow-on engineering courses earlier.**

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.

## CURRENT CATALOG COPY

The Civil Engineering curriculum prepares students for entry level positions in the civil engineering profession. It was developed to provide students with knowledge in the areas of structural engineering, construction engineering, geotechnical engineering, transportation engineering, and water resources engineering. Technical, communication, and human relation skills are developed throughout the curriculum. Design is emphasized from the beginning of the curriculum.

Accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

For up-to-date educational objectives and learning outcomes, see department web page at [www.wmich.edu/civil-construction/academics/abet/outcomes](http://www.wmich.edu/civil-construction/academics/abet/outcomes).

## WMU Essential Studies Program Requirements

Students who have chosen the Civil or Construction Engineering curriculum will satisfy the WMU Essential Studies Program Requirements as outlined within the course listings below. To satisfy these requirements students take courses in twelve (12) categories. Six (6) of the courses are designated within the civil engineering program requirements and six (6) are free electives which students choose from a list of courses in the corresponding course category. Students will meet the planetary sustainability outcome in CCE4850: Senior Project and must select a course that satisfies the Diversity and Inclusion outcome when choosing a course in the other six (6) categories.

### Requirements

Candidates for the Bachelor of Science in Engineering must complete the following program of 126 semester credit hours as well as University requirements stated elsewhere in this catalog.

1. A "C" or better must be earned in all courses with a CCE, IEE, EDMM or ME prefix.
2. A student is required to earn a grade of "C" or better in the prerequisite courses for all CCE courses before enrollment is permitted in the next sequence course.
3. No more than two grades of "D" or "DC" in courses presented for graduation may be counted for graduation.
4. Complete the following program of 126 semester hours. The schedule below is an example of one leading to graduation in eight semesters. Pre-engineering requirements are indicated.

### First Semester (15 hours)

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The following courses are Pre-engineering requirements.

- [CCE 1001 - Introduction to Engineering Design](#) **Credits:** 1 hour
- [GEOS 1300 - Physical Geology](#) **Credits:** 4 hours
- [IEE 1020 - Technical Communication](#) **Credits:** 3 hours  
(Satisfies WMU Essential Studies Level 1: Writing Course Requirement)
- [EDMM 1420 - Engineering Graphics](#) **Credits:** 3 hours
- [MATH 1220 - Calculus I](#) **Credits:** 4 hours
- or
- [MATH 1700 - Calculus I, Science and Engineering](#) **Credits:** 4 hours  
(Satisfies WMU Essential Studies Level 1: Quantitative Literacy Course Requirement)

### Second Semester (16 hours)

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The following courses are Pre-engineering requirements.

- [CCE 1002 - Introduction to Engineering Analysis](#) **Credits:** 1 hour
- [CHEM 1100 - General Chemistry I](#) **Credits:** 3 hours

- [CHEM 1110 - General Chemistry Laboratory I](#) **Credits:** 1 hour
- [CS 1022 - Introduction to Engineering Computing II: Mathematical Software](#) **Credits:** 1 hour
- [CS 1023 - Introduction to Engineering Computing III: Computer Programming](#) **Credits:** 1 hour
- [MATH 1230 - Calculus II](#) **Credits:** 4 hours

or

- [MATH 1710 - Calculus II, Science and Engineering](#) **Credits:** 4 hours
- [PHYS 2050 - University Physics I](#) **Credits:** 4 hours  
(Satisfies WMU Essential Studies Level 2: Laboratory Science Course Requirement)
- [PHYS 2060 - University Physics I Laboratory](#) **Credits:** 1 hour  
(Satisfies WMU Essential Studies Level 2: Laboratory Science Course Requirement)

### Third Semester (18 hours)

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- [CCE 2360 - Geomatics](#) **Credits:** 3 hours
- [IEE 2610 - Engineering Statistics](#) **Credits:** 3 hours  
(Satisfies WMU Essential Studies Level 1: Oral and Digital Communication Course Requirement)
- [MATH 2720 - Multivariate Calculus and Matrix Algebra](#) **Credits:** 4 hours  
Pre-engineering requirement
- [ME 2560 - Statics](#) **Credits:** 3 hours  
Pre-engineering requirement
- [PHYS 2070 - University Physics II](#) **Credits:** 4 hours  
Pre-engineering requirement
- [PHYS 2080 - University Physics II Laboratory](#) **Credits:** 1 hour

### Fourth Semester (16 hours)

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- WMU Essential Studies Level 1: Inquiry and Engagement Course Elective **Credits:** 3 hours
- [CHEG 2611 - Environmental Engineering I](#) **Credits:** 3 hours
- [MATH 3740 - Differential Equations and Linear Algebra](#) **Credits:** 4 hours
- [ME 2570 - Mechanics of Materials](#) **Credits:** 3 hours  
Pre-engineering requirement
- [ME 2580 - Dynamics](#) **Credits:** 3 hours

## Fifth Semester (15 hours)

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- WMU Essential Studies Level 2: Artistic Theory and Practice Course Elective **Credits:** 3 hours
- WMU Essential Studies Level 2: Societies and Cultures Course Elective **Credits:** 3 hours
- [CCE 3360 - Soil Mechanics](#) **Credits:** 3 hours
- [IEE 3100 - Engineering Economy](#) **Credits:** 3 hours  
(Satisfies WMU Essential Studies Level 2: Science and Technology Course Requirement)
- [ME 3560 - Fluid Mechanics](#) **Credits:** 3 hours

## Sixth Semester (15 hours)

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- WMU Essential Studies Level 2: World Language and Cultures Course Elective **Credits:** 3 hours
- [CCE 3080 - Civil and Construction Engineering Materials](#) **Credits:** 3 hours
- [CCE 3300 - Transportation Engineering](#) **Credits:** 3 hours
- [CCE 3330 - Construction Codes, Specifications, and Contracts](#) **Credits:** 3 hours
- [CCE 3860 - Structural Analysis](#) **Credits:** 3 hours

## Seventh Semester (16 hours)

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- CCE Construction Engineering Elective **Credits:** 3 hours
- CCE Elective **Credits:** 3 hours
- [CCE 4300 - Traffic Design](#) **Credits:** 3 hours
- [CCE 4400 - Introduction to Structural Design](#) **Credits:** 3 hours
- [CCE 4561 - Foundation and Earth Retaining Structure Design](#) **Credits:** 3 hours
- [CCE 4830 - Project Design and Control](#) **Credits:** 1 hour

## Eighth Semester (15 hours)

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- CCE Structural Engineering Design Elective **Credits:** 3 hours
- CCE Elective **Credits:** 3 hours
- WMU Essential Studies Level 2: Personal Wellness Course Elective **Credits:** 3 hours
- WMU Essential Studies Level 3: Global Perspectives Course Elective **Credits:** 3 hours
- [CCE 4850 - Senior Project](#) **Credits:** 3 hours

(Satisfies WMU Essential Studies Level 3: Local and National Perspectives Course Requirement and the required Planetary Sustainability outcome.)



The Civil Engineering curriculum prepares students for entry level positions in the civil engineering profession. It was developed to provide students with knowledge in the areas of structural engineering, construction engineering, geotechnical engineering, transportation engineering, and water resources engineering. Technical, communication, and human relation skills are developed throughout the curriculum. Design is emphasized from the beginning of the curriculum.

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### **Requirements**

Candidates for the Bachelor of Science in Engineering must complete the following program of 126 semester credit hours as well as University requirements stated elsewhere in this catalog.

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3. No more than two grades of “D” or “DC” in courses presented for graduation may be counted for graduation.
4. Complete the following program of 127 semester hours. The schedule below is an example of one leading to graduation in eight semesters. Pre-engineering requirements are indicated.

## First Semester (16 hours)

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The following courses are Pre-engineering requirements.

- [CCE 1100 - Introduction to Engineering Practice](#) **Credits: 2 hours**
- [GEOS 1300 - Physical Geology](#) **Credits: 4 hours**
- [IEE 1020 - Technical Communication](#) **Credits: 3 hours**  
(Satisfies WMU Essential Studies Level 1: Writing Course Requirement)
- [EDMM 1420 - Engineering Graphics](#) **Credits: 3 hours**
- [MATH 1220 - Calculus I](#) **Credits: 4 hours**  
or
- [MATH 1700 - Calculus I, Science and Engineering](#) **Credits: 4 hours**  
(Satisfies WMU Essential Studies Level 1: Quantitative Literacy Course Requirement)

## Second Semester (16 hours)

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The following courses are Pre-engineering requirements.

- [CHEM 1100 - General Chemistry I](#) **Credits: 3 hours**
- [CHEM 1110 - General Chemistry Laboratory I](#) **Credits: 1 hour**
- [MATH 1230 - Calculus II](#) **Credits: 4 hours**  
or
- [MATH 1710 - Calculus II, Science and Engineering](#) **Credits: 4 hours**
- [PHYS 2050 - University Physics I](#) **Credits: 4 hours**  
(Satisfies WMU Essential Studies Level 2: Laboratory Science Course Requirement)
- [PHYS 2060 - University Physics I Laboratory](#) **Credits: 1 hour**  
(Satisfies WMU Essential Studies Level 2: Laboratory Science Course Requirement)
- [WMU Essential Studies Level 1: Inquiry and Engagement Course Elective](#) **Credits: 3 hours**

## Third Semester (18 hours)

---

- [CCE 2360 - Geomatics](#) **Credits: 3 hours**
- [IEE 2610 - Engineering Statistics](#) **Credits: 3 hours**  
(Satisfies WMU Essential Studies Level 1: Oral and Digital Communication Course Requirement)
- [MATH 2720 - Multivariate Calculus and Matrix Algebra](#) **Credits: 4 hours**  
Pre-engineering requirement
- [ME 2560 - Statics](#) **Credits: 3 hours**  
Pre-engineering requirement
- [PHYS 2070 - University Physics II](#) **Credits: 4 hours**  
Pre-engineering requirement

- [PHYS 2080 - University Physics II Laboratory](#) **Credits:** 1 hour

#### Fourth Semester (16 hours)

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- [CHEG 2611 - Environmental Engineering I](#) **Credits:** 3 hours
- [MATH 3740 - Differential Equations and Linear Algebra](#) **Credits:** 4 hours
- [ME 2570 - Mechanics of Materials](#) **Credits:** 3 hours
- Pre-engineering requirement
- [ME 2580 - Dynamics](#) **Credits:** 3 hours
- **WMU Essential Studies Level 2: Personal Wellness Course Elective Credits: 3 hours**

#### Fifth Semester (15 hours)

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- WMU Essential Studies Level 2: Artistic Theory and Practice Course Elective **Credits:** 3 hours
- WMU Essential Studies Level 2: Societies and Cultures Course Elective **Credits:** 3 hours
- [CCE 3360 - Soil Mechanics](#) **Credits:** 3 hours
- [IEE 3100 - Engineering Economy](#) **Credits:** 3 hours
- (Satisfies WMU Essential Studies Level 2: Science and Technology Course Requirement)
- [ME 3560 - Fluid Mechanics](#) **Credits:** 3 hours

#### Sixth Semester (15 hours)

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- WMU Essential Studies Level 2: World Languages and Cultures Course Elective **Credits:** 3 hours
- [CCE 3080 - Civil and Construction Engineering Materials](#) **Credits:** 3 hours
- [CCE 3300 - Transportation Engineering](#) **Credits:** 3 hours
- [CCE 3330 - Construction Codes, Specifications, and Contracts](#) **Credits:** 3 hours
- [CCE 3860 - Structural Analysis](#) **Credits:** 3 hours

#### Seventh Semester (16 hours)

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- CCE Construction Engineering Elective **Credits:** 3 hours
- CCE Elective **Credits:** 3 hours
- [CCE 4300 - Traffic Design](#) **Credits:** 3 hours
- [CCE 4400 - Introduction to Structural Design](#) **Credits:** 3 hours
- [CCE 4561 - Foundation and Earth Retaining Structure Design](#) **Credits:** 3 hours
- **CCE 4830 - Senior Design Proposal Credits: 1 hour**

#### Eighth Semester (15 hours)

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- **Engineering Science or Design Elective Credits: 3 hours**

- CCE Structural Engineering Design Elective **Credits:** 3 hours
- CCE Elective **Credits:** 3 hours
- WMU Essential Studies Level 3: Global Perspectives Course Elective **Credits:** 3 hours
- CCE 4850 - CCE Senior Design Project **Credits:** 3 hours

(Satisfies WMU Essential Studies Level 3: Local and National Perspectives Course Requirement and the required Planetary Sustainability outcome.)