Section 1 – Program Mission and Educational Objectives

The MSCE degree, while technically offered as a stand-alone graduate degree, is predominately offered as part of a five-year, concurrent degrees program wherein students earn both their BSCE and MSCE. During the 2021-22 year, all graduating and continuing MSCE students were following the BSCE/MSCE concurrent degrees program of study.

The mission of the Oregon Tech Civil Engineering program (both BSCE and BSCE/MSCE) is to prepare students for professional practice. To be prepared to practice as professionals, engineers must be able to act responsibly and ethically, understand their limits and the limits of the tools they use, communicate effectively, work well in teams, and, amid the changing landscape of the field of civil engineering, be able to pursue graduate-level education.

The mission of the graduate (MSCE) program is to prepare students for professional practice by offering courses in advanced topics in civil engineering that support our students in identifying complex problems in a specialty area of civil engineering and selecting and applying concepts, principles, and/or experiments to solve those complex problems.

Thus, the graduate degree requires coursework beyond the BSCE requirements and targeted instruction in problem identification and problem solving that employs literature review, experimentation, computation, and modeling.

The mission of the MSCE portion of the program aligns with the mission of the department and the mission of the university in important ways. It is directly tied to the last phrase of the department's mission "…be able to pursue graduate-level education". The MSCE relies on the outcomes of the BSCE and it is professionally-focused, directly linking it to Oregon Tech's primary mission of "[providing] innovative, professionally-focused undergraduate and graduate degree programs in the areas of engineering, health, business, technology, and applied arts and sciences".

BSCE Educational Objectives

Civil engineering graduates will be able to:

1. Practice as a professional civil engineer.
2. Pursue advanced education in civil engineering or related fields.
3. Act as responsible, effective and ethical citizens.
4. Understand and effectively communicate the realistic constraints of civil engineering.
5. Perform effectively in a multi-disciplinary environment.

Because the **MSCE** is the graduate-level education described in the mission statement for the civil engineering program, and it fulfills the BSCE Objective 2, it relies on the undergraduate outcomes. Full details on the BSCE program may be found in the BSCE 2021-22 Assessment Report (submitted separately).

Section 2 – Program Student Learning Outcomes

Graduate-level education is inherently more rigorous and commonly requires greater self-direction and self-study than undergraduate education. The American Society of Civil Engineers (ASCE) Civil Engineering Body of Knowledge (CEBOK3) offers some guidance regarding outcomes that might be satisfied in postgraduate education: "postgraduate education should certainly increase the critical thinking and problem-solving abilities of civil engineers."

Postgraduate outcomes are identified in only three places in the CEBOK3, at the *application* or *analysis* levels of Bloom's Taxonomy:

1. Experimentation (Analyze): Select appropriate experiments, and analyze the results in the solution of civil engineering problems.
2. Depth in a Civil Engineering Area (Analyze): Select appropriate advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.
3. Depth in a Civil Engineering Area (Apply): Apply advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.

At Oregon Tech, for the MSCE, we have embraced all three ASCE-recommended outcomes for thesis- and report-based degrees that utilize experimentation whereas outcomes 2 and 3 are used for all graduate students, including those completing a course-based curriculum.

Thus, the **MSCE program outcomes,** to be met by all graduates, are listed below:

1. Select appropriate advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.
2. Apply advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.

These outcomes are reviewed by the department faculty at the fall term department retreat – they were last reviewed on September 28, 2021.

Section 3 – Curriculum Map

As previously stated, the primary pathway to earning the MSCE degree is to complete the BSCE and MSCE degrees concurrently. Following the junior year, students choosing the BSCE/MSCE path adhere to the following curriculum map for their fourth and fifth years. The 400-level classes represent the final requirements of the BSCE degree and the 500-level classes (including Graduate Technical Electives and optional Grad Project or Graduate Thesis) comprise the MSCE degree. In all cases, MSCE students complete at least 45 quarter credits beyond the BSCE requirement of 180 quarter credits.

Fourth Year

- CE 401 - Civil Engineering Project I Credit Hours: 2
- COM 401 - Civil Engineering Project I Credit Hours: 3
- CE 402 - Civil Engineering Project II Credit Hours: 4
- CE 405 - Sustainability & Infrastruct Credit Hours: 3
- CE 501 - Civil Engr Graduate Seminar Credit Hours: 1
- WRI 521 - Writing at the Grad Level Credit Hours: 3
- Technical Electives Credit Hours: 3
- Graduate Technical Electives Credit Hours: 12
- MATH 4XX - Math/Science Elective Credit Hours: 4
- Social Science Elective Credit Hours: 3
- Social Science Elective Credit Hours: 3
- SPE/WRI/COM Elective Credit Hours: 3

Year Total: 44 Credit Hours

Fifth Year

- ANTH 452 - Globalization Credit Hours: 3
-
- CE 590 - Civil Engineering Grad Project Credit Hours: 9
- or
- CE 595 - Graduate Thesis Credit Hours: Varies (1-6)
-
- Technical Electives Credit Hours: 12
- Graduate Technical Electives Credit Hours: varies

Year Total: 44 Credit Hours

The MSCE program outcomes of “select appropriate advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering” And “Apply advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering” are met primarily in **Graduate Technical Elective** courses and the optional **Grad Project** or **Graduate Thesis** portion of the degree.

Since the MSCE is the graduate degree portion of the concurrent BSCE/MSCE program, all Oregon Tech ISLOs and all BSCE PSLOs have previously been met with the BSCE degree – please see the BSCE Program Assessment Report for details.

Section 4 – Assessment Cycle

Since the MSCE is the graduate degree portion of the concurrent BSCE/MSCE program, all Oregon Tech ISLOs and all BSCE PSLO have previously been met with the BSCE degree.

The two unique MSCE outcomes, listed below, are currently met by holistic evaluation of each MSCE student's performance in **Graduate Technical Elective** courses and (optionally) the **CE590/CE595 Project/Thesis courses**. As these are all elective courses, each student chooses their own set of courses.

1. Select appropriate advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.
2. Apply advanced concepts and principles to solve complex problems in a specialty area appropriate to the practice of civil engineering.

Section 5 – Assessment Data Collection Processes

The Civil Engineering faculty are preparing a standardized assessment report for the MSCE degree portion of the BSCE/MSCE program for the first time in 2021-22 and have not yet developed a standard for directly assessing the two MSCE-only outcomes. Therefore, there is no assessment data collection process to discuss at this time. The faculty will draft this process at the Fall 2023 faculty retreat when MSCE Program Director, Dr. Charles Riley, returns from a sabbatical leave.

Section 6 – Assessment Data

See section 5.

Section 7 – Data-driven Action Plans: Changes Resulting from Assessment

As previously stated, the Civil Engineering faculty are preparing an assessment report for the MSCE degree portion of the BSCE/MSCE program for the first time in 2021-22 and have not yet developed a plan for assessing the two MSCE-only PLSOs.

Action Plan

During the 2022-23 academic year, faculty teaching graduate-level courses and graduate student advisors will experiment with ways of directly assessing the PSLOs so that the faculty can draft an assessment process at the Fall 2023 faculty retreat when MSCE Program Director, Dr. Charles Riley returns from a sabbatical leave.

Section 8 – Closing the Loop: Reflection on previous work

As this is the first year that a stand-alone assessment report is being submitted for MSCE degree portion of the BSCE/MSCE program, there is no "closing the loop" reflection possible at this time.