

## Oregon Institute of Technology

### MS Civil Engineering

#### 2015-2016 Assessment Report

- I. The Master of Science of Civil Engineering (MSCE) Program is offered on the Klamath Falls campus in a traditional on-campus instructional mode. The MSCE was approved in 2009 but due to limited instructional faculty staffing, the first students were not admitted to the program until Fall Term 2013. The degree is pursued in one of two ways, in a traditional post-BS degree program mode or in a concurrent degrees (BS/MS) program mode.

During the 2015-16 academic year there were eight students enrolled in the second year of the MSCE program, one in the post-BS degree mode and seven in the concurrent degrees (BS/MS) mode. In Fall 2015 one of these students earned a MSCE degree followed by another in Winter 2016, both in the concurrent degrees (BS/MS) program. In Spring 2016 four more students earned MSCE (concurrent). In addition, by Spring 2016 there were seven students enrolled in the first year of the MSCE following a schedule that would lead to Spring 2017 graduation. Beyond the 2015-16 year the concurrent degrees (BS/MS) program remains popular with an additional seven students declaring intent to begin their first year of MSCE studies in 2016-17.

Traditional retention rates are difficult to compute for such a new and small program, however of the eight students in the second year of the program as of Fall 2015, six have now (Spring 2016) graduated. These six graduates are finding success across the spectrum of traditional engineering employers; three are working for consulting engineering firms, two with state government and one with the federal government. Furthermore, the career areas for these MSCE graduates span the civil engineering sub-disciplines and include geotechnical, structural, transportation, and water resources. Each MSCE graduate had successfully completed the fundamentals of engineering (FE) exam prior to graduation.

- II. Since the primary mode is the concurrent degrees (BS/MS) program, the mission and objectives of the BS program are integrated within the BS/MS and are as listed below.

The mission of program 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 either as a BS/MS student at Oregon Tech or at another university.

The following objectives are what the faculty expects graduates from the program to be able to accomplish a few years after the commencement of their careers and stem directly from the program mission. The alumni from the program should:

- practice in civil engineering or a related field.
- pursue advanced education in civil engineering or a related field.
- act as responsible, effective, and ethical citizens.
- communicate effectively.
- collaborate effectively.

There are two student learning outcomes (SLO) in the MSCE program.

1. Ability to conduct scholarly research commensurate with the graduate level.
2. Attainment of advanced technical knowledge in one or more civil engineering specialty area (geotechnical, structural, transportation, water resources).

The Civil Engineering Industrial Advisory Committee (CE-IAC) provides advice on both the BS and MS degrees. The CE-IAC meets annually to discuss the MSCE program with both faculty and students. The most recent meeting took place Friday April 8, 2016. Each of the seven MS students in their first term of study discussed their coursework and projects with the IAC members and received valuable input including technical leads and references for their graduate work.

- III. Due to the small size of the program and the small number of SLOs, each of the two SLOs listed in Part II will be assessed for each student in each year of the three-year assessment cycle. As the program grows in size and/or there are additional SLOs, this concept may be modified.
- IV. Three MSCE graduates in 2016 prepared a graduate project report prepared to standards set by Oregon Tech's Graduate Council. These graduate project reports were prepared over a period of six to nine months under the supervision of a CE Dept. faculty member and also reviewed by a Communication Dept. faculty member. Each student in the MSCE program is required to complete a 3-credit communications course, WRI 521 Writing at the Graduate Level, as a means to provide each student with writing instruction specifically aimed at developing scholarly writing techniques. The COM Dept. review of each graduate report was provided by the WRI 521 instructor. Each graduate project was also reviewed by a CE faculty advisor and the CE Department Chair

Additionally, three MSCE graduates in 2016 completed their degrees via the course-only option. In these cases, the students were required to conduct scholarly research and prepare scholarly writing in the form of a formal report in WRI 521 Writing at the Graduate Level.

Thus SLO #1 Ability to conduct scholarly research commensurate with the graduate level was ensured by requiring three levels of review and approval (CE faculty advisor, COM faculty reviewer, CE dept. chair) of each graduate project report and COM faculty review of students in the course-only option.

Copies of each completed graduate report are archived in electronic form in the Oregon Tech library and paper copies are stored in the assessment filing cabinet in the Civil Engineering Department Chair's office.

To ensure of SLO #2 Attainment of advanced technical knowledge in one or more civil engineering specialty area (geotechnical, structural, transportation, water resources), each MSCE graduate in 2016, in addition to WRI 521 Writing at the Graduate Level and CE 501 Graduate Seminar, successfully completed at least 41 graduate level technical elective credits in one or more CE specialty areas. A list of available courses is listed in VIII.

While the relatively small sample size of eight students makes it difficult to draw any meaningful recommendations for improvements to the program, the faculty observed that project-based students needed several rounds of revisions to create acceptable graduate project reports. This was not unexpected given our experiences in 2014-15 and therefore this year's students were advised to start report preparation early in the calendar year. These cycles of revisions can be time consuming, yet are essential to the creation of acceptable work. Even with this additional advising from faculty, some students were making revisions during the final week of Spring

Term. In future years, students will be advised to start the report review process even earlier, perhaps as much as four months prior to their anticipated graduation date.

## VIII. Appendices

MSCE Students choose their 41 credits of graduate-level technical electives from the following list (no more than 9 credits may be at the 400-level). Students choosing the project-based route take between 3 and 9 credits of CE 590 CE Graduate Project:

CE411	Engineering Geology	Sleep	3-0-3
CE413	Advanced Soils Lab	Sleep	2-3-3
CE421/511	Seepage and Earth Structures	Sleep	3-0-3
CE422/522	Advanced Shear Strength	Sleep	3-0-3
CE423/513	Deep Foundations	Sleep	3-0-3
CE432	Structural Loading and Lateral Forces	StClair	4-0-4
CE433/533	Matrix Structural Analysis	StClair	2-3-3
CE439/539	Bridge Rating	Riley	2-3-3
CE442	Advanced Reinforced Concrete Design	StClair	4-0-4
CE444	Intermediate Steel Design	Riley	4-0-4
CE447	Masonry Design	StClair	3-0-3
CE448	Timber Design	StClair	3-0-3
CE449/549	Bridge Design	Riley	3-3-4
CE450/550	Transportation Structures	Riley	2-3-3
CE456	Pavement Engineering	Lindgren	2-3-3
CE457/557	Transportation & Land Development	Lindgren	2-3-3
CE458/558	Transportation Safety	Lindgren	4-0-4
CE468/568	Travel Demand Modeling	Lindgren	3-3-4
CE472/572	Hydrometry	Thaemert	2-3-3
CE473	Groundwater	Thaemert	3-0-3
CE476/576	Applied Hydraulic Design	Thaemert	2-3-3
CE481	Environmental Engineering 1	Thaemert	3-3-4
CE489	Treatment Wetlands	Thaemert	3-0-3
CE501	Graduate Seminar	Lindgren	1-0-1
CE512	Earthquake Engineering	Sleep	3-0-3
CE534	Advanced Solid Mechanics	Riley	3-0-3
CE535	Structural Dynamics	Riley	2-3-3
CE542	Prestressed Concrete Design	StClair	3-0-3
CE544	Advanced Steel Design	Riley	3-0-3
CE551	Geometric Design	Lindgren	2-3-3
CE554	Advanced Traffic Engineering	Lindgren	2-3-3
CE556	Advanced Pavement Design	Lindgren	2-3-3
CE571	Open-Channel Hydraulics	Thaemert	3-3-4
CE574	Environmental River Mechanics	Thaemert	3-3-4
CE586	Water & Wastewater Treatment	Thaemert	4-0-4
CE587	Environmental Remediation Technologies	Thaemert	3-0-3