



## Program Assessment Report (PAR)

Materials Science + Egr (MSE) Masters Degree

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ACADEMIC YEAR COVERED BY THIS REPORT: 2021-2022

### I. PROGRAM LEARNING OUTCOMES

Graduates of this program will be able to; 1. obtain employment suitable to their field or continue to further graduate study 2. apply advanced engineering analysis techniques to the solution of complex problems 3. articulate the results of complex engineering problems in written or oral form

### II. PROCEDURES USED FOR ASSESSMENT

#### A. Direct Assessment

Outcome 1. % of students employed, % going on to grad study Outcome 2 Class final exams collected, 3 data points total Outcome 3. Class final exams collected, 3 data points and/or thesis/papers/project reports.

#### B. Scoring of Student Work

1. Data collected by Masters program chairs during academic year 2. CQI committee analyzes and drafts suggestions 3. Charge grad committees with action 4. Grad committees report back with actions taken 5. Make continuous improvements and repeat

#### C. Indirect Assessment

Outcome 1. Indirect assessment MS exit survey. Outcome 2. Indirect assessment MS exit survey. Outcome 3. Indirect assessment MS exit survey.

### III. ASSESSMENT RESULTS/INFORMATION:

Assessment May 2021 Outcome 1. Graduates will obtain employment suitable to their field or continue to further graduate study Direct assessment Qualtrics alumni survey, 2020, 4 responses to the question “True/False My MS degree helped me obtain a job/promotion or helped me pursue an advanced degree.” 4/4 True. Indirect assessment MSMSE exit survey, 2020-2021, Q33 “Please indicate your level of agreement with the following statement My MS degree helped me obtain a job/promotion in my field or helped me pursue an advanced degree.” Responses NR, 4, 5, 4, NR, 4, 2. With NR data points removed, average response was 3.8/5.0. Outcome 2. The ability to apply advanced engineering analysis techniques to the solution of complex problems Direct assessment Assessment 1 ME 6770 Final Exam Q5, Portevin-LeChatelier effect, 4 students, strong, strong, strong, acceptable. 100% acceptable or above. Assessment 2 ME 6770 Final Exam Q6, True and Engineering strain calculations, 4 students, outstanding, strong, outstanding, strong. 100% acceptable or above. Assessment 3 ME 6770 Final Exam Q7, Fiber Reinforced Composites, 4 students, outstanding, outstanding, outstanding, acceptable. 100% acceptable or above. Indirect assessment MSMSE exit survey, 2020-2021, Q34, “Please indicate your level of agreement with the following statement My MS degree contributed to my ability to apply advanced engineering analysis techniques to the solution of complex problems.” Responses NR, 3, 5, 4, NR, 5, 5. With NR data points removed, average response was 4.4/5.0. Outcome 3. The ability to articulate the results of complex engineering problems in written or oral form. Direct assessment Assessment 1 ME 6770 Final Exam, Q1 Essay Work Hardening, 4 students, outstanding, strong, strong, strong. 100% acceptable or above. Assessment 2 ME 6770 Final Exam, Q2 Essay Second Phase Particles, 2 students, strong, strong. 100% acceptable or above. Assessment 3 ME 6770 Final Exam, Q3 Essay Cottrell’s Equation, 2 students, strong, strong, strong. 100% acceptable or above. Indirect assessment MSMSE exit survey, 2020-2021, Q35, “Please indicate your level of agreement with the following statement My MS degree contributed to my ability to articulate the results of complex engineering problems in written or oral form.” Responses NR, 4, 5, 4, NR, 4, 5. With NR data points removed, average response was 4.4/5.0.

Outcome 1 4/4 responding alumni indicated the MSMSE program assisted with professional advancement. Responses were heavily tilted towards employment. Outcome 2 Direct assessment from a core MSMSE grad class in 2020 indicated 100% of students meeting objective. Outcome 3 Direct assessment from a core MSMSE grad class in 2020 indicated 100% of students meeting objective.

Outcome 1 Indirect assessments via survey tend to have low response rate, which can skew the data. Department faculty know many graduates who go on for Ph.D.s elsewhere who did not respond to this survey. Outcome 2 Students are meeting outcome 2 strongly. Next assessment year will focus on a different graduate

class. Outcome 3 Students are meeting outcome 3 strongly. Next assessment year will focus on a different graduate class.

#### **IV. ACTIONS TO IMPROVE STUDENT LEARNING**

Based on results of the prior assessment cycle, the CQI committee determined that direct assessment of Outcome 3 required the identification of required courses that include an oral presentation or written report. This result was shared with the Graduate Studies Committee, which subsequently conducted a survey of the MME faculty to identify all such courses. A subset of these courses will be used in the next assessment cycle to provide a more robust assessment of Outcome 3. These actions are documented in the minutes of the November, 2021 CQI meeting (attached). In 2021-2022, significant faculty discussion/action occurred regarding assessment of student learning in our graduate programs, with a focus on satisfaction of Outcome 3. In particular, there was some concern that non-thesis students may be able to navigate our graduate programs without taking a course having a significant writing/communication component. As a result, the writing/communication component survey data provided by the faculty graduate course coordinators was cross-checked against the transcripts of all students earning graduate degrees in either the Spring 2021 or Fall 2022 semesters. The results of both the faculty survey and the cross-check are attached. Based on the above analysis, it was determined that all non-thesis students graduating in that timeframe took at least 2 courses having a significant writing/communication component. Coupled with the extensive writing/communication requirements of our M.S. thesis students, this suggests that our graduate programs are appropriately structured to address Outcome 3. As documented in the minutes of its latest meeting (attached), the CQI committee is prepared to suggest a new MS degree program requirement to ensure the satisfaction of Outcome 3 by all students. However, based on our current slate of graduate course offerings and the analysis presented above, such a change may not be necessary at this time.

#### **V. SUPPORTING DOCUMENTS**

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.