



Program Assessment Report (PAR)

Renewable and Clean Energy Egr (RCEE) Masters Degree

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ACADEMIC YEAR COVERED BY THIS REPORT: 2020-2021

I. PROGRAM LEARNING OUTCOMES

The outcomes of the MSRCEE are listed below. Outcome 1 Graduates will obtain employment suitable to their field or continue to further graduate study. Outcome 2 The ability to apply advanced engineering analysis techniques to the solution of complex problems. Outcome 3 The ability to articulate the results of complex engineering problems in written or oral form.

II. PROCEDURES USED FOR ASSESSMENT

A. Direct Assessment

Closed loop process 1. Data collected by Master's 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 improvements and repeat Outcome 1. Direct assessment Data collected from students who graduated, % of students employed and % going on to grad study Outcome 2. Direct assessment class exams collected from ME7500, 3 data points total Outcome 3. Direct assessment class exams collected from ME7500 and thesis/papers/project reports collected, 3 data points total ME7500 is taken by all students in the Renewable and Clean Energy Program in Engineering. All students in the program either do a thesis or a semester long independent project with report.

B. Scoring of Student Work

The rubrics shown below are used to rate student mastery.. Student work is evaluated by course instructors, thesis committee, or advisor. Numerical ratings follow the rubric Outstanding 95-100 Student demonstrates mastery of content

and/or sophisticated analysis of problem nuances Strong 80-95 Student demonstrates competence at content and understanding of problem fundamentals. Small flaws in computation or logic may be present Acceptable 70-80 Student demonstrates basic understanding of content, but lacks depth. Significant errors or flaws in work present Developing 60-70 Student lacks basic understanding. Struggles to start the problem or frame a valid analysis Needs improvement

C. Indirect Assessment

Outcome 1. Indirect assessment MME Graduate Student Exit Survey which includes RCEE program. This survey form is attached. Outcome 2. Indirect assessment MME Graduate Student Exit Survey which includes RCEE program. This survey form is attached. Outcome 3. Indirect assessment MME Graduate Student Exit Survey which includes RCEE program. This survey form is attached.

III. ASSESSMENT RESULTS/INFORMATION:

Outcome 1. Graduates will obtain employment suitable to their field or continue to further graduate study Direct assessment % of students employed, % going on to grad study Indirect assessment MS Exit Interview Outcome 2. The ability to apply advanced engineering analysis techniques to the solution of complex problems Direct assessment class exams collected, 3 data points total Indirect assessment MS Exit Interview Outcome 3. The ability to articulate the results of complex engineering problems in written or oral form. Direct assessment class final exams collected, 3 data points and/or thesis/papers/project reports Indirect assessment MS Exit Interview

Outcome 1. 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." 3/4 True. The one false response is from an older, retired person who is not looking for work. Indirect assessment MS 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." Only 1 response 4. Average response was 4.0/5.0. Outcome 2. Direct assessment Assessment 1 ME 7500 Final Exam, Spring 2020, Q1 Working with the inter-molecular pair-potential for a dense gas, 8 students 3 outstanding, 0 strong, 0 acceptable, 1 developing, 4 needs improvement. 38% acceptable or above. Assessment 2 ME 7500 Final Exam, Spring 2020, Q1 Working with entropy, 8 students 3 outstanding, 1 strong, 0 acceptable, 0 developing, 4 needs improvement. 50% acceptable or above. Assessment 3 ME 7500 Homework #5, Spring 2020, Working with partition function, 8 students 8 outstanding, 0 strong, 0 acceptable, 0 developing, 0 needs improvement. 100% acceptable or above. Indirect assessment MSME 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.” Only 1 response 4. Average response was 4.0/5.0. Outcome 3. Direct assessment Assessment 1 ME 7500 Final Exam, Spring 2020, Q3 Essay Thermodynamic Properties of Solute and Solvents, 8 students, 8 outstanding, 0 strong, 0 acceptable, 0 developing, 0 needs improvement. 100% acceptable or above. Assessment 2 Writing and defending thesis, 1 student 1 outstanding, 0 strong, 0 acceptable, 0 developing, 0 needs improvement. 100% acceptable or above. Assessment 3 ME 7500 Final Exam, Spring 2020, Written report on industrial applications of thermodynamic equation of states in literature, 8 students, 0 outstanding, 0 strong, 0 acceptable, 2 developing, 6 needs improvement. 0% acceptable or above Indirect assessment MSME 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.” Only 1 response 4. Average response was 4.0/5.0.

Outcome 1. In regards to obtaining employment, the students are doing very well. All students who were seeking employment, obtained employment. There were no students in this cycle who applied to graduate school. In the past, RCEE students have made it into graduate school. Outcome 2. these results indicated there is room for improvement for outcome #2. It should be noted that ME7500 is a difficult class. This class was chosen for assessment because all MSRCEE students must take this course. Outcome 3. According to survey results, students are acceptable with articulating their technical engineering knowledge with two measures and unacceptable with the third measure. In the RCEE program, most students are from outside the United States. English grammar is a struggle for some of these students.

IV. ACTIONS TO IMPROVE STUDENT LEARNING

The 2020 assessment cycle is not yet complete. In the Fall of 2021, the results will be shared with the CQI committee, which will draft recommendations and charge the appropriate grad committee with action. The grad committee will then report back with actions taken. This will be documented and reported in future years.

V. SUPPORTING DOCUMENTS

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