Master of Science
Renewable Energy Engineering

2020-21 Assessment Report

Electrical Engineering and Renewable Energy Department

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Contents

1 Program Mission and Educational Objectives

1.1 Program Mission

The Master of Science in Renewable Energy Engineering (MSREE) program goal is to provide graduates for careers in areas of renewable energy engineering including but not limited to solar PV, solar thermal, wind power, wave power, geothermal energy, transportation, energy storage, hydroelectric and traditional energy fields such as power systems, smart grid, energy management, energy auditing, energy systems planning, energy economics, energy policy and development, carbon accounting and reduction, and controls and instrumentation. MSREE graduates will enter renewable energy engineering careers as leaders in design, site analysis, product, application, test, quality control, and sales.

The MSREE program supports the university mission of offering "innovative, professionally-focused undergraduate and graduate degree programs" and providing "a hands-on, project-based learning environment" with an emphasis on "innovation, scholarship, and applied research". The MSREE program has been designed to align with the university mission and to prepare graduates to be energy engineering professionals who have advanced knowledge and skills that enable them to assume a broad range of technical leadership roles. The flexibility in the degree options gives various forms of research opportunity for students to explore the current technology and meet the industrial needs.

1.2 Program Educational Objectives

The Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. The Program Educational Objectives (PEOs) of Oregon Tech's Master's of Science in Renewable Energy Engineering program are these:

- PEO1: MSREE graduates will excel as leaders in the various fields of energy engineering.
- PEO2: MSREE graduates will demonstrate an ability to apply advanced engineering methods to the solutions of complex energy-related engineering problems.
- PEO3: MSREE graduates will demonstrate an ability to acquire emerging knowledge and remain current in the dynamic field of renewable energy.

1.3 Relationship between Program Objectives and Institutional Objectives

These program educational objectives map to the Oregon Tech's institutional mission statement and core themes by offering statewide educational opportunity in an innovative and rigorous applied degree program in engineering oriented toward graduate success and an appreciation for the role of the engineer in public service.

2 Program History and Description

2.1 Program History

In 2005, the Oregon Institute of Technology (Oregon Tech) began offering its new Bachelor of Science degree in Renewable Energy Systems program (BSRES) at its satellite campus in Portland, Oregon. In 2008, the BSRES degree was discontinued and replaced by the Bachelor of Science degree in Renewable Energy Engineering (BSREE). Analysis of the marketplace and observed growth in career options across the renewable energy fields revealed significant opportunities for graduates with a solid energy engineering education. Building upon this strong foundation of renewable energy engineering education, the MSREE was launched in the Portland-Metro campus in 2012. In 2013, an accelerated, concurrent degree option was launched for exceptional undergraduate students in the BS Renewable Energy Engineering and BS Electrical Engineering programs. The MSREE concurrent degree was launched in Klamath Falls in 2016. Full time offering of the MSREE program was extended to the Klamath Falls campus for the first time in 2018.

We anticipate MSREE graduates will enter energy engineering careers as leaders in the fields of power engineering, PV/semiconductor processing engineering, facilities and energy management, energy system integration engineering, HVAC and hydronics engineering, design and modeling engineering for net-zero energy buildings, biofuels plant and operations engineering, energy systems control engineering, power electronics engineering, utility program management, as researchers and educators in renewable energy fields, as well as in the roles of LEED accredited professionals (AP) and renewable energy planners and policy makers. Graduates of the program will be able to pursue a wide range of career opportunities, not only within the emerging fields of renewable energy, but within more traditional areas of energy engineering as well. MSREE graduates with strong interests in research and academia will be well situated to pursue further advanced degrees at PhD granting institutions.

2.2 Program Description

The MSREE program is designed to help students to understand and apply the principles of energy and power concepts to the next generation of technologies improving battery storage, building energy systems, grid integration of renewables and solar and thermal energy systems.

2.2.1 Degree Requirements

The Master of Science in Renewable Energy Engineering is a rigorous curriculum that requires 54 credit hours and approximately two years to complete.

2.2.2 Area of Focus

Students working toward the MSREE degree must complete REE specialization sequences from the list below. Based on the career goals and interest they may choose one of the sequences listed below. One sequence constitutes three courses under the titles listed below.

- Advanced Energy Storage
- Biofuels and Biomass
- Electrical Power Systems
- Energy Efficient Building Systems
- Energy Storage

- Fuel Cell Systems
- Geothermal Energy
- Global Energy Issues
- Hydro Power Systems and Integration
- Photovoltaic Systems and Processes
- Wind Power Systems and Integration

In addition to the specialization sequence, students must complete the following required courses

- Research Methods/Innovation I, II and III
- Energy Engineering I, II and III
- Graduate Research/Project/Thesis

2.3 Industry Relationships

The REE programs have strong relationships with industry, particularly through the program-level Industry Advisory Council (IAC) and REE alumni. The IAC has been instrumental in the success of the REE program. Representatives from corporations, government institutions and non-profit organizations comprise the IAC, giving the BSREE and MSREE a broad constituent audience. The IAC provides advice and counsel to the REE program with respect to the areas of curriculum content advisement, instructional resources review, career guidance and placement activities, program accreditation reviews, and professional development advisement and assistance. In addition, each advisory committee member serves as a vehicle for public relations information and potentially provides a point of contact for the development of specific opportunities with industries for students and faculty.

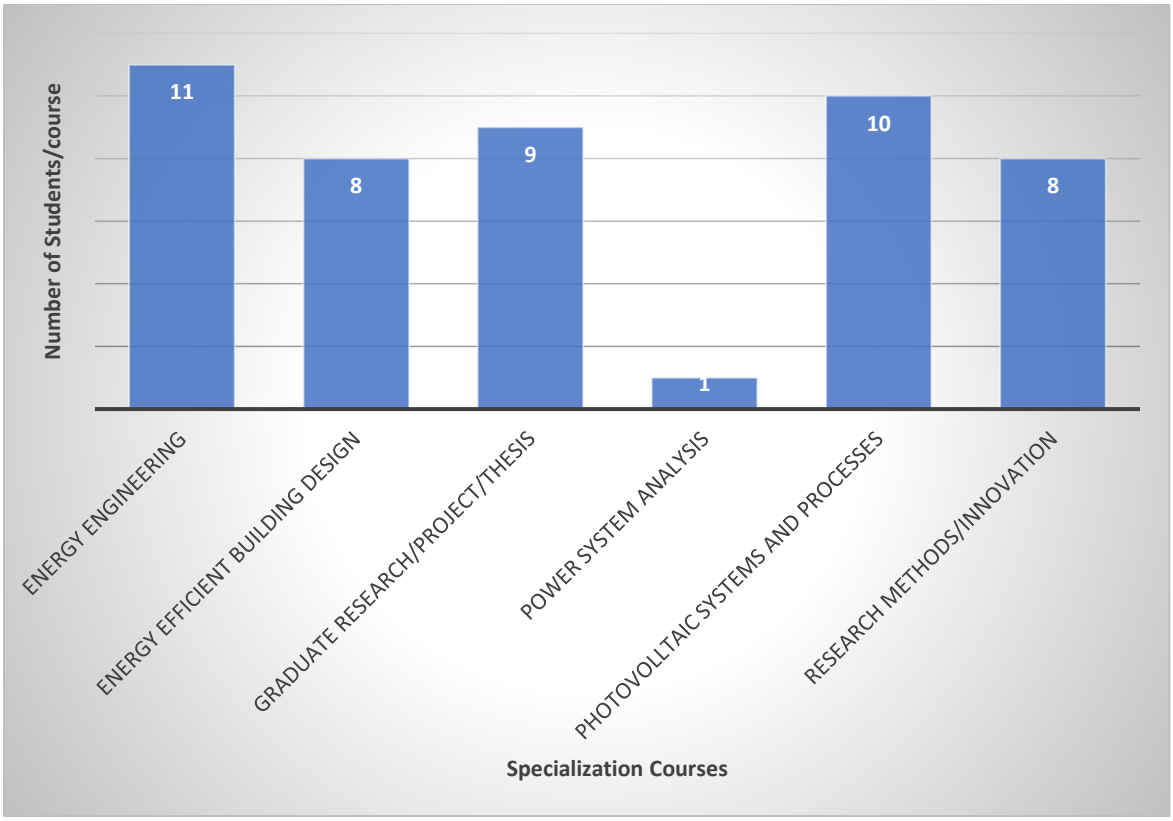
2.4 Program Locations

Among the advantages that make Oregon Tech an ideal institution for offering the MSREE program is the benefit of having a campus in urban Portland in proximity to the Pacific Northwest's energy industry cluster, and with close ties to Oregon Tech's campus in rural Southern Oregon, which exceptional natural energy resources and on-campus facilities generating renewable energy. The Portland campus allows students to leverage their classroom experience within internships at the Northwest's world-class energy and power companies. Graduate-level courses are also offered at the Klamath Falls campus. Online courses offer flexibility to concurrent degree and full-time students in both campuses.

2.5 Enrollment and Graduates

The inaugural graduating class in Spring 2014 included just one student. Fifty-one students have graduated from the program as of Summer 2020 term. Table 1 shows the historical enrollment and graduation history. The specialization enrollment data for AY2020-21 is shown in Table 1.

Table 1: MSREE Enrollment per specialization for AY2020-21


Number of Students/course
11
8
9
1
10
8
ENERGY ENGINEERING
ENERGY EFFICIENT BUILDING DESIGN
GRADUATE RESEARCH/PROJECT/THESIS
POWER SYSTEM ANALYSIS
PHOTOVOLLTAIC SYSTEMS AND PROCESSES
RESEARCH METHODS/INNOVATION
Specialization Courses

3 Cycle of Assessment for Program Outcomes

3.1 Program Outcomes

The MSREE program builds on the engineering knowledge students gained as undergraduates. The MSREE program outcomes are these:

(a) an ability to identify, formulate, and solve energy-related engineering problems.

(b) an ability to communicate effectively.

(c) an ability to independently acquire knowledge of contemporary technical, political, and economic issues related to energy.

MSREE students who are graduating from the accelerated BS+MSREE degree program are required to meet the program level outcome of the undergraduate program as well as the institutional-level essential student learning outcomes (ESLOs).

3.2 Assessment Methodology

The assessment of the program outcomes was reviewed, and decision has been made to consider REE 599 Graduate Thesis/Project course to evaluate the program outcomes. The MSREE outcome assessment cycle was revised and year 2018-19 was used to assess all three outcomes using REE 599 Graduate Thesis/Project. This course involves the final work of students in the MSREE degree and provides a window into the three program outcomes. Starting in AY 2019-20, each outcome will be assessed each year, following the new MSREE outcome assessment cycle presented in Table 2.

Students taking REE 599 have to present a written thesis or project and defend it in front of a committee composed by their advisor, a member of the department, and an external committee member. The three members of the committee read the written document prior to the defense. Department faculty who are members of the students committees but not their REE 599 advisors will be assigned with the assessment of outcomes. Assessment year 2018-19 has been used as a resetting point, considering all three outcomes, to continue with a regular 3-year cycle, as shown in Table .2

3.3 Assessment Cycle

Table 2. MSREE Outcome Assessment Cycle

	2018-19	2019-20	2020-21
(a) Problem Solving	REE 599	REE 599	
(b) Communication	REE 599		REE 599
(c) Independent/Contemporary	REE 599		

3.4 Curriculum Map

The MSREE curriculum map is shown in Table .3 The table identifies how each program outcome appears within the curriculum at the Foundation (Introduction), Practice (Reinforcement and Application) and Capstone (Synthesis) levels. The original assessment plan considered assessment of the program outcomes in different courses over a three-year cycle. However, faculty found out that the selected courses were not representative of the program outcomes and the methodology had to be revised. Long considerations during

academic years 2016-17 and 2017-18 led to the decision that REE 599 Graduate Thesis/Project was the best course to evaluate the program outcomes.

Table 3. MSREE Curriculum Mapping

Course	Outcome A	Outcome B	Outcome C
Graduate Research Methods/ Innovation - Required			
REE 511 Research Methods I	-	F	-
REE 512 Research Methods II	-	F	-
REE 513 Research Methods III	-	F	-
Energy Engineering - Required			
REE 515 Energy Engineering I	-	-	F,P
REE 516 Energy Engineering II	-	-	F
REE 517 Energy Engineering III	-	-	F
Power Systems Engineering - Elective			
REE 529 Power Systems Analysis	F,P	-	-
REE 549 Power Systems Protection and Control	F,P	-	-
REE 569 Grid Integration of Renewables	F,P	-	-
Energy Efficient Building Systems – Elective			
REE 533 Heating, Ventil/AC	F	-	-
REE 553 Energy Systems Mange/Audt	F,P	-	-
REE 573 Energy Efficient Build design	F,P	-	-
Photovoltaic Systems and Processes - Elective			
REE 545 Applied Photvoltaics	F,P	-	-
REE 565 Semiconductor Process Engg	F,P	-	-
REE 525 Solid-State Physics/Photovoltaics	F,P	-	-
REE 5xx Elective			
REE 5xx Elective I	Varies		
REE 5xx Elective II			
REE 5xx Elective III			
Graduate Thesis – Required			
REE 59X Graduate R&D/Project/Thesis	C	C	C
REE 59X Graduate R&D/Project/Thesis	C	C	C
REE 59X Graduate R&D/Project/Thesis	C	C	C

4 Summary of Assessment Activities & Evidence of Student Learning

The assessment methodology is discussed and revised periodically by the department meeting during convocation. The assessment is conducted annually by two different methods, one based on the criteria statement in Table.2 and another based on the indirect assessment conducted for the graduated students as an exit survey. The indirect assessment provides information about the students' achievement of program and institutional learning outcomes.

The MSREE faculty conducted formal assessment during the 2020-21 academic year using direct measures, such as designated assignments and evaluation of coursework normally assigned. Additionally, the student outcomes were assessed using indirect measures, primarily results from a graduate exit survey.

4.1 Methods for Assessment of Program Outcomes

At the beginning of the assessment cycle, an assessment plan is generated by the Assessment Coordinator in consultation with the faculty. This plan includes the outcomes to be assessed during that assessment cycle (according to Table 2), as well as the courses and terms where these outcomes will be assessed.

The program outcomes are evaluated as part of the course curriculum primarily by means of students' final theses or projects. These theses or projects requiring the student to apply math, science, and engineering principles learned in the course to solve a particular problem requiring the use of modern engineering methodology and effectively communicating the results.

A systematic, rubric-based process is then used to quickly assess the level of attainment of a given program outcome, based on a set of performance criteria. The work produced by each student is evaluated according to the different performance criteria, and assigned a level of 1-developing, 2-accomplished, or 3-exemplary. The results for each outcome are then summarized in a table and reviewed by the faculty at the annual Closing-the-Loop meeting.

The acceptable performance level is to have at least 80% of the students obtain a level of accomplished or exemplary in each of the performance criteria for any given program outcome.

If any of the direct assessment methods indicates performance below the established level, that triggers the continuous improvement process, where all the direct and indirect assessment measures associated with that outcome are evaluated by the faculty, and based on the evidence, the faculty decides the adequate course of action. The possible courses of action are these:

- Collect more data (if there is insufficient data to reach a conclusion as to whether the outcome is being attained or not); this may be the appropriate course of action when assessment was conducted on a class with low enrollment, and it is recommendable to re-assess the outcome on the following year, even if it is out-of-cycle, in order to obtain more data.
- Make changes to the assessment methodology (if the faculty believe that missing the performance target on a specific outcome may be a result of the way the assessment is being conducted, and a more proper assessment methodology may lead to more accurate numbers); for example, this could be the suggested course of action if an outcome was assessed in a lower-level course, and the faculty decide

that the outcome should be assessed in a higher-level course before determining whether curriculum changes are truly needed.

- Implement changes to the curriculum (if the faculty conclude that a curriculum change is needed to improve attainment of a particular outcome). A curriculum change will be the course of action taken when the performance on a given outcome is below the target level, and the evidence indicates that there is sufficient data and an adequate assessment methodology already in place, and therefore there is no reason to question the results obtained.

If the faculty decide to take this last course of action and implement curriculum changes, the data from the direct assessments is analyzed and the faculty come up with a plan for continuous improvement, which specifies what changes will be implemented to the curriculum to improve outcome performance.

In addition to direct assessment measures, indirect assessment of the student outcomes is performed on an annual basis through a graduate exit survey.

The results of the direct and indirect assessment, as well as the conclusions of the faculty discussion at the Closing-the-Loop meeting are included in the annual MSREE Assessment Report, which is reviewed by the Department Chair and the Director of Assessment for the university. The suggested changes to the curriculum are presented and discussed with all the department faculty at the annual Convocation meeting in Fall, as well as with the Industry Advisory Board at the following IAB meeting. If approved, these changes are implemented in the curriculum and submitted to the University Graduate Council (if catalog changes are required) for the following academic year.

4.2 AY2020-21 Targeted Direct Assessment Activities

The sections below describe the 2020-21 targeted assessment activities and detail the performance of students for each of the assessed outcomes. Unless otherwise noted, the tables report the number of students performing at a developing level, accomplished level, and exemplary level for each performance criteria, as well as the percentage of students performing at an accomplished level or above. Outcomes (b), was assessed for academic year 2020-21 by means of six theses or projects completed during the year by graduating students of the MSREE program under the course denoted REE 599. These students conducted their graduate research or thesis under three different advisors. Dr. H.J. Corsair advised one student. Dr. Slobodan Petrovic advised two students and Dr. Eklas Hossain advised three students.

The minimum acceptable performance level for all outcomes is to have 80% or more of the students performing at the accomplished or exemplary level for all performance criteria. The summary data presented in this section represent the percentages of students meeting course-specific criteria.

4.2 Targeted Assessment for Outcome (b): an ability to communicate effectively

This outcome was assessed in REE 599 – Graduate Thesis or Project by means of an evaluation of a final graduate-level thesis or project. Students submitted a well-organized graduate thesis with good abstract, state of art information from many sources, test credibility, shows evidence of application and use of research information in the thesis, analyze and critique different sources and answers all questions. The research work

should be presented well with good audience contact in the oral defense and/or use good writing mechanics and presentation techniques in the submitted thesis. Students submitted written documentation of their work, presented an oral defense, and made revisions and corrections based on feedback from both written and oral presentations of work.

Six MSREE students were assessed from using the performance criteria listed in the table below. The minimum acceptable performance level was to have above 80% of the students performing at the accomplished or exemplary level in all performance criteria.

Table 4 summarizes the results of this targeted assessment. The results indicate that the performance level of 100% was met on all performance criteria for this program outcome, that is, 100% of students were able to communicate, present and acquire the relevant information required for the research.

Table 4. Targeted Assessment for Outcome (a) (N=6)

Outcome (a): an ability to communicate effectively				
Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	%Students >= 2
Orally Communicate information			6	100%
Written Information			6	100%
Acquiring Information		1	5	100%

4.3 Summary of Indirect Assessment for 2020-21

In addition to direct assessment measures, the student outcomes are normally indirectly assessed through a graduate exit survey.

The survey asked students to indicate how well the MSREE program prepared them in each of the three specified outcomes. Figures 1 and 2 show the results of the indirect assessment of the MSREE student outcomes for the 2020-21 graduating class.

One of five MSREE graduating student completed the survey, with 100% of respondent indicating that because of completing the MSREE program they feel prepared or highly prepared in each of the student outcomes. This suggests that graduates feel that they have attained the MSREE student outcomes. Both direct and indirect assessment indicate that the MSREE program is preparing students in the program's student outcomes.

The survey includes the following questions:

- **Q MREE 1 - Program Student Learning Outcomes for Renewable Energy Engineering M.S. Please rate your proficiency in the following areas.**

(High Proficiency/Proficiency / Some Proficiency / Limited Proficiency)

(1.a) An ability to identify formulate, and solve energy-related engineering problems
(1.b) An ability to communicate effectively
(1.c) An ability to independently acquire knowledge of contemporary technical, political, and economical issues related to energy

- **Q MREE 2 - Program Student Learning Outcomes for Renewable Energy Engineering M.S. How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?**

(Very much / Quite a bit / Some / Very little)

(2.a) An ability to identify formulate, and solve energy-related engineering problems
(2.b) An ability to communicate effectively
(2.c) An ability to independently acquire knowledge of contemporary technical, political, and economical issues related to energy

A total of 6 students graduated in AY2020-21, but only 1 student out of 5 graduated students (N=1) filled out the exit survey. The results of the exit survey are overall positive but the limited size limits the overall assessment of the outcomes. The attainment of MSREE learning outcome and contribution of Oregon Tech in attainment of learning outcomes are shown in Figures 1 and 2.

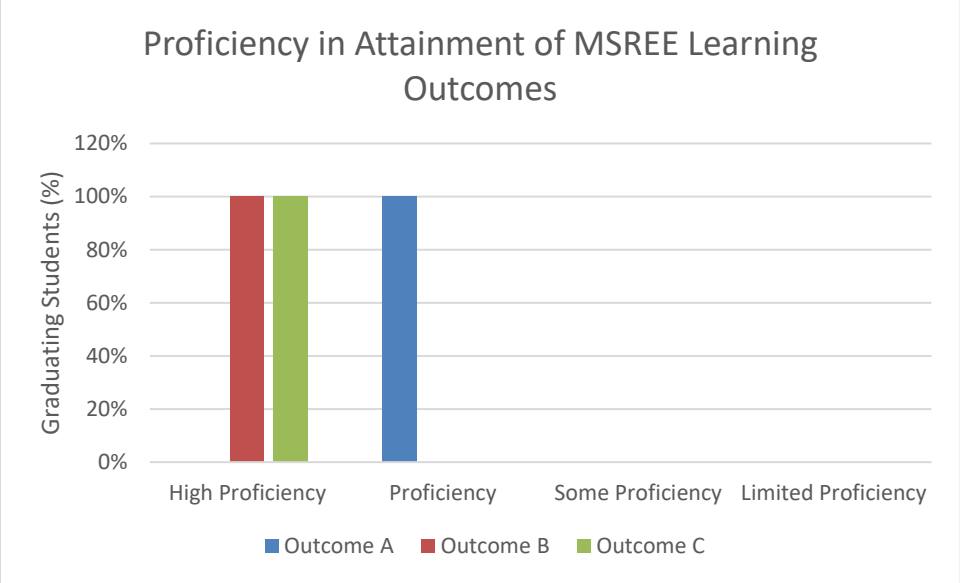


Fig1. Results of Indirect Assessment exit survey report for AY 2020-21 (N=1)

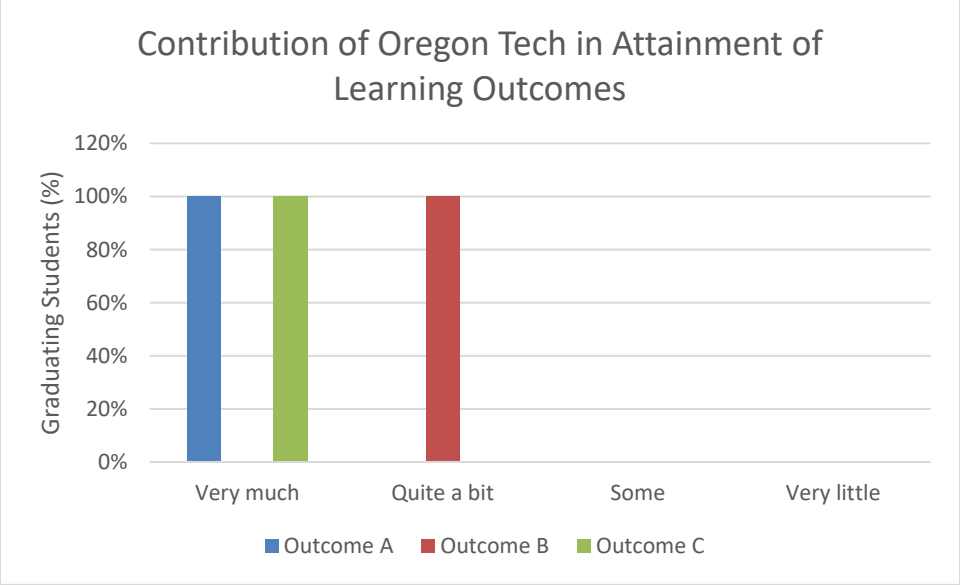


Fig2. Results of Indirect Assessment exit survey report for AY 2020-21 (N=1)

5 Review of Assessment Results

This section describes the changes resulting from the assessment activities carried out during the academic year 2020-21. The objective set for all programs in the EERE department is to have at least 80% of the students perform at the level of accomplished or exemplary in all performance criteria of the assessed outcomes.

Tables 5 shows the summary of 2020-21 and 2018 – 19 direct assessment results of outcome (b). The results show the outcome is stable in b.2 and b.3 irrespective of number of sample size. The attainment of outcome b.1 for AY2018-19 was not available. In AY2020-21, the percent of students assessed at a level of 2-accomplished or above is 100%. This shows positive improvement in the attainment of outcome assessment. The rubric for outcome (b) is included in the Appendix.

Table 5. Summary of direct assessment for Outcome (b)

Performance Criteria	AY2020-21 (N=6) %Students>= 2	AY 2018-19 (N=4) %of students ≥2
b.1-Orally Communicate information	100%	-
b.2-Written Information	100%	100%
b.3- Acquiring Information	100%	100%

5.1 Review of Assessment Methodology

This section describes changes to the assessment methodology that were proposed in the 2020-21 assessment cycle for implementation in the 2021-22 assessment cycle.

The faculty discussed about the Coursework-only and Graduate Research and Development (ENGR 596) options. In the course work only option, the student completes an additional approved REE graduate specialization sequence (9 credits) in lieu of a graduate thesis/project/R&D. Students should get prior approval for the sequence from their academic advisor or MSREE Program Director.

The Graduate Research and Development (ENGR 596) option involves conducting research and/or developing a project in a chosen topic. The scope of the research or project must meet the standards for graduate work, like the graduate thesis and graduate project options. In the case of students following the accelerated BS/MSREE path who have not completed an undergraduate capstone project, the scope of the project must also meet the requirements for the undergraduate capstone project. However, the requirements of review for this option are lower. Under this option, an oral defense before a faculty committee is not required. The work is graded exclusively by the faculty advisor supervising the work, who will also determine the particular deliverables appropriate to the nature of the work performed by the student (e.g., project report, oral presentation, live demonstration, etc.). Faculty decided to include these options in the AY2021-22 assessment cycle.

6 Review of Assessment Results and Closing the Loop

A special REE faculty meeting was conducted 29 October 2021 to review the MSREE assessment report. Faculty also discussed changes needed for MSREE curriculum and decided to continue the discussion further in the future meetings. To increase the sample sizes to get statistically meaningful results it was decided to include more course in the assessment. Also, the courses for next three-year assessment cycle were decided. Table. 6 shows the courses that are assessed in AY2021-22 to AY2023-34.

Table 6: Assessment Cycle for AY2021-22 to AY2021-24

	2021-22	2022-23	2023-24
(a) Problem Solving	REE529,REE 599	REE565, REE 599	
(b) Communication	REE569, REE 599		REE511, REE 599
(c) Independent/Contemporary	REE515, REE 599		

It was believed that by including most of the sequences in one or more outcome assessment we should be able to get stable feedback about the curriculum and outcomes achieved.
The outcomes are attached in the appendix. 8

8 Appendix MSREE Program Rubrics

OUTCOME A RUBRIC – AN ABILITY TO IDENTIFY, FORMULATE,AND SOLVE TECHNICAL PROBLEMS

COURSE:_____ STUDENT NAME:_____ GRADE_____

Students must demonstrate the following Program Outcome A). An ability to identify, formulate and solve technical problems,				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
IDENTIFIES TECHNICAL PROBLEMS	Classifies information to develop possible solutions (comp). Distinguishes what is known/unknown for a problem (comp).	Identifies where an improvement can be made for a problem solution (analyze). Develops possible alternative solutions to a given solution. (app.).	Assembles new solution information from various solutions (syn). Assesses effectiveness of problem solutions (Eval).	
FORMULATES PROBLEMS.	Describes problem to be solved (know). Visualize a problem with diagrams (comp). Specifies problem scope (comp.). States a problem in words (app.).	Specifies problem and appropriate models (appl.). Determines the limits of a problem (app.). Analyzes problem variable limits for a basic model (anal.).	Builds variables, resources and limits into a problem statement (syn). Assess problem statement with regard to objectivity, relevance and validity (eval.).	
IMPLEMENT A SOLUTION	Describe implementation process and documentation (know.). Describe several documentation methods and it's relationship to problem (comp.).	Applies manage/team skills to implement solution (app.). Communicates (oral/written) recommended solutions (app.). Reviews/critiques documentation by others to problem at hand (anal.).	Apprises effectiveness of techniques to problem at hand (anal.). Uses management/team solutions to implement final solution (syn.). Evaluate recommendations/solutions with respect to impact factors (eval.).	

OUTCOME B RUBRIC – AN ABILITY TO COMMUNICATE EFFECTIVELY

COURSE:_____ STUDENT NAME:_____ GRADE_____

Students must demonstrate the following Program Outcomes B). an ability to communicate effectively,				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ORALLY COMMUNICATE INFORMATION	Presentation is disorganized, lacks a cohesive flow; Missing requirements. Questions unanswered. No visual aids; Reads report; Little audience contact, Weak delivery.	All requirements met; Organized, but does not flow well. Answers most questions. Some visual aids; Good presentation technique and delivery.	Plans, prepares and delivers a well organized presentation; All requirements met. Analyzes and answers all questions. Good visual aids; Good presentation techniques; Good audience contact (eye contact, voice).	
WRITTEN COMMUNICATION	Poor Organization; Missing basic components. Many grammatical and mechanical errors. A summary.	Organized, abstract; Possess a style. Good grammar and writing mechanics. Summarize and classifies.	Well organized and developed; Good abstract; Selects appropriate style, form and tone. Good grammar and writing mechanics; Good use of elements of writing processes. Analyzes and critiques effectively.	
ACQUIRING INFORMATION FROM VARIOUS SOURCES	Few sources, mostly Web sources; Inadequate application and usage of information.	Various sources; Tests credibility; Good application and usage.	State of the art information from many sources; Analyzes information; Tests credibility; Applies and uses information well.	

OUTCOME C RUBRIC – INDEPENDENTLY ACQUIRE KNOWLEDGE OF CONTEMPORARY TECHNICAL, POLITICAL, AND ECONOMIC ISSUES RELATED TO ENERGY

COURSE:_____ STUDENT NAME:_____ GRADE_____

Students must demonstrate the following Program Outcome C). an ability to independently acquired knowledge of contemporary technical, political and economic issues related to energy.				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
KNOWLEDGE OF CONTEMPORARY ISSUES IN CONTEXT	Lists and recognizes socio-economic, political, and environmental issues	Contextualizes information, organizes information by categories, recognizing relevance to specific examples	Identifies how information is interrelated; Applies contextualized information to actual situations	
IDENTIFYING, GATHERING AND ANALYZING INFORMATION.	Identifies tools needed to conduct research and improve skills	Explains how what has been learned will improve research; Develop independent learning skills.	Applies what has been learned to a project; Independent research conducted.	