Annual Graduate Program Report

Mechanical Engineering Department (MEEG)
University of Arkansas
Fayetteville, AR

Degree Programs:

Mechanical Engineering (MSME, thesis option)
Master of Science in Mechanical Engineering (MSME, non-thesis option), and
Doctor of Philosophy (PhD) in Engineering.

Period of Interest

AY2024-2025

Date:

29 May 2025

Contact Information:

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PROGRAM GOALS

The Mechanical Engineering Department (MEEG) developed a departmental strategic plan that aligns with both the COE and UA's priorities. The plan was completed, and faculty approved during on 9/18/2017 during the Fall faculty meeting. In the new strategic plan, the vision statement is "We seek to serve society by preparing high quality mechanical engineers and performing impactful scholarly work that advances the well-being of Arkansas and beyond". The strategic goals are:

1. Graduate diverse, fully qualified mechanical engineers
2. Enhance research in core and emerging mechanical engineering areas
3. Expand doctoral graduate program and PhD's granted
4. Reduce student-to-faculty ratio
5. Expand and improve infrastructure for educational and research activities
6. Strengthen hands-on educational experiences

MEEG STUDENT LEARNING OUTCOMES (SLOS)

MEEG Student Learning Outcomes are defined in terms of the knowledge, skills, and abilities that students will know and be able to do as a result of completing a program (either MSME or PhD). These student learning outcomes are directly linked to the accomplishment of the program goals listed above. They are:

MSME SLOs:

1. Students will gain advanced knowledge in mechanical engineering.
2. a. Thesis: Students will gain a necessary understanding of their research field.
   b. Non-thesis: Students will apply advanced coursework to an engineering problem.
3. a. Thesis: Students will contribute new knowledge of fundamental or applied importance.
   b. Non-thesis: Students will demonstrate important application(s) of existing knowledge.
4. Students will be able to communicate effectively during oral presentations.
5. Students will be able to communicate effectively in writing.

PhD SLOs:

1. Students will gain advanced knowledge in mechanical engineering.
2. Students will show proficiency in the foundational topics of mechanical engineering.
3. Students will gain an understanding of their research field to contribute new knowledge.
4. Students will contribute new knowledge of fundamental or applied importance.
5. Students will be able to communicate effectively during oral presentations.
6. Students will be able to communicate effectively in writing.

PROCESS FOR ASSESSING STUDENT LEARNING OUTCOMES (SLOS)

The graduate faculty approved a new academic assessment plan in August 2015, which became effective the Fall 2015 semester. This new assessment plan has been providing better program assessment and feedback for continuous improvement. In addition to defining the MEEG graduate

program goals and student learning outcomes (SLOs), detailed performance surveys are being used to supplement existing assessment measures. The surveys are periodically completed by graduate students, their major advisors, and their faculty advisory committee members throughout a student's program period. In particular, these performance surveys explore beyond the previous annual 'satisfactory or unsatisfactory progress' check. Each survey asks about overall student progress, interactions with the student's peers and major advisor/committee member, level of effort, and oral/written communication skills.

For the new assessment process, the assessment measures (see Tables 1 and 2) are matched with their related SLOs. Samples of standard forms (i.e., annual graduate student academic review, graduate student performance survey (self-assessment and advisor) are available upon request. All data are collected by the Assistant to the Graduate Program Coordinator and recorded in a spreadsheet for analysis. Data are to be reviewed annually by the MEEG Graduate Studies Committee and results reported to the Dean of the College of Engineering (COE) by the Chair of the MEEG Graduate Studies Committee. Future plans are for the data to be entered into an Access Database of Graduate Student Progress which will allow for improved analysis and access to historical data.

Table 1. Means of assessment for MSME (thesis/non-thesis) students.

Student Learning Outcome	Assessment Measure
1. Academic Progress Toward Gaining Advanced Knowledge	Cumulative GPA. Annual Graduate Student Academic Review.
2a. Understanding of Field	Student self-assessment in Graduate Student Performance Survey. Thesis defense, Graduate Student Performance Survey.
2b. Applying Coursework	Student self-assessment in Graduate Student Performance Survey. Project presentation, Graduate Student Performance Survey.
3. Contribute New Knowledge	Student self-assessment in Graduate Student Performance Survey. Thesis defense / project presentation, Graduate Student Performance Survey.
4. Communicate Orally	Graduate Seminar, Student self-assessment in Performance Survey. Thesis defense / project presentation, Graduate Student Performance Survey.
5. Communicate in Writing	Student self-assessment in Graduate Student Performance Survey. Thesis / project report, Graduate Student Performance Survey.

Table 2. Means of assessment for PhD students.

Student Learning Outcome	Assessment Measure
1. Academic Progress Toward Gaining Advanced Knowledge	Cumulative GPA. Annual Graduate Student Academic Review.
2. Foundational Proficiency	Cumulative GPA. Ph.D. Candidacy exam
3. Understanding of Field	Student self-assessment in Graduate Student Performance Survey. Candidacy exam, Dissertation, Graduate Student Performance Survey.
4. Contribute New Knowledge	Student self-assessment in Graduate Student Performance Survey. Candidacy exam (PhD proposal), Dissertation, Graduate Student Performance Survey.
5. Communicate Orally	Graduate Seminar, Student self-assessment in Performance Survey.

	Candidacy exam, Dissertation defense.
6. Communicate in Writing	Student self-assessment in Graduate Student Performance Survey. Candidacy exam, Dissertation.

PROGRAM ASSESSMENT RESULTS

MEEG utilize seven assessment measures:

1. Cumulative GPA
2. Annual graduate student academic review
3. Graduate student performance survey
4. Participation in graduate seminar
5. PhD Candidacy exam
6. Oral defense of MS thesis, MS project, or PhD dissertation
7. Written MS thesis, MS project, or PhD dissertation

Results for AY2024-2025 are given below and discussed with regard to SLOs.

Cumulative GPA
MS SLOs: #1 – Gain advanced knowledge (i.e., academic progress)
PhD SLOs: #1 – Gain advanced knowledge (i.e., academic progress)
#2 – Foundational proficiency

Table 3 provides the cumulative GPA for MEEG graduates. These results show that students are proficient and making good progress in their course work at the graduate level.

Table 3. Cumulative GPA for MEEG graduate students.

Name	Acad Plan	Cumulative GPA
Abe, Adedoyin Ayomide	MEEGPH	4.000
Akintunde, Tijesunimi Obed	MEEGPH	3.875
Baedke, Joshua Robert	MEEGMS	4.000
Baker, Kasey Allen	MEEGMS	3.100
Bretz, Noah Wesley	MEEGMS	3.118
Burroughs, Matthew Thomas	MEEGMS	4.000
Davar, Amirreza	MEEGMS	3.640
Desai, Om N	MEEGMS	3.000
Dunlap, Christy Lela	MEEGPH	4.000
Dye, Chandler Riggs	MEEGMS	4.000
Fisher Jr, Dion Scott	MEEGMS	3.000
Fletcher, Stuart Glenn	MEEGMS	3.571
Ghufran, Muhammad	MEEGPH	4.000
Harris, John R	MEEGPH	3.429
Harris, Nathaniel Quinn	MEEGPH	3.857
Hasan, Mehedi	MEEGMS	3.875

Hoskins, Julia K.	MEEGPH	3.929
Hossain, Mohammad Ishraq	MEEGMS	3.750
Imhanzuaria, Darlington Ehijie	MEEGPH	4.000
Jiang, Pengxiang	MEEGPH	3.875
Kasitz, Joshua Michael	MEEGPH	3.857
Kokash, Mohammad Taher Hussein	MEEGPH	3.375
Liang, Youwen	MEEGPH	3.667
Lindsey, Ian Malcolm	MEEGMS	3.750
Lu, Kang	MEEGPH	4.000
Majakoti, Saroj	MEEGPH	3.750
Musa, Mishek Jair	MEEGPH	3.929
Naghavi Pour, Bahar Alsadat	MEEGPH	2.667
Nanayakkara Ratnayake, Charith Oshadi	MEEGPH	3.700
Norris, Matthew Gregor	MEEGPH	3.625
Olatunji, Toluwalase	MEEGMS	4.000
Peraza, Daniel A	MEEGMS	3.667
Pierson, Stephen Adam	MEEGPH	3.800
Powell, Trent Thomas	MEEGMS	4.000
Prottoy, Salman Mahmud	MEEGPH	4.000
Russ, Corbin Mccabe	MEEGMS	4.000
Sangsefidi, Milad	MEEGPH	4.000
Schwartz, Hunter	MEEGMS	4.000
Scott, Daniel	MEEGPH	3.923
Shen, Bo	MEEGMS	3.750
Simmonds, Cole Christian	MEEGMS	4.000
Stevens, Braden	MEEGPH	4.000
Stubbs, Najee Ian	MEEGMS	3.222
Tull, Jeremy Dale	MEEGPH	4.000
Tullis, Michael Robert	MEEGMS	4.000
Tushar, Nahid Hasan	MEEGPH	3.880
Velasquez Carballo, Kevin Eduardo	MEEGPH	3.643
Vinson, Whit Miller	MEEGPH	3.929
Wagner, Michael Robert	MEEGMS	4.000
Wu, Rencheng	MEEGPH	3.533
Zhang, Chenhan	MEEGPH	0.000

Annual Graduate Student Academic Review

MS SLOs: #1 – Gain advanced knowledge (i.e., academic progress)

PhD SLOs: #1 – Gain advanced knowledge (i.e., academic progress)

Table 4 below provides the results the annual graduate student academic review forms (received each spring semester). Students are required to annually obtain feedback from their major advisor with regard to their progress toward graduation. The forms allow for only a rating of satisfactory or unsatisfactory. A review of the historical and this year's annual review data show that students are generally making satisfactory progress.

Table 4. Annual graduate student academic reviews.

Academic Year	Number Satisfactory	Number Unsatisfactory
2024-2025	51	0

Graduate Student Performance Surveys

MS SLOs: #2a – Understanding of field
#2b – Applying coursework
#3 – Contribute to new knowledge
#4 – Communicate orally
#5 – Communicate in writing

PhD SLOs: #3 – Understanding of field
#4 – Contribute to new knowledge
#5 – Communicate orally
#6 – Communicate in writing

Tables 5 and 6 below show the results of the graduate student performance surveys in terms of mean ratings. These surveys were created in an effort to better assess the SLOs from several different perspectives. The surveys are required prior to enrolling each semester by the student and student's major advisor. The surveys are also required after the oral defense (i.e., MS thesis/project or PhD dissertation) by the student, major advisor, and all thesis/project/dissertation committee members. The scores are on a scale of 1-5, with 1 "low", 3 "average", and 5 "high". For the self-assessment, the scores are all above 4 with the exception of Fall 2024 Overall Research Progress, which is 3.99. For the advisor assessment, three categories have mean scores below 4, including "Overall Research Progress", "Time Spent in Lab/Office", and "Effort Level on Research". Encouragingly, these scores were all above 4 for the Spring 2025 semester. Nevertheless, we intend to include a discussion research expectations during the Fall 2025 Graduate Seminar series, which all students will attend. No other general concerns are apparent.

Table 5. Statistics from student self-assessment in graduate student performance surveys (2024-2025 Academic Year).

Question	Fall 24 (47 Respondents)	Spring 25 (44 Respondents)
Overall Academic Progress	4.38	4.45
Overall Research Progress	3.99	4.23
Quantity of Interaction with Prof.	4.35	4.38
Quality of Interaction with Prof.	4.50	4.57
Quantity of Interaction with Peers	4.30	4.41
Quality of Interaction with Peers	4.50	4.53
Time Spent in Lab/Office	4.05	4.12
Effort Level on Research	4.25	4.40
Oral Communication	4.35	4.50
Written Communication	4.34	4.45

Table 6. Statistics from major advisor or committee member graduate student performance surveys. (2024-2025 Academic Year).

Question	Fall 24 (48 Respondents)	Spring 25 (43 Respondents)
Overall Academic Progress	4.30	4.53
Overall Research Progress	3.86	4.16
Quantity of Interaction with Prof.	4.00	4.24
Qua454lity of Interaction with Prof.	4.00	4.29
Quantity of Interaction with Peers	4.11	4.26
Quality of Interaction with Peers	4.14	4.24
Time Spent in Lab/Office	3.89	4.30
Effort Level on Research	3.87	4.33
Oral Communication	4.13	4.28
Written Communication	4.03	4.19

Participation in Graduate Seminar
MS SLOs: #4 – Communicate orally
PhD SLOs: #5 – Communicate orally

All graduate students are required to enroll in MEEG 68000 Graduate Seminar each semester. Students are also required to give a presentation on their research topic once per year. Most MS

students give one presentation prior to graduation. For PhD students, they give an average of about 3 presentations.

Recent action: Based on a review of recent attendance records, it was apparent that an increasing number of graduate students have failed to register and attend the graduate seminar. After consultation with the department chair and members of the graduate studies committee, a department staff person was put in charge to register the seminar class on behalf of the students. In addition, students' presentations and attendance are closely monitored. To be excused from individual seminars, students are required to submit official requests with approval from the Graduate Coordinator. During Fall 2024 and Spring 2025 semester, the seminar was well attended by all students who did not have prior conflicts (e.g. overlapping courses or TA assignments).

PhD Qualifying and Candidacy Exam

MS SLOs: n/a
PhD SLOs: #2 – Proficiency in foundational topics
#3 – Understanding of research field

In Fall 2021, MEEG faculty developed and approved a new qualifying exam format. The primary reason for the change was to better reflect the increasing multidisciplinary nature of both the students' academic background and the research projects they are involved in. The new format essentially combines the PhD qualifying and candidacy exams into a single exam consisting of two different phases. In Phase I, the students demonstrate proficiency in fundamental mechanical engineering principles through graduate level coursework and the submission of an abstract describing the foundational principles of proposed research. In Phase II, the students submit a detailed writeup of proposed research and pass an oral defense.

Table 7 below provides a list of PhD candidates who passed their qualifying and candidacy exams from Fall 2024 to Spring 2025. Based on comments from the faculty members that served on the exam committees, there appears to be no obvious issues or concerns of the new exam format.

Table 7. PhD candidacy exam completed from Fall 2024 to Spring 2025.

Student Name	Term	Candidacy Exam Status
Daniel Scott	Fall 2024	Pass
Nahid Tushar	Spring 2025	Pass

Oral Defense of MS Thesis, MS Project, or PhD Dissertation

MS SLOs: #4 – Communicate orally
PhD SLOs: #5 – Communicate orally

and

Written MS Thesis, MS Project, or PhD Dissertation

MS SLOs: #5 – Communicate in writing
PhD SLOs: #6 – Communicate in writing

The last two steps in a student's work prior to graduating include writing and orally defending their MS thesis/project or PhD dissertation. Verification of progress or success in this area is partially assessed by the fact the student graduated. Table 8 provides a list of recent graduates during this academic year. There appears to be no obvious issues or concerns.

Table 8. List of degree and graduation dates for MEEG graduates.

Semester	Year	Degree	Name	Advisor
Fall	2024	MSME	K C, Navin	Meng
Fall	2024	PhD	Pandey, Hari	Hu
Fall	2024	PhD	Meyer, Jeremy	Tung
Fall	2024	PhD	Jack, Justin	Millett
Fall	2024	PhD	Eaton, Abigail	Nair
Spring	2025	MSME	Bennett, Will	Zou
Spring	2025	MSME	Dye, Chandler	Huang
Spring	2025	MSME	Imhanzuaria, Darlington	Meng
Spring	2025	MSME	Kasitz, Josh	Huitink
Spring	2025	MSME	Lindsay, Ian	Meng
Spring	2025	MSME	Russ, Corbin	Churchill
Spring	2025	MSME	Tullis, Michael	Walters
Spring	2025	MSME	Wagner, Michael	Huitink
Spring	2025	PhD	Vinson, Whit	Huitink

Conclusions

Based on the given assessment measures, it appears that all the student learning outcomes (SLOs) are being met by the MEEG graduate program at both the MS and PhD levels. As future survey assessment data become available, changes are expected to be identified which will strengthen the graduate program. During the prior academic year, no systemic issues have been identified, nor are there any recommended program modifications.