

Undergraduate Research Technical Elective Program

Mechanical Engineering

Undergraduates who are majoring in Mechanical Engineering are required to take 12 credit hours of technical electives. Besides the standard elective program described above there are two research track options (A and B) that are available for students to fulfill their Technical Elective course requirement.

Option A: Honors Research Distinction Track

This track is intended for students with at least a 3.4 GPA who wish to perform undergraduate research. Under this track, students are still required to take 12 hours of technical elective credit, but they may apply 6 hours from undergraduate research (ME 4999H) towards that total. The steps listed below allow a student to meet the College of Engineering Requirements for Honors Research Distinction.

1. A total of 6 cr-hrs of ME 4999H
2. At least 1 MECHENG 6000-level or above class
3. Other MECHENG 5000-level or above technical elective courses to bring the total of TE cr-hrs to at least 12
4. Successful defense of thesis and submission of thesis to Knowledge Bank
5. Completion of an Honors Contract in Engineering **or** performing at least 1 action from the following list:
 - a. Presentation of the research at one OSU-sponsored event (e.g., Denman Undergraduate Research Forum, CoE Research Forum, etc.) or at a national conference
 - b. Submission of a manuscript to a peer-reviewed research journal or conference proceedings with the student as a co-author
 - c. Submission of a manuscript to an undergraduate research journal or non-peer-reviewed journal or proceedings with the student as lead author
 - d. Completion and submission of a patent disclosure application
 - e. Other appropriate activity that has been approved via petition by the Honors Committee in Engineering

Option B: Research Distinction Track

This track is intended for students with at least a 3.0 GPA who wish to perform undergraduate research. Under this track, students are still required to take 12 hours of technical elective credit, but they may apply 6 hours from undergraduate research (ME 4999) towards that total. The steps listed below allow a student to meet the College of Engineering Requirements for Research Distinction

1. A total of 6 cr-hrs of MECHENG 4999
2. Other 5000-level and above courses to bring the total of cr-hrs to at least 12
3. Presentation of the research at a local conference (e.g., Denman Undergraduate Research Forum, CoE Research Forum, etc.) or a national conference
4. Successful defense of thesis and submission of thesis to Knowledge Bank

Notes on Course Selection for Research Tracks (Options A and B)

The courses that are needed in addition to ME 4999 or 4999H to earn at least 12 credit hours of technical electives must be approved by the student's undergraduate research advisor and the MAE Honors Program advisor. It is recognized that performing undergraduate research provides students with knowledge of "applications and broader impact" and also "professional skills". Students are encouraged, but are not required, to take at least one course that complements their undergraduate research project and gives them experience with both computational and experimental work. For instance, if a student's research project is heavily experimental, that person is encouraged to take a course that fulfills at least 1 cr-hr of computational electives.

Courses Outside the Department that can Count as Technical Electives (Limit One Course)

- Chemistry (CHEM) 2310 and above (this cannot include a course already counted for the Additional Science Requirement)
- Engineering other than MECHENG, AEROENG and NUCLREN;
 - Biomedical Engineering (BIOMEDE) 4X10
 - Food Agriculture and Biological Engineering (FABENG) 3481, 3510, 3610 and 3810
 - All courses 5000 level and above (excluding FABENG 7220)
- Evolution, Ecology, and Organismal Biology (EEOB) 2520
- Neuroscience (NEUROSC) 3000
- Mathematics (MATH): 4000 level and above
- Physics : 3470, 4700 and 5000 level and above
- Physiology and Cell Biology (PHYSIO) 3101,3102
- Statistics (STAT) 4201 and above

All Individual or Group Studies Courses: X193 (4193 and up) are subject to approval by petition to the Undergraduate Studies Committee. No more than 3 credit hours may be applied.

Aerospace Engineering

Undergraduates who are majoring in Aerospace Engineering are required to take 3 technical elective classes. Besides the standard elective program described above there are two research track options (A and B) that are available for students to fulfill their Technical Elective course requirement.

Option A: Honors Research Distinction Track

This track is intended for students with at least a 3.4 GPA who wish to perform undergraduate research. Under this track, students may apply 3 hours of ME 4999H towards their undergraduate technical elective program; the other 2 classes must be approved technical electives that meet the requirement for Option A. The steps listed below allow a student to meet the College of Engineering Requirements for Honors Research Distinction.

1. A total of 6 cr-hrs of AEROENG 4999H. While only 3 hours can count towards the TE program, it is a requirement of the College to take 6 hours of 4999H
2. 2 other technical elective courses
3. Successful defense of thesis and submission of thesis to Knowledge Bank

4. Completion of an Honors Contract in Engineering **or** performing at least 1 action from the following list:
 - a. Presentation of the research at one OSU-sponsored event (e.g., Denman Undergraduate Research Forum, CoE Research Forum, etc.) or at a national conference
 - b. Submission of a manuscript to a peer-reviewed research journal or conference proceedings with the student as a co-author
 - c. Submission of a manuscript to an undergraduate research journal or non-peer-reviewed journal or proceedings with the student as lead author
 - d. Completion and submission of a patent disclosure application
 - e. Other appropriate activity that has been approved via petition by the Honors Committee in Engineering

Option B: Research Distinction Track

This track is intended for students with at least a 3.0 GPA who wish to perform undergraduate research. Under this track, students may apply 3 hours of ME 4999 towards their undergraduate technical elective program; the other 2 classes must be approved technical electives that meet the requirement for Option A. The steps listed below allow a student to meet the College of Engineering Requirements for Research Distinction

1. A total of 6 cr-hrs of AEROENG 4999. While only 3 hours can count towards the TE program, it is a requirement of the college to take 6 hours of 4999
2. 2 other technical elective courses
3. Presentation of the research at a local conference (e.g., Denman Undergraduate Research Forum, CoE Research Forum, etc.) or a national conference
4. Successful defense of thesis and submission of thesis to Knowledge Bank

Combined Degree Track (Mechanical or Aerospace Engineering)

Success in graduate school is determined by a student's ability to perform research. Students in the Combined Degree program who also perform undergraduate research spend less time in graduate school obtaining an MS or PhD degree after the completion of the undergraduate degree than students in the Combined Degree program who do not have undergraduate research experience. Therefore, students who are interested in this combined-degree program are encouraged to speak with the Combined Degree program coordinator (Nick Breckenridge) to learn how to coordinate the Honors Research Distinction Track (Option A) with the coursework of the Combined Degree program. Combined Degree program students who do not perform undergraduate research under Option A or B above must follow the non-research Technical Elective Program.