20MS ME
Mechanical Engineering MS

Department of
Mechanical and
Materials Engineering

College of
Engineering and
Applied Science

2014

Primary Faculty:
David F.
Thompson PhD
Associate
Professor and
Graduate
Director
513 556-3693
david.thompson@uc.edu

Faculty Committee:
Member Name
Phone
Email
**Program Overview**

**University of Cincinnati Mission Statement**

The University of Cincinnati serves the people of Ohio, the nation, and the world as a premier, public, urban research university dedicated to undergraduate, graduate, and professional education, experience-based learning, and research.

We are committed to excellence and diversity in our students, faculty, staff, and all of our activities. We provide an inclusive environment where innovation and freedom of intellectual inquiry flourish.

Through scholarship, service, partnerships, and leadership, we create opportunity, develop educated and engaged citizens, enhance the economy and enrich our University, city, state and global community.

**College of Engineering and Applied Science Mission Statement**

The mission of the College of Engineering and Applied Science is to provide:

- Excellence in Education—provide a world-class education for our students
- Excellence in knowledge creation and transfer in support of education and community—provide the best education featuring new breakthroughs in science and technology and be able to transfer that knowledge of science technology both to our students and to our local community
- Accessibility—provide a venue where qualified students who want to come, can come; and provide the support necessary to allow them to be successful

**Mechanical Engineering Program Mission Statement**

The graduate program in Mechanical Engineering must fulfill a dual purpose of conducting nationally and internationally recognized doctoral research, while at the same time producing highly-qualified MS-degreed engineers to meet the advanced technology needs of local and regional employers. The mission statement of the program is given below:

*The mission of the Mechanical Engineering Program of the University of Cincinnati is to educate students in the fundamentals of engineering and help them develop their full potential as competent engineers, leaders and responsible citizens of a global society. Primary goals are the enhancement of the ability of graduates to apply knowledge to engineering situations, to function competently in multidisciplinary situations, to communicate effectively and to understand professional and ethical responsibility.*

The major program areas of emphasis can be identified as structural dynamics and vibro-acoustics; solid mechanics; thermal-fluids sciences; and manufacturing and design.
Program Outcomes (Student Learning Outcomes)

a. Student will develop capabilities for design of experiments and carry out numerical simulations and analyze the significance of the research work related to topics in mechanical engineering.
b. Students will achieve significant progress in terms of breadth of knowledge and depth of specialization in both theoretical and experimental research in mechanical engineering writing.
c. Student will be able to effectively communicate the technical program both orally and in writing.
d. Student will be able to identify and formulate the engineering problems and develop solutions by integrating and incorporating interdisciplinary concepts from mathematics, physics, biology, chemistry and other disciplines.
e. Students will develop a sound background in vibration and control, solid and fluid mechanics, thermodynamics, manufacturing and mechanical design.

Curriculum/Program Map

The table below lists the following courses which will be used for assessment. The Mechanical Engineering graduate programs have no required classroom courses; each student follows a Program of Study tailored to his/her specific academic objectives. However, within each of the program’s four major academic thrust areas (Structural Dynamics/Acoustics/Dynamics & Control, Solid Mechanics, Design/Manufacturing, and Thermal/Fluid Sciences) there are core classroom courses which are essentially treated as “track” requirements, and these courses (listed below) will be assessed. Depending upon the student’s area of specialization, he/she will normally be associated with one of these tracks and would normally take the corresponding core course. In addition, Research/Thesis (MECH 9015), and Graduate Seminar (MECH 9022) will be used for assessment.

Total credit hours for degree – 30
Required courses: MECH 9015, MECH9022
Core courses: MECH 6023, MECH 6060, MECH 7014, MECH 7096
Minimum 18 credit hours in classroom courses.
Classroom course distribution requirement: Minimum 12 hours in MECH-prefixed courses; minimum 3 hours in MATH, or approved substitute; 3 hour approved elective.
Thesis required.
<table>
<thead>
<tr>
<th>Course</th>
<th>Program Outcomes (Student Learning Outcomes)</th>
</tr>
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<tbody>
<tr>
<td>MECH 6023 CAD for Manufacturing (Design/Manufacturing Track)</td>
<td>(a) emerging strengthening strengthening (b) strengthening strengthening (c) strengthening strengthening (d) strengthening strengthening</td>
</tr>
<tr>
<td>MECH 6060 Applied Fast Fourier Transforms (Structural Dynamics track)</td>
<td>(a) emerging strengthening strengthening (b) strengthening strengthening (c) strengthening strengthening</td>
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<tr>
<td>MECH 7014 Advanced Solid Mechanics (Solid Mechanics Track)</td>
<td>(a) emerging strengthening strengthening (b) strengthening strengthening (c) strengthening strengthening</td>
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<tr>
<td>MECH 7096 Viscous Fluid Flow (Thermal/Fluid Sciences track)</td>
<td>(a) emerging strengthening strengthening (b) strengthening strengthening (c) strengthening strengthening</td>
</tr>
<tr>
<td>MECH 9022 Graduate Seminar (Required)</td>
<td>(a) strengthening strengthening (b) strengthening strengthening (c) strengthening strengthening</td>
</tr>
<tr>
<td>MECH 9015 Research/Thesis (Required)</td>
<td>(a) achieved achieved achieved achieved achieved</td>
</tr>
</tbody>
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**Methods/Measures/Evaluation Criteria**

The table below outlines the methods/measures and evaluation criteria to be used:

<table>
<thead>
<tr>
<th>Program Outcome</th>
<th>Assessment Tools/Evaluation Criteria</th>
<th>Course/Experience</th>
<th>Timeline</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Student will develop capabilities for design of experiments and carry out numerical simulations and analyze the significance of the research work related to topics in mechanical engineering.</td>
<td>Committee evaluation of quality of thesis document and oral presentation at the thesis defense; scoring rubric TBD. Time to degree recorded.</td>
<td>MECH 9015 Research/Thesis</td>
<td>AY 2014-2015 initial implementation</td>
<td>ME Graduate committee will gather and maintain statistics for annual reporting and benchmarking.</td>
</tr>
<tr>
<td>(b) Students will achieve significant progress in terms of breadth of knowledge and depth of specialization in both theoretical and experimental research in mechanical engineering writing.</td>
<td>Committee evaluation of quality of thesis document at the thesis defense; scoring rubric TBD. Survey in Graduate Seminar.</td>
<td>MECH 9015 Research/Thesis, MECH 9022 Graduate Seminar</td>
<td>AY 2014-2015 initial implementation</td>
<td>ME Graduate committee will gather and maintain statistics for annual reporting and benchmarking.</td>
</tr>
<tr>
<td>(c) Student will be able to effectively communicate the technical program both orally and in writing.</td>
<td>Committee evaluation of quality of thesis document and oral presentation at the thesis defense; scoring rubric TBD. Number of student co-authored publications recorded.</td>
<td>MECH 9015 Research/Thesis</td>
<td>AY 2014-2015 initial implementation</td>
<td>ME Graduate committee will gather and maintain statistics for annual reporting and benchmarking.</td>
</tr>
<tr>
<td>(d) Student will be able to identify and formulate the engineering problems and develop solutions by integrating and incorporating interdisciplinary concepts from mathematics, physics, biology, chemistry and other disciplines.</td>
<td>Surveys in core courses; survey in Graduate Seminar.</td>
<td>MECH 6023, MECH 6060, MECH 7014, MECH 7096, MECH 9022</td>
<td>AY 2014-2015 initial implementation</td>
<td>Statistics will be maintained by the ME Graduate committee.</td>
</tr>
</tbody>
</table>
Students will develop a sound background in vibration and control, solid and fluid mechanics, thermodynamics, manufacturing and mechanical design.

| Surveys in core courses | MECH 6023, MECH 6060, MECH 7014, MECH 7096 | AY 2014-2015 initial implementation | Statistics will be maintained by the ME Graduate committee. |

**Assessment Infrastructure**

Implementation of the assessment plan will be carried out by the Mechanical Engineering Graduate Studies Committee, consisting of Dr. David F. Thompson, Associate Professor and Graduate Director, Dr. Milind Jog, Professor, and Dr. Jay Kim, Head, Department of Mechanical and Materials Engineering. Additional faculty within the program will also be appointed to assist the committee in this effort. Administrative support will be provided by Susan Lyons, Operations Manager, and Larry Schartman, Computer and Information Analyst, assisted by their respective support staff members.

Administrative support at the College (CEAS) level will be provided by Virginia Westheider, Academic Director of the Assessment and Continuous Improvement (ACIC) Center in the College. University-level support offered through the Center for Enhancement of Teach and Learning (CET&L) will also be relied upon.

Development of surveys for assessment of classroom courses, as well as for doctoral committee assessment, are currently underway; initial implementation is anticipated during the 2014-2015 academic year.

**Findings**

The assessment plan is yet to be implemented; no findings are available at this time.