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# Mechanical Engineering Graduate Program

## Requirements for PhD students

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**REQUIREMENT:**

**COMPLETION DATE:**

1. Confirm the name of your thesis advisor by the end of the first semester. Only a regular member of the Graduate Faculty can serve as an advisor of a doctoral dissertation.

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**Primary thesis advisor name:** \_\_\_\_\_

(optional) Co-thesis advisor name: \_\_\_\_\_

2. Complete **15 credit hours of coursework at UVM** beyond all M.S. credits earned at UVM or at another academic institution. For students entering the PhD program without an M.S. degree, a minimum of 39 credit hours of coursework at UVM is required.

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3. Complete at least **15 credit hours in graduate-level mechanical engineering coursework at UVM** from any areas of specialization below (including cross-listed courses outside of mechanical engineering). This can include M.S. credits earned at UVM. **At least 6 credits must be at the 6000 level or above.**

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4. Complete 9 additional credit hours in graduate-level Engineering, Mathematics, Statistics, Physical or Life Sciences.

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5. Pass the **Doctoral Comprehensive Examination**. See below guidelines regarding the Doctoral Comprehensive Exam.

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6. Complete the **teaching requirement** by serving as a full-time (20hrs/week) graduate teaching assistant for one semester or half-time (10hrs/week) for two semesters at UVM.

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7. Select your **Thesis Defense Committee**. The Thesis Defense Committee must consist of at least four members of the UVM Graduate Faculty. At least two Graduate Faculty members must be from the mechanical engineering graduate program. The Chairperson must be both a member of the Graduate Faculty and from outside the mechanical engineering program. The Chairperson will be designated by the Graduate Dean upon nomination by the dissertation advisor.

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8. Pass **Dissertation Proposal**. A proposal of the dissertation research must be presented to and approved by the Thesis Defense Committee. The Doctoral Comprehensive Exam must be passed prior to the Dissertation Proposal. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_
9. Complete a minimum of **20 hours of thesis credits (ME 7491)** supervised by the dissertation advisor prior to the doctoral thesis defense, with the expectation that the student's research must culminate in original works publishable in peer-reviewed journal articles. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_
10. Complete a total of **75 credit hours**. A minimum of 51 credit hours must be accumulated in residence at UVM combining both credits taken for coursework and independent research. Up to 24 credits hours is allowable for transfer from other institutions. Also, up to 24 hours of coursework for which graduate credit is earned at UVM in an M.S. program may be applied toward a Ph.D., provided the credit is appropriate for a Ph.D. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_
11. Pass the **Thesis Defense**. The Thesis Defense committee will decide on the pass/fail status of the candidate's thesis credits. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_
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## AREAS OF SPECIALIZATION IN MECHANICAL ENGINEERING:

<b>Bioengineering and Biomechanics Area</b>	<p>ME 5410. Adv. Bioengineering Systems          ME 5440. Biothermodynamics          ME 5990 AST: Advanced Biomaterials          Any approved or Advanced Special Topics course at the 5000 level or above in Bioengineering and Biomechanics area as offered.</p>
<b>Control Theory and Design of Mechanical Systems Area</b>	<p>ME 5190. Astrodynamics          ME 5370. Micro and Nano Systems          ME 6120. Advanced Dynamics          ME 6990. AST: Motion Control          Any approved or Advanced Special Topics course at the 5000 level or above in Control Theory and Mechanical Systems areas as offered.</p>
<b>Materials Engineering and Solid Mechanics Area</b>	<p>ME 5110. Mechanical Behavior of Materials          ME 5120. Advanced Engineering Materials          ME 5520. Computational Solid Mechanics          ME 5370. Micro and Nano Systems          ME 5990. AST: Advanced Biomaterials          ME 6550. Multiscale Modeling          Any approved or Advanced Special Topics course at the 5000 level or above in Materials Engineering and Solid Mechanics areas as offered.</p>
<b>Thermodynamics, Fluids and Energy Area</b>	<p>ME 5230. Vortex Flow          ME 5220. Adv. Engr. Thermodynamics I          ME 5990. AST: Computational Fluid Dynamics          ME 6210. Adv. Engr. Thermodynamics II          ME 5240. Advanced Heat Transfer I          ME 6240. Advanced Heat Transfer II          ME 6230. Advanced Fluid Dynamics          ME 6250. Advanced Gas Dynamics          ME 6270. Turbulence          Any approved or Advanced Special Topics course at the 5000 level or above in Thermo-Fluids-Energy areas as offered.</p>
<b>Computational Mechanics Area</b>	<p>ME 5980. Numerical Methods for Engineer          ME 5520. Computational Solid Mechanics          ME 5990. AST: Computational Fluid Dynamics          ME 6550. Multiscale Modeling          Any approved or Advanced Special Topics course at the 5000 level or above in Computational Mechanics area as offered.</p>

**NOTE: Two 3000/4000 level undergraduate courses may be applied towards the doctorate degree, if approved prior to the semester the student takes the course. Form for the approval is available [here](#).**

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## Doctoral Comprehensive Examination for the Ph.D. Degree in Mechanical Engineering

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- a. The Doctoral Comprehensive Exam is administered by the Graduate Program of the Department of Mechanical Engineering at UVM. The candidate must pass **a combined written and oral examination**.
- b. The doctoral comprehensive examination will be offered twice a year, December, or May, by the end of the second calendar week in each case, unless otherwise noted.
- c. The candidate is given a maximum of two opportunities to pass the examination.
- d. Candidates must inform the Mechanical Engineering Graduate Program Director at the beginning of the semester in which the examination may be offered.
- e. The examination subject matter must cover **four courses** at the Doctorate level that the student has taken in the prior or current semesters. A doctoral comprehensive examination committee consisting of **3 mechanical engineering graduate faculty** and **1 from outside the program** will be the examiners. A faculty member with secondary appointment in the mechanical engineering program can be considered as the outsider.
- f. The first part of the examination will be in a written closed-book format that has two 2-hour sessions. The second part of the examination is the oral portion with each examiner. The written examination must be graded before the oral examination.
- g. Following the oral examination, each examiner will directly report to the mechanical engineering graduate program director who will decide on the pass/fail status and inform the UVM Graduate College about his/her decision.