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# Mechanical Engineering Graduate Program

## Master's Degree Requirements

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**REQUIREMENT:**

**COMPLETION DATE:**

- 1) **Thesis option:** Confirm the name of your thesis advisor by the end of the first semester. Only a regular member of the UVM Graduate Faculty can serve as primary thesis advisor.

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

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

- 2) Complete following **core** courses:

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- ME 304 – Advanced Engineering Analysis I** (3 CR)
- ME 336 – Continuum Mechanics** (3 CR)

- 4) Complete **one numerical method course** (3 CR):  
One of ME218 (Numerical Methods for Engineer), ME249 (Computational Fluids Engr), ME259 (Computational Solid Mechanics), ME350 (Multiscale Modeling); or equivalent.

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- 5) Complete **two courses in the same area of specialization in mechanical engineering** from the table below (6 CR), but different from course chosen in 4). Note that the courses may have prerequisites as specified in the catalogue which must be satisfied

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**Select specialization area here:** \_\_\_\_\_

**Course 1:** \_\_\_\_\_

**Course 2:** \_\_\_\_\_

- 6) Pass the **Master's Comprehensive Examination**.  
See below guidelines regarding the Master's Comprehensive Exam.

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- 7) Complete thesis/non-thesis option requirements shown in the next page.

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- 8) Complete **30 total credits**: This will be distributed between core courses, specialization courses, elective courses and/or thesis research.

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### **THESIS OPTION REQUIREMENTS:**

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- 1) Complete **6 - 9 hours of thesis credits (ME391)** prior to the Master's thesis defense, with the expectation that:
  - To obtain **6 credits**, the student's research must culminate in an original piece of work publishable as a conference proceedings paper or a peer-reviewed journal article.
  - To obtain **9 credits**, the student's research must culminate in an original piece of work publishable as a peer-reviewed journal article.
- 2) Pass **written report and oral defense of your Master's thesis**. The Thesis Defense Committee consists of three UVM faculty members, at least two of whom must be regular members of the UVM Graduate Faculty. Ordinarily, two committee members will be from the mechanical engineering graduate program, including the thesis advisor. The third member, who acts as chair of the committee, must be a member of the Graduate Faculty and from outside the Mechanical Engineering program. The Thesis Defense committee will decide on the pass/fail status of the candidate's thesis credits.

### **NON-THESIS OPTION REQUIREMENTS:**

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- 1) Non-thesis students must complete **three additional courses in mechanical engineering at the 200 or 300 level (9 CR.) from the table of areas of specialization**.
- 2) Non-thesis students must present **a public seminar for the Mechanical Engineering Seminar Series** counting towards the Master's Comprehensive Examination shown in the next page.

## AREAS OF SPECIALIZATION IN MECHANICAL ENGINEERING:

<b>Bioengineering and Biomechanics Area</b>	ME201. Biomaterials Engineering ME206. Biomechanics of Human Motion ME207. Intro Biomedical Engineering ME208. Biomechanics: Tissue Engr. ME209. Biomechanics: Transport Proc. ME213. Systems & Synthetic Biology ME312. Adv. Bioengineering Systems Any approved course at the 200 or 300 level in Biomechanics area as offered
<b>Control Theory and Design of Mechanical Systems Area</b>	ME203. Machinery Analysis & Synthesis ME210. Control Systems (cross-listed with EE210) ME230. Astrodynamics ME234. Mechanical Vibrations ME270. Structural Dynamics (cross-listed with CE272) ME271. Micro and Nano Systems ME338. Advanced Dynamics Any approved course at the 200 or 300 level in Control Theory and Mechanical Systems area as offered
<b>Materials Engineering and Solid Mechanics Area</b>	ME201. Biomaterials Engineering ME252. Mechanical Behavior of Materials ME255. Advanced Engineering Materials ME257. Composite Materials ME259. Computational Solid Mechanics ME271. Micro and Nano Systems ME333. Stress Analysis ME350. Multiscale Modeling Any approved course at the 200 or 300 level in Materials Engineering and Solid Mechanics area as offered
<b>Thermodynamics, Fluids and Energy Area</b>	ME233. Vortex Flows ME237. Turbulence ME238. Energy Systems Engineering ME239. Rocket Propulsion ME240. Compressible Flow ME241, 342. Combustion Processes, Advanced Combustion ME242, 344. Adv. Engr. Thermodynamics I, II ME243. Incompressible Flow ME245, 345. Advanced Heat Transfer I, II ME249. Computational Fluids Engr ME343. Advanced Fluid Dynamics Any approved course at the 200 or 300 level in Thermo-Fluids-Energy area as offered
<b>Computational Mechanics Area</b>	ME218. Numerical Methods for Engineer (cross-listed with CE218) ME249. Computational Fluids Engr ME259. Computational Solid Mechanics ME350. Multiscale Modeling (cross-listed with CYS350) Any approved course at the 200 or 300 level in Computational Mechanics area as offered

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## **The Master's Comprehensive Examination for the Master's Degree in Mechanical Engineering**

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**THESIS OPTION: Candidates in this option must successfully present a proposal research seminar.**

- a) The proposal oral presentation should occur no less than 3 months prior to the oral defense of their Master's thesis.
- b) The candidate's Thesis Defense committee will decide on the pass/fail status of the proposal research seminar.
- c) The oral defense of the Master's thesis cannot serve as the Master's Comprehensive Examination.

**NON-THESIS OPTION: Candidates in this option must successfully present a public seminar for the Mechanical Engineering Seminar Series.**

- a) The examination shall consist in presenting a 25-minute public seminar (including questions) during the weekly seminar series of the Department of Mechanical Engineering. The seminar should be a comprehensive literature review on a subject matter relevant to the candidate's chosen area of specialization in mechanical engineering.
- b) The candidate must register to the one-credit ME281 or ME282 seminar course and inform the faculty organizer for the seminar series at the beginning of the semester in which he/she plans to take the examination.
- c) The director of the Mechanical Engineering graduate program will decide on the pass/fail status of the non-thesis Master's comprehensive exam. The exam will be assessed from a brief questionnaire distributed to the audience of the seminar.
- d) The candidate is given a maximum of two opportunities to pass the examination.
- e) Candidates planning on graduating in the Spring Commencement must complete the seminar examination requirement at least by May 1.