Mechanical Engineering Graduate Program
Master's Degree Requirements

REQUIREMENT:  

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.

   **Primary thesis advisor name**: ________________________

   (optional) **Co-thesis advisor name**: ________________________

2) Complete following **core** courses:

   - ME 5040 – Advanced Engineering Analysis I (3 CR)
   - ME 5160 – Continuum Mechanics (3 CR)

3) **Complete one numerical method course** (3 CR):
   One of ME 5980 (Numerical Methods for Engineer), ME 5990 (AST: Computational Fluid Dynamics), ME 5520 (Computational Solid Mechanics), ME 6550 (Multiscale Modeling); or equivalent.

4) **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

   **Specialization Course 1**: ________________________________

   **Specialization Course 2**: ________________________________

5) **Pass the Master’s Comprehensive Examination**.
   See guidelines in Page 4 regarding the Master’s Comprehensive Exam.

6) **Complete thesis option or non-thesis option requirements shown in Page 2**.

7) **Complete 30 total credits**: This will be distributed between core courses, specialization courses, elective courses and/or thesis research.
THESIS OPTION REQUIREMENTS:

1) Complete 6 - 9 hours of thesis credits (ME 6391) 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:

1) Non-thesis students must complete three additional courses in mechanical engineering at the 5000 level or above (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:

| Bioengineering and Biomechanics Area | 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. |
| Control Theory and Design of Mechanical Systems Area | 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. |
| Materials Engineering and Solid Mechanics Area | 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. |
| Thermodynamics, Fluids and Energy Area | ME 5230. Vortex Flow  
| | 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. |
| Computational Mechanics Area | 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. |

**NOTE:** One 2000/3000 level undergraduate course may be applied towards the Master’s degree (but after earning the BS degree), if approved prior to the semester the student takes the course. Form for the approval is available [here](#).
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 ME 5820 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.