Mechanical Engineering Graduate Program
Master's Degree Requirements

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. ____/____/_____

   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)

4) Complete **one numerical method course** (3 CR): ____/____/_____
   One of ME 5350 (Adv. Computational Fluid Engineering), ME 5520 (Computational Solid Mechanics), either ME 5980 or CEE 5980 (Numerical Methods for Engineer), ME 6550 (Multiscale Modeling); or equivalent.

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 ____/____/_____

   Specialization Course 1:_____

   Specialization Course 2:_____

6) Pass the **Master's Comprehensive Examination**. ____/____/_____
   See guidelines in Page 4 regarding the Master's Comprehensive Exam.

7) Complete thesis option or non-thesis option requirements shown in Page 2. ____/____/_____

8) 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 <u>and</u> 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 **<u>three</u> 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 ME 5990 AST: Orthopedic Biomechanics 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 5320. Fundamentals of Robotics 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 5120. Advanced Engineering Materials ME 5370. Micro and Nano Systems ME 5520. Computational Solid Mechanics ME 5990. AST: Advanced Biomaterials ME 6110. Mechanical Behavior of Solids 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 5220. Adv. Engr. Thermodynamics I ME 5230. Vortex Flow ME 5240. Advanced Heat Transfer I ME 5350. Adv. Computational Fluid Engineering ME 6210. Adv. Engr. Thermodynamics II ME 6230. Advanced Fluid Dynamics ME 6240. Advanced Heat Transfer II 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 5350. Adv. Computational Fluid Engineering ME 5520. Computational Solid Mechanics ME 5980 or CEE 5980. Numerical Methods for Engineer 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 3000/4000 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.

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

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 or ME 5990 Graduate 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.

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