Mechanical Engineering Graduate Program
Requirements for PhD students

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.
   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.
   ____/____/____

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 9 credits must be at the 300 level or above.**
   ____/____/____

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

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

6. Complete the **teaching requirement** by either:  ____/____/____
   A. giving 2 public seminars or conference presentations
   B. serving as a Graduate Teaching Assistant (GTA) for one semester.

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.  ____/____/____

9. **Complete a minimum of 20 hours of thesis credits (ME491)** 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.

## Areas of Specialization in Mechanical Engineering:

| Bioengineering and Biomechanics Area | ME201. Biomaterials Engineering  
ME207. Bioengineering  
ME208. Biomechanics: Tissue Engr.  
ME213. Systems & Synthetic Biology  
ME312. Adv. Bioengineering Systems  
Any approved course at the 200 or 300 level in Biomechanics area as offered |
| Control Theory and Design of Mechanical Systems Area | ME203. Machinery Analysis & Synthesis  
ME210. Control Systems (cross-listed with EE210)  
ME230. Orbital Mechanics  
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 |
| Materials Engineering and Solid Mechanics Area | 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 |
| Thermodynamics, Fluids and Energy Area | ME237. Turbulence  
ME238. Energy Systems Engineering  
ME239. Rocket Propulsion  
ME240. Compressible Flow  
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 |
| Computational Mechanics Area | 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 |
Doctoral Comprehensive Examination for the Ph.D. Degree in Mechanical Engineering

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.

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