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The department offers three graduate degree programs: Master's Degree Plan A, Master's Degree Plan B, and PhD Degree. The M.S. and Ph.D. programs require that a student concentrate in one of three areas of concentration: Materials & Manufacturing; Mechanics, Systems & Controls; and Thermal and Fluid Sciences.

**Doctoral Degree**

The Doctor of Philosophy degree is awarded only for the most distinguished scholarly achievement. The quality of a candidate's work is judged by a variety of means culminating in a set of qualifying, comprehensive, and final examinations and a dissertation. The dissertation must be a significant original contribution to knowledge in mechanical engineering. Students in the Ph.D. program are required to concentrate in one of the three areas of concentration described in Section 3. Moreover, students are required to show proficiency in a minor field which is within the compass of the three areas of concentration. Proficiency in the minor may be met by documenting satisfactory performance in course work (at least 3 credit hours at the graduate level). Requirements for doctoral students are described in the following.

**A.1. Course Requirements:** The courses that a student takes shall be selected by the student in consultation with the student's dissertation advisor. Students must satisfactorily complete a minimum of 50 credit hours in course work beyond the B.S. degree. ME 800 Dissertation Research credit hours are not counted toward the 50 credit hour requirement. The minimum GPA is the same as the M.S. degree (Section A.1 of MS Plan). The Course Requirements contribute substantially to achieving SLO 1.

**A.2. Qualifying Examination:** The purpose of this examination is to determine if a student has the potential to conduct research independently. The student must register for 4 credit hours of ME 699 Directed Research and form a Qualifying Examination Committee consisting of three members of the graduate faculty of the University of Hawaii; the chairman and at least one other committee member must be on the Mechanical Engineering (M.E.) graduate faculty. The exam consists of an oral defense of a written report of the student's research. To pass, the student must demonstrate the ability to perform independent research. This requirement must be completed prior to the end of the student's second semester of attendance. The Qualifying Examination contributes to SLOs 2 and 3 since the student must communicate effectively both orally and in writing, and to demonstrate an ability to conduct research.

**A.3. Comprehensive Examination:** Each student must pass an oral comprehensive examination. The purpose of this examination is to ascertain the student's comprehension of areas of study relevant to the dissertation topic as well as the fundamental areas of course works related to the dissertation topic. The comprehensive examination, to be administered by the student's comprehensive examination committee, may be taken only after the completion of the course work specified in Section A.1. The comprehensive examination committee will consist of at least five members of the U.H. graduate faculty and chaired by the student's dissertation advisor. Excluding the committee chair, at least half of the committee members must be the graduate faculty or cooperative graduate faculty of M.E. and at least 2 must

be in the student's major area of study. At least one member must be from a department other than M.E. This outside member must be a full member of the regular graduate faculty. The Comprehensive Examination contributes to SLOs 1, 2, and 4.

**A.4. Dissertation:** The doctoral dissertation is expected to be a scholarly presentation of an original contribution to knowledge resulting from independent research and should be suitable for publication. The Dissertation contributes to SLOs 1, 2, and 3 since the student author must demonstrate facility with techniques and methodology pertinent to the research effort, communicate effectively in writing, and accurately and clearly state the creative substance of the research effort.

**A.5. Final Examination:** Each Ph.D. candidate will be required to pass an oral final examination based primarily upon the dissertation. The examination consists of a presentation of the research effort followed by questioning from the committee members. The examination will be administered by the student's dissertation committee, which shall consist of the same members as the comprehensive examination committee unless a change of members is approved before the examination. Candidates shall pass the final examination upon the favorable recommendation of a majority of the committee. The Final Examination contributes to SLOs 1, 2, and 3 for the reasons stated in Section A.4. In addition, the ability to respond to questions demonstrates professional conduct contributing to SLO 4.

**A.6. Seminar Requirements:** This is the same Seminar Requirement of Master's Plan A (described in Section A.3 of MS Plan). The Seminar Requirements contribute to achieving SLO 2 since candidates can observe others giving presentations, and the candidate also has the option of making a presentation. By attending the seminar, candidates also gain experience interacting with presenters with their questions and dialog. This contributes to achieving SLO 4.

*Table 1. Map of PhD Requirements & SLOs*

PhD Requirements	SLO 1	SLO 2	SLO 3	SLO 4
A.1. Course Requirements	X			
A.2. Qualifying Exam.		X	X	
A.3. Comprehensive Exam.	X	X		X
A.4. Dissertation	X	X	X	
A.5. Final Examination	X	X	X	X
A.6. Seminar Requirements:		X		X