

DOCTOR OF PHILOSOPHY MATERIALS SCIENCE PROGRAM
REQUIREMENTS

Part A: Curriculum (Approved – June 2002; Revised November 2009 to be effective for new students starting January 2010)

Requirements

- A minimum of 10 classroom courses consisting of at least 28 credits. Satisfactory progress must be demonstrated, consistent with Graduate School requirements for good standing (i.e., 3.0 GPA or better). The following additional requirements and restrictions apply to these 10 courses:
 - At least one course (at least 3 credits) must be in mathematical analysis techniques or emphasizing its application (Choose from: CBE 660, NEEP/EP 547/548, Math 703 or 704, Physics 721. Others possible by petition.) The purpose of this math requirement is to ensure literacy in mathematical descriptions (typically calculus-based) of materials-relevant phenomena. Examples of where this mathematical literacy is important include transport, stress/strain, dynamic reactions, quantum properties, electron or x-ray microscopy, and electromagnetic properties. Examples of the types of mathematical language that are important to descriptions of materials phenomena include differential equations (ordinary and partial, the latter referring to multivariate models and solving boundary value problems, diffusion equations, wave equations etc.), transform theory (Fourier, Laplace), series solutions and approximations, and complex analysis.
 - At least five courses consisting of at least 14 credits must be at or above the 600 level. Students can petition for exceptions for other courses that must not be generally regarded as part of undergraduate curricula. (Examples of exceptions: NEEP 547 &

548, MSE 530, 570, & 445, CBE 540 & 544. Others possible by petition.)

- MS&E 900 may not be used to satisfy any aspect of this requirement.
 - The courses must span two or more Departments, meeting the objective of an interdisciplinary education in materials.
- Academic advisor's signature is required to remove the registration hold for each semester's registration.
- Two semesters of MS&E 900 (MSP seminar course). MS&E 900 must be taken in the first and second semester of enrollment if it does not conflict with other requirements.
- Within the first year, each student must select and declare to the MSP office three core courses that are fundamental to their research specialization. These courses must be approved by the student's MSP advisor. In the RRE exam, the student will be examined orally on these subjects in addition to questions on their research presentation.

Relevant Information

- A maximum of two courses or six credits can be satisfied by transfer procedures for graduate courses taken while enrolled as a graduate student at another academic institution.
- Consistent with Graduate School requirements, students must have an academic advisor who advises them in course selection. Typically, the research mentor(s) (or "major professor(s)") will also serve as the academic advisor(s). The academic advisor's signature approving the semester course plan must be on file in the MSP office in order to remove the registration hold for each semester's registration. The

MSP Director or his/her appointee will serve as academic advisor for new students who have not yet selected a research mentor.

- Academic advisor's signature is required to remove the registration hold for each semester's registration.
- A petition process will be available for special exceptions
- A standing committee will be appointed and maintained by the Program Director for the purpose of evaluating petitions.

Part B: Research Requirements (Approved, June 2002)

Requirements:

- Satisfactory performance in the Research Readiness Exam (RRE)
- Preparation and approval of the Ph.D. Thesis Proposal
- Completion of original research project at a level appropriate for the Ph.D. degree
- Completion of a Ph.D. thesis using the guidelines set forth by the UW graduate school
- Successful defense of the thesis to the student's Ph.D. Thesis Committee
- Public seminar on the thesis research

Research Report and Research Readiness Exam (RRE)

- A written report describing the student's research must be submitted to the student's MS/RRE Committee for evaluation. This report is to be written by the student in consultation with his/her thesis advisor(s) in a format that is acceptable to the advisor(s) and the MS/RRE committee. Possible formats include a formal Masters Thesis (if

being counted for MS degree requirements), a completed publication, and a completed progress report, among others.

- The student will make an oral presentation summarizing the research procedures, results, related literature, and significance of the research. The RRE Committee will evaluate the abilities of the student. Discussions will be directly about the research presented, and will probe the student's understanding of relevant related concepts. In particular, the student will be examined in the three core areas (declared by the student) as fundamental to this research. The Committee must determine whether the student is ready to pursue Ph.D. level research and the Ph.D. degree based on the written report, graduate course grades to date, and this Exam.
- The student is responsible for scheduling this presentation and evaluation, confirming that all RRE Committee members can attend, and reporting the date and Committee members' names in advance to the Materials Science Program Office. The date and time of the presentation will be announced to members of the Materials Science Program. It is intended that this examination normally take place before the end of the fourth regular semester of study (not including summer sessions).
- Committee members may decline to participate in a scheduled Research Readiness Exam if they have not received the final draft of the written report at least two weeks prior to the scheduled event or if the student's major professor(s) have not approved it.
- *RRE Committee constitution:* This Committee consists of at least five faculty members including their major professor(s). At least four of the members must be members of the Materials Science Advisory Committee (MSAC). Committee members must have appointments spanning at least two different academic departments. The student may wish to invite additional faculty with relevant expertise who are not members of the MSAC. The student must confirm that each

Committee member is willing to serve and report the makeup of the Committee to the Program office by the end of the third semester of study.

- The UW Graduate School requires passing a “prelim exam” as a requirement for a PhD. In the MSP, successful completion of the Research Readiness Exam and successful completion of a Thesis Proposal are equivalent to passing the Preliminary Exam required by the Graduate School. After passing these two MSP exams and completion of coursework, the MSP student reaches dissertator status. The student is responsible for obtaining the exam signature form, and may consult the Program Office for assistance.
- The Research Readiness Exam and Research Project Report may serve in lieu of the MS oral evaluation and MS Project Report, respectively, for students seeking an MS degree from the Materials Science Program. Committee members will decide whether the Report and Exam performance are sufficient for an M.S. degree pass, even if they have not demonstrated Ph.D.-level research readiness.

Ph.D. Thesis Committee

- Immediately after successfully passing the Research Readiness Exam, Ph.D. students should form their Ph.D. Thesis Committee, in consultation with their major professor(s). This Committee consists of at least five faculty members including their major professor(s). At least four of the members must be members of the Materials Science Advisory Committee (MSAC). Committee members must have appointments spanning at least two different academic departments. The make-up of the Ph.D. Thesis Committee must be on file in the Materials Science Program Office by the end of the first regular semester after successful completion of the Research Readiness Exam.

Thesis Proposal

- Students who have passed the Research Readiness Exam and assessment prepare a written thesis proposal and make an oral presentation of this proposal to all members of the Ph.D. Thesis Committee. The Ph.D. Thesis Proposal must be concise. A suggested model is similar to NSF grant proposal format (no more than 15 pages, including figures and equations, but not references or title page). In some cases, several iterations of the written thesis proposal may be required before all Thesis Committee members judge the Thesis Proposal to be satisfactory.
- The Thesis Committee must approve the Thesis Proposal and approval must be reported to the Program Office before the student can apply for Dissertator Status. Formal approval will require the signature of every member of the Thesis Committee. Students may apply for Dissertator status any time after this approval is reported to the Program Office and all coursework requirements are satisfied.

Ph.D. Thesis (completion of a Ph.D. thesis using the guidelines set forth by the UW graduate school)

- Under the guidance of (a) thesis and academic advisor(s), the student must complete original research and prepare a Ph.D. thesis. The guidelines set forth by the UW graduate school for the student-advisor relationship, the conduct of thesis research, and the preparation of the thesis must be followed.

Ph.D. Thesis Oral Defense

- Ph.D. candidates must defend the Ph.D. thesis orally to their Ph.D. Thesis Committee. All members of the Ph.D. Thesis Committee

should be present at the Thesis Defense. Committee members may decline to participate in a Ph.D. Thesis Defense if they have not received the final draft of the thesis at least two weeks before the scheduled defense or if it has not been approved by the student's major professor(s). The student is responsible for scheduling the Thesis Defense, informing the MSP Office, and obtaining all the appropriate signature forms.

Public Seminar

- Students must present the work accepted by the Ph.D. Thesis Committee in a public seminar prior to graduation. The date and time of the presentation will be announced to members of the Materials Science Program.