

Guidelines

for

Graduate Students

in

Materials Science

Guidelines for Graduate Students in Materials Science

Materials science includes the principles and practice of designing, synthesizing, characterizing, preparing, and fabricating useful materials. The Materials Science Program accepts qualified bachelors and masters graduates in the sciences and engineering who wish to pursue graduate research for a PhD in the area where the disciplines overlap. Materials science is an interdisciplinary program and this feature is emphasized in our research activities.

The Materials Science Program at Washington State University is a joint academic inter-college program between the College of Sciences and the College of Engineering & Architecture.

A. Introduction

This document has been prepared to assist graduate students who are studying for graduate degrees in the interdisciplinary Materials Science Program (MSP). These guidelines enumerate the policies and procedures used by the Program relative to graduate student admissions, appointments, and programs, and include other general information for student guidance.

Except for emphasis, the information contained in the *WSU Graduate School Policies and Procedures* bulletin are not repeated herein. Those policies are university-wide policies upon which this document expands. All graduate programs in materials science must meet

all requirements delineated in these Guidelines as well as all requirements of the Graduate School. Students are expected to read and understand the *Graduate Bulletin* and the *Graduate School Policies and Procedures*. Questions should be discussed with the Program chair.

Graduate work, including both classroom and research endeavors, is a cooperative venture between faculty and students. Faculty are expected to guide and assist students in gaining knowledge, experience, and ability. However, the quality of education, particularly at the graduate level, is primarily dependent upon a student's individual efforts. Students are encouraged to make suggestions and to contribute to the development of courses, programs, and research areas.

B. Admission

The Program Coordinator corresponds with interested applicants and collects applications, transcripts, and letters of recommendation. When the file is complete and a Departmental Recommendation Memo has been received from the Graduate School, the file is given to the Program chair for a decision on admittance and potential recommendation for financial assistance.

Admission to the MSP requires a minimum grade point average of 3.0 (on a 4.0 scale). A Master of Science degree is not a prerequisite for application to the program.

Admission of applicants from foreign universities will be based on

consideration of the School's grading system, evaluation of the Graduate Admission forms, and letters of recommendation.

C. Undergraduate Deficiencies

Because of the interdisciplinary nature of materials science, students entering the MSP may have a wide range of backgrounds. Students with BS or MS degrees in Chemistry, Physics, or Materials Science and Engineering, will normally meet the course prerequisites. Students with degrees in other fields of engineering and the physical sciences should discuss with the Program chair what, if any, undergraduate prerequisites will be required.

D. Appointments

In order to be considered for an appointment (Research Assistant or Teaching Assistant) for the fall semester, all application materials must be received by

- March 1 (Applicants from PRC)
- April 1 (Applicants from outside US)
- May 1 (Applicants within US and Canada).

For spring semester, all application materials must be received by

- July 1 (Applicants from PRC)
- August 1 (Applicants from outside US)
- September 1 (Applicants within US and Canada).

The following will be considered in selecting those for appointment: GPA, area(s) of interest, research experience, TOEFL scores, and quality of previous graduate work. Decisions on support of students from specific funded research projects are the responsibility of the faculty member who is the Principal Investigator of the project.

Appointments are made for one or two semesters during the academic year. If the coursework, research progress, and assigned responsibilities have been performed satisfactorily, students may normally expect reappointment during the following academic year until their degree program is completed. There is no guarantee of summer financial support. Students should talk to their faculty advisor or the Program chair if they have concerns about financial support for the summer.

E. Selecting a Research Topic and Advisor

All students must have a Faculty Advisor. The student and advisor shall select a minimum of two additional Graduate Faculty within their first semester in the MSP to serve as the student's Advisory Committee.

The program of study shall be approved by the advisory committee and the Program chair. The program of study shall then be submitted to the Graduate School prior to the start of the second semester of the student's enrollment.

F. Program Requirements

A PhD program must contain 72 hours of credit beyond the bachelor degree including graded coursework and thesis research. The program must contain:

1. A minimum of 34 hours of graded coursework, including:

Core Courses (16 credit hours)

- (a). MatS 505 *Advanced Materials Science* (4)
- (b). MatS 571 *Microscopic Analysis of Surfaces* (3)

(c). A graduate *Thermodynamics* course (one of Phys 533, MSE 514, Chem 531, Phys 534, Chem 534, ME 526) (3)

(d). Phys 563 or Phys 463 *Solid State Physics* (3)

(e). Math 540 *Applied Mathematics* (3)

Additional Courses (18 credit hours)

Additional courses selected by the student in consultation with their faculty advisor and advisory committee. Any 400-500 level courses in engineering, mathematics, and the physical sciences are usually acceptable unless they have been used for credit in the undergraduate program.

2. The program of study must also include:

(a). MatS 593 Seminar in Materials Science (1). Minimum 6 credit hours. (See G below.)

(b). A minimum of 20 credits of MatS 800 (thesis research).

3. Additional conditions:

(a). No more than 6 hours may be 400-level courses.

(b). Course selection should also satisfy the *Graduate School Policies and Procedures*.

G. Seminar

Students entering the MSP with a masters degree can apply seminar credits taken during that time to the those required by the PhD program. Usually a maximum of 3 hours of seminar can be transferred.

H. Preliminary Examination

The intent of this examination is to assess the research ability of the student and whether they demonstrate the capabilities to complete the research requirements of a doctoral program. The preliminary examination should be

scheduled by the fall of their third year. Any deviation from this policy must be pre-approved by petition to the MSP Graduate Studies Committee.

The examination shall consist of a written component and an oral component. The written portion shall be a report describing the research progress that has been made by the student since entering the graduate program. This report will include a literature review, details of the experimental or computational facilities that have been used, a description of the experiments or studies that have been performed and the results from this work, and a detailed plan for the proposed future research. For general guidelines on an acceptable style of the report follow those used by the NSF in its Grant Proposal Guide. The student's advisor or the Program chair can provide additional details. The final report shall be submitted to the student's research advisor and advisory committee and the Program chair at least one month prior to the proposed date of the oral examination.

In order to schedule the oral part of the Prelim:

1. The student's program of study must be on file.
2. The student must obtain a Request to Take a Prelim form from the Graduate School.
3. The form must be signed by the student's committee, the Program chair, and by a representative of either the College of Sciences or the College of Engineering and Architecture.
4. After the form is returned to the Graduate School, they (the Graduate School) will schedule

the Prelim no sooner than 10 working days from that time.

The student's advisor and advisory committee will conduct the oral examination. A member of the graduate faculty selected by the Graduate School will also be present. The oral exam will seek to determine whether the student is making satisfactory performance in their research, whether they are able to apply knowledge obtained in the classroom to their research, and whether their plan for future research meets the requirements for that of a PhD. The oral examination will have duration of approximately 2 hours.

A passing or failing grade on the oral examination will be the decision of the student's research advisor and advisory committee. The student may be permitted to retake the oral examination if the first attempt is not successful. Failure on the second examination eliminates candidacy.

I. Forms

All forms are found on the Graduate School's website. Whenever possible, all forms should be taken to the Principal Assistant of the Materials Science Program for review prior to the Chair's signature. All forms will be reviewed for adherence to the MSP guidelines, core course requirements, and transfer credit approvals.

J. Dissertation and Final Examination

The student's doctoral committee is responsible for guiding the student through the research and dissertation and will follow existing Graduate School procedures.

The scheduling for the dissertation defense requires that the student submit the dissertation to their faculty advisor for review and initial confirmation that the dissertation is in good shape. The research advisor will sign the Final Examination Scheduling form only when the dissertation is in a final and acceptable format. A copy of the dissertation and the scheduling form will then be submitted to the members of the student's advisory committee and the Program chair for approval at least one month before the defense date. The Program chair will only sign those schedule forms that have been signed by all members of a student's committee.

While in residence, it is expected that each PhD student will present the results of their doctoral research to the faculty and graduate students. This will usually be done during the MatS593 seminar.

Two copies of the final dissertation must be given to the Program chair. The Program will pay for binding of the copies. One copy will be filed in the MSP office and the other copy will be given to the student's advisor.

Summary of Procedures

<i>Procedure</i>	<i>Under the Direction of</i>	<i>Date</i>
Obtaining a faculty advisor	Check with Program chair	As soon as possible after admission to Graduate School but no later than the beginning of the second semester.
Submission of proposed program of study	Program chair, faculty advisor, and advisory committee	End of first year of graduate work
Approval of program of study and doctoral committee	Associate Dean of the Graduate School	A copy of the approved program is sent to the Program, faculty advisor, and student
Scheduling of Preliminary Examination	Program chair and Dean of the Graduate School	By fall of 3 rd year.
Application for degree	Associate Dean of the Graduate School	Check with Graduate School for deadlines
Payment of Graduation Fee	Controller (Cashier's Office, French Administration building)	Before date of final examination
Payment of microfilming fee	Controller (Cashier's Office)	Before date of final examination
Scheduling of final examination	Associate Dean of the Graduate School	Check with Graduate School for deadlines
Defense	Doctoral committee, Graduate Faculty, Associate Dean of the Graduate School, Program chair.	Check with Graduate School for deadlines
Final acceptance of archival manuscript and one copy of approved thesis	Graduate School	Check with Graduate School for deadlines

Curriculum

CORE: (16 credits)

MatS 505 Advanced Materials Science. (4)

Mats571 Microscopic Analysis of Surfaces. (3)

A graduate Thermodynamics course (one of Phys 533, MSE 514, Chem 531, Phys 534, Chem 534, ME 526/527) (3)

Phys 563 or Phys 463 Solid State Physics; Chem 480 Solid State Chemistry. (3)

A graduate math course (Math 540 Applied Mathematics or Phys 571) (3)

ADDITIONAL COURSES: (minimum of 18 credits)

Additional courses are selected by the student in consultation with their research advisor and thesis committee. Any 400-500 level courses in engineering, mathematics, and the physical sciences are usually acceptable unless they have been used for credit in the undergraduate program. Whenever a course is cross-listed with a Mat S course, students should sign up for the Mat S course. Suggested courses include, but are not limited to

Chem 501 Advanced Inorganic Chemistry (3)

Chem 532 Advanced Physical Chemistry (3)

Chem 536 Quantum Chemistry (3)

Mat S 506 Biomaterials (3)

Mat S 516 Phase Transformations (3)

Mat S 521 Statistics of Microstructures (3)

ME 530 Solid Mechanics (3)

ME 537 Fracture Mechanics and Mechanisms (4)

MSE 515 Electronic Properties of Materials (3)

Phys 561 Atomic and Molecular Physics (3)

Phys 575 Advanced Solid State Physics (3)

SEMINAR:

MatS 593 Seminar in Materials Science (1). May be repeated for credit. Minimum 6 credit hours required.

RESEARCH CREDITS:

At least 20 credits of MatS 800.

OTHER REQUIREMENTS:

The program must include enough 500-level courses to satisfy the Graduate School.

Materials Science Program Faculty and Staff

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