

Materials Science and Engineering Doctoral Program
Graduate Student Handbook
Version 4.2: 03/11/2024

I. Introduction

This handbook describes the policies and procedures for the Materials Science and Engineering doctoral program (<https://mse.nd.edu/>) at the University of Notre Dame. In this interdisciplinary program, graduate students are also expected to adhere to the handbook for their home department or program:

- [Department of Aerospace & Mechanical Engineering Graduate Studies Handbook](#)
- [Bioengineering Graduate Program](#)
- [Department of Chemistry and Biochemistry Guide to Graduate Studies](#)
- [Department of Chemical and Biomolecular Engineering Guide to Graduate Studies](#)
- [Department of Civil & Environmental Engineering and Earth Sciences Graduate Handbook](#)
- [Electrical Engineering Department Graduate Studies Handbook](#)
- [Department of Physics and Astronomy Guide for Graduate Students](#)

The Graduate School policies regarding degree progress and requirements to maintain eligibility for financial support and health care subsidies are contained in the [Du Lac, the University's student policy and procedure manual](#), and the Graduate and Professional Student Handbook. Nothing herein is to be interpreted as contrary to the regulations of the Graduate School.

This handbook provides the official policies of the degree program. Any deviation from these policies requires the written approval from the program Steering Committee which will then document the exception in the student's permanent file. Deviations will be considered on a case-by-case basis; an exception in a particular case will not imply a change in policy.

For questions regarding the graduate program please contact Derek Lake, NDnano Associate Director, 206 Cushing Hall, email: dlake@nd.edu, or the program director, Professor Alan Seabaugh 230A Fitzpatrick Hall, aseabaug@nd.edu.

II. Basic Responsibilities Of Students

Registration & Enrollment

A graduate student must meet the home department or program requirements to be full time as explained in the home department's graduate studies guide. This includes registration and enrollment, both responsibilities of the student.

Satisfactory Degree Progress

Students must be making satisfactory progress toward their degree and remain in good standing in accordance with their home department's policies. This includes but is not limited to completion of qualifying exams, successful candidacy exam review, dissertation completion and defense, etc. The exact degree milestones will be detailed in the home department graduate studies guide.

Grades

The most readily used means for assessment of the student's academic progress is through grades assigned in course work. The Graduate School grading system is on a four-point basis. Grades recorded for graduate courses are: A (4.0), A- (3.667), B+ (3.333), B (3.0), B- (2.667), C+ (2.333) and C (2.0). Students must meet the minimum GPA requirements for their home department. In the Materials Science and Engineering required courses, each student must receive a B or higher in each course for the course to count towards the Materials Science and Engineering degree requirements.

Teaching and Research Responsibilities

Most graduate students are supported by research grants and contracts. Each student is responsible for meeting the requirements of his/her research position, which should be considered a full-time position. Students should be on campus and meet with their research supervisor regularly.

Most departments in the Colleges of Engineering and Science require their graduate students to assist with teaching. The director of graduate studies in the student's home department or program may assign teaching assistant duties according to the policies of the department.

Holidays and Time-off

The policies for holidays and time-off for the home department or program should be followed.

Office and Laboratory Facilities

Each home department supports office space and individual research laboratories. Students are responsible for acquainting themselves with and following the proper safety procedures for the laboratories they use. Because the offices and laboratories are diverse in their purposes, procedures, and equipment, specific safety procedures are not listed here. However, all users of these offices and laboratories are to observe the following general safety and security procedures:

1. A student may be issued keys or electronic access to university buildings. Keys may not be traded among, loaned to, or passed on to other students and must be returned as soon as the need for regular access has passed.
2. Laboratory users share in maintaining its security and cleanliness. Laboratory doors are not to be propped open or left unlocked when the laboratory is unattended, and must be locked at the end of the working day.
3. Unauthorized users are not allowed into a laboratory.
4. Guests may be invited into a laboratory, but may not be left unsupervised. The home department is responsible for the guests' safety.

Safety

Office facilities and laboratory spaces have an integrated safety plan. Each student should be familiar with it, and each advisor or his/her designee should instruct students in laboratory safety. Each student should bring to the attention of the laboratory supervisor or advisor any unsafe laboratory situations they encounter. If a student does not feel that a concern has been adequately addressed, that student should contact the program director. The following general rules apply to all laboratories:

1. Students must complete assigned training through [Risk Management and Safety](#) before working in laboratory facilities.
2. Each student using a laboratory must be acquainted with all the particular safety procedures and safety equipment in the laboratory. These include the locations of emergency controls and the locations and use of all safety equipment and first aid supplies.
3. Students should contact their advisor or other laboratory management if they see an unsafe situation, or feel the need for additional or different personal protective equipment.
4. Graduate students who supervise undergraduate laboratories assume primary responsibility for safety procedures. If additional safety supplies (such as hard hats or safety glasses) are required, the course instructor should be notified.
5. Any graduate student developing a new experiment or acquiring new equipment will also be responsible for developing and recording the proper safety procedures associated with the new equipment.
6. Observed inadequacy of laboratory safety procedures or equipment must be reported immediately to a faculty member so that the situation may be corrected.
7. Violations of safety procedures or the creation of unsafe or unhealthy conditions must be reported to the responsible faculty. Failure to work safely or to maintain orderly, professional working environments will result in the forfeiture of all office or laboratory privileges.

In addition to the safety policies outlined here, students should review and understand the home department's safety policies.

Leaves or Study at Other Sites

Students should review their home department policies around leaves and study at other sites.

III. Program Structure

The Materials Science and Engineering doctoral program is administered by Notre Dame Nanoscience and Technology (NDnano) and is housed across participating departments and programs in the Colleges of Engineering and Science. The program is a Ph.D. program, and the Graduate School does not grant an M.S. degree in Materials Science and Engineering.

Administration

All policymaking and administrative authority in the Materials Science and Engineering doctoral program resides with the Steering Committee and the program director. Any policy question or administrative matter should be referred in writing to the Steering Committee via Heidi Deethardt, 206 Cushing Hall,

MSE-list@nd.edu. Matters that cannot be resolved satisfactorily can be appealed to the Graduate School, via the Dean of the Graduate School. The program director is Professor Alan Seabaugh, 230A Fitzpatrick Hall, aseabaug@nd.edu.

Home Department or Program

Each student in the program will belong to a home department or program. The home department or program is the department or program to which the student was admitted. The home department or program in conjunction with the advisor will provide office and laboratory facilities for the student. The student is required to fulfill any teaching assistant, service, and professional development requirements as other Ph.D. students in the home department or program. When considering Materials Science and Engineering courses, the home department for Bioengineering students will be the same home department for the student as defined by the Bioengineering program. (See [Bioengineering Studies Handbook](#) Section III part B. *“Each student in the program is assigned to a home department. The home department is the department where the student’s faculty advisor has their primary appointment.”*)

Financial Support

Most full-time students receive a stipend. Funds for these stipends typically come from externally funded grants and contracts of the student's advisor. One-year Materials Science and Engineering Fellowships are available and awarded annually by the Executive Committee.

Materials Science and Engineering Fellowships

Materials Science and Engineering Fellowships will be awarded each year by the Executive Committee. The Fellowship is for one-year and is non-renewable. The application process is joint between the student and the student’s advisor. The following items are required when applying for a fellowship: 1) A two-page research proposal written by the faculty advisor, 2) a one-page statement of interest from the student, 3) the student’s curriculum vitae, and 4) a letter of support from the faculty advisor. Faculty interested in submitting a fellowship proposal on behalf of a student should contact Derek Lake, NDnano Associate Director, for full details on the fellowship proposal process. The Materials Science and Engineering Fellowships will typically be used in the student’s second or third years of study. MSE students that are awarded a fellowship are required to have an interdisciplinary mentor that crosses disciplines and is encouraged to be from outside the department or program. Faculty from outside of Notre Dame can also serve as an interdisciplinary mentor, as long as the student's home department allows that. Each student may only be awarded the Materials Science and Engineering Fellowship one time. A student does not have to be awarded a Materials Science and Engineering fellowship to participate in the Materials Science and Engineering graduate program.

IV. Advising

One of the most important matters for graduate students is the choice of a faculty advisor. This choice can have a great effect on the student’s time in graduate school and long-term career path. Students in this program should follow their home department or program policies to select a graduate research advisor.

Interdisciplinary Mentor: Faculty in the program are requested to designate a mentor who will provide expertise and/or resources that enhance the interdisciplinary nature of the MSE research. The mentor does not direct the student's project. Research direction is still provided by the student's advisor. The level of interaction with the mentor is decided by the advisor and student in consultation with the interdisciplinary mentor. The aim is to provide the student an interdisciplinary perspective to benefit the aims of the MSE research. The interdisciplinary mentor can change during the student's research and studies. There is no restriction on the number of mentors.

Faculty from outside of Notre Dame can also serve as an interdisciplinary mentor, as long as the student's home department allows that.

Interdisciplinary Mentors working with fellowship students are expected to write collaborative proposals with the primary advisor and serve on the student's candidacy and dissertation committees. It is preferred that the Interdisciplinary Mentor be from a different department than the primary advisor.

Examination Committee

Each student should follow the home department or program guidelines for the selection of his/her examination committee. For students that have received a fellowship, the student's interdisciplinary mentor is expected to be part of the examination committee, which includes both the candidacy and defense examinations. For non-fellowship students, the student's interdisciplinary mentor can be part of the committee, but it is not required.

Professional Development and Career Planning

The Graduate Career Center resources are focused on graduate student success – helping each student to be the best prepared in order to obtain strong career outcomes after his/her time at Notre Dame. All Materials Science and Engineering students should meet any requirements with respect to the Graduate Career Center as stated in the home department's or program's policies. The Center is located in the Graduate School, 110 Bond Hall, and online at <http://gradcareers.nd.edu/>.

V. Program Requirements

Admission

Students can be admitted to the Materials Science and Engineering Program in one of two ways.

Incoming Students:

When applying to Notre Dame, incoming PhD students can select the Materials Science and Engineering degree that corresponds to the admitting department/program:

- Aerospace and Mechanical Engineering: Materials Science and Engineering - PhD
- Biochemistry: Materials Science and Engineering - PhD
- Bioengineering: Materials Science and Engineering - PhD
- Chemical Engineering: Materials Science and Engineering - PhD
- Chemistry: Materials Science and Engineering - PhD

- Civil and Environmental Engineering and Earth Sciences: Materials Science and Engineering - PhD
- Electrical Engineering: Materials Science and Engineering - PhD
- Physics: Materials Science & Engineering - PhD

Students will follow the admitting department's/program's existing process and timeline for recruiting and admissions. Each student will be asked to submit a one-page, advisor-approved overview of his or her research for review by the Materials Science and Engineering Steering Committee. The template for this research overview can be found in [Appendix E](#).

Current PhD Student Transfers

With the support of their faculty advisor, current Notre Dame graduate students already pursuing a PhD degree in a participating department/program can transfer into the Materials Science and Engineering program (generally sometime in the first three years of their doctoral studies). Students considering a transfer should follow these steps:

- Review the program details, including the expectations for your thesis research and the courses needed to earn the Materials Science and Engineering degree.
- Discuss the opportunity to earn the Materials Science and Engineering PhD with your research advisor(s). (If you don't have a research advisor yet, discuss with your department's Director of Graduate Studies (DGS)). In this discussion, make sure that you and your advisor(s) are in agreement on how your thesis could or does meet the requirements of the Materials Science and Engineering degree. Also ensure that you'll be able to complete the courses required for the degree in your remaining time at Notre Dame.
- If you and your advisor(s) are in agreement about your joining the Materials Science and Engineering PhD program, email MSE-list@nd.edu to let the program staff know of your interest to pursue the degree.
- Submit a one-page, advisor-approved overview of your research for review/decision by the Materials Science and Engineering [Steering Committee](#). The Steering Committee meets approximately quarterly for this purpose. The research overview template can be found in [Appendix E](#).
- Once your research is approved by the Steering Committee, the program staff will work with your home department and the Graduate School to ensure your transfer into the program.

Course Requirements

Materials Science and Engineering students reside in a home department or program and are expected to meet the course requirements of the home department or program. Under the guidance of the faculty advisor in the host department, from a designated set of Materials Science and Engineering graduate courses ([MSE Graduate Courses](#)). Two of the three courses must be outside the student's home

department, and only one of those can be cross-listed within the student's home department. Cross-listed means that a course has a course number from two different departments. This cross-listing applies to the semester the course was taken, regardless of whether the course was cross-listed before or after the student completed it. The course catalog is the final reference as to the cross-listing of a course, regardless of what is printed on the MSE website or student handbook.

Each academic department or program determines whether these credits are electives or additional courses. (*MSE is the attribute to identify Materials Science and Engineering Courses in the Notre Dame course catalog.*)

Materials Science and Engineering students typically complete the required Materials Science and Engineering course requirements from the approved course list. Deviations from the approved course list must be approved by the Academic Committee. These requests should be submitted to the MS&E administrative staff at MSE-list@nd.edu. Generally, transfer credit is not accepted in the Materials Science & Engineering doctoral program. This is because it is contrary to the program aims to provide interdisciplinary training, and to have this additional experience earned at Notre Dame.

The Academic Committee will make decisions on the addition or removal of courses on the list of approved Materials Science and Engineering graduate courses. Students and faculty members may petition the Academic Committee to have courses added. The request should be submitted to the MS&E administrative staff at MSE-list@nd.edu. The request will then be sent to the chair of the Academic Committee for consideration.

Degree Program

The Materials Science and Engineering graduate student must meet the requirements of that student's home department or program. In addition, this student must have a doctoral thesis that has a significant materials component as determined by the Materials Science and Engineering Steering Committee. If a thesis is not approved by the Steering Committee and the difference cannot be successfully resolved,

then the decision can be appealed to the Executive Committee for review. The appeals can be made in writing to the committee via Heidi Deethardt, 206 Cushing Hall, MSE-list@nd.edu.

Research Approval

All students entering the program, either through direct admission or transfer, must have their research approved. Research approval occurs either through submission of the one-page research overview to the Steering Committee or through the Fellowship process. Students must have their research approved within their first three years of study. It is expected that the research overview will be approved prior to the student going for their Oral Candidacy Exam (OCE). Students that go for the OCE within their first three years and do not have their research overview approved must submit the research overview along with the OCE materials to the committee at the same time for consideration.

Research Approval Via the Fellowship Process

The [fellowship proposal process](#) requires the advisor and interdisciplinary mentor to submit proposed research for the student. If the advisor, interdisciplinary mentor, and student are awarded the fellowship, then the student's research is approved. No further research review by the Steering Committee is required.

Research Approval Via the Steering Committee Process

All students that have not been awarded a fellowship need to have their research approved by the Steering Committee. Once the student has selected an advisor, the student and advisor have agreed on a research project, and an [interdisciplinary mentor has been selected](#), then the student should submit a one-page research overview for consideration and approval by the Steering Committee. Typically, this research overview is submitted within the student's first three years of study. The research overview template can be found [here](#). The completed research overview should be emailed to the Materials Science and Engineering administrative staff at MSE-list@nd.edu.

The research overview must describe how the research fits within materials science and engineering. Materials science and engineering is most broadly concerned with understanding how the history of a material (e.g., processing, environment or use) influences its structure and composition, and thus its properties and performance. The understanding of processing-structure-property relationships is called the materials paradigm and central to materials research [1].

Qualifying Exam

Students will follow the qualifying exams policy guidelines as set out in the home department or program policies.

The Candidacy Examination

Students will follow the candidacy examination policy guidelines as set out in the home department or program policies. Each student will share a copy of the candidacy proposal with the Steering Committee

[1] W.D. Callister and D.G. Rethwisch, Materials Science and Engineering: An Introduction, 10th Edition, Wiley, 2020.

when it is sent to the candidacy review committee. The candidacy materials should have the [template cover page](#) and a completed [student candidacy statement](#). Links to both of those templates are below.

- [Candidacy Materials Cover Page Template](#)
- [Student Candidacy Materials Statement Template](#)

A copy of the candidacy proposal should be emailed to the MSE staff at MSE-list@nd.edu. The candidacy proposal will be reviewed to make sure it still has a materials focus and aligns with the student's research upon entering the program. If the OCE is in the student's first three years, and the student has yet to complete the research overview, then the research overview must be submitted at the same time as the student's OCE materials.

The Dissertation and Defense

Students will follow the dissertation and defense policy guidelines as set out in the home department or program policies. Each student will share a copy of the dissertation with the Steering Committee when it is sent to the committee in preparation for defense. The dissertation submission to the MSE Steering Committee should also include the completed dissertation statement. A link for the dissertation statement template is below. Also below is a link to the dissertation cover page template.

- [Dissertation Statement Template](#)
- [Dissertation Cover Page Template](#)

The dissertation can be emailed to the MSE staff at MSE-list@nd.edu. The dissertation will be reviewed to make sure it still has a materials focus and aligns with the student's research upon entering the program.

VI. FACILITIES AND SERVICES

A. Library

The University Library system consists of a number of libraries. Circulation policies and operating hours are available at each of the libraries. Students should make themselves aware of the resources the libraries provide and become more familiar with them by visiting the University library website, <http://library.nd.edu/>.

B. Computing Facilities

The Office of Information Technologies (OIT) oversees an extensive variety of computers, workstation clusters, and personal computer facilities throughout campus. The University has a wide range of software and printing services available for use by all students. For a complete current listing of University facilities, students should visit <http://oit.nd.edu>.

The Center for Research Computing (CRC) at University of Notre Dame is an innovative and multidisciplinary research environment that supports collaboration to facilitate multidisciplinary discoveries through advanced computation, software engineering, data analysis, and other digital research tools. The CRC is composed of four main groups with complementary expertise: computational scientists, software development, Center for Social Science Research, and high performance computing. For more information on the CRC visit <https://crc.nd.edu/>.

C. Laboratory Facilities

Students may work in a wide variety of laboratories across the University campus. These may be laboratories specific to the student's research group, or shared facilities that are supported by user fees.

D. Office Facilities

All full-time graduate students have access to personal office space. Offices are typically shared with other students. Each student will also have a mailbox located in or near the main administrative office in the building to which the student has been assigned. Students are expected to maintain professional office environments, to maintain a neat office, and to be respectful and courteous to their office mates and others in their office environment.

E. Copying Facilities

There are many copying facilities on campus, with services available at a charge. Many small machines are located in Hesburgh Library, branch libraries and home departments. Students should check with the administrative staff or their advisor to learn about local resources.

F. Student Government Service

Graduate students are responsible for the activities of the Graduate Student Government (GSG). Through a council of elected officers, appointed officers, and representatives from the departments of its constituent colleges, the GSG provides a variety of services and represents its membership on various University councils and committees. It publishes the bimonthly GSG newsletter, conducts a graduate orientation program, and sponsors workshops, travel grants, and various social and cultural activities. The GSG is the graduate students' official liaison with University administration, the Office of Student Activities, and the Library Administration. The GSG finances operations through a yearly fee assessed on all graduate students. The GSG maintains offices in W206A Duncan Student Center, 631-6963; their website is: <https://gsg.nd.edu/>.

G. Health and Counseling

There are additional services available to graduate students, described in the Bulletin of Information or on the web at: <http://graduateschool.nd.edu/resources-for-current-students/>.

University Health Services, located in the University Health Center, 631-7497, provides immediate, follow-up, and ongoing health care. The services provided include outpatient clinics, dispensing medication, administering allergy injections, laboratory and x-ray facilities, and a 25 bed inpatient unit. Health insurance is required of all international and full-time students. The University offers a plan for all students. A student's spouse and children have the option of purchasing health insurance through this plan. More information can be obtained by calling 631-6114. The University Counseling Center, located in the University Health Center, 631-7336, offers professional services to all graduate students and their families.

The University Counseling Center is available to assist students in meeting the challenges that are an integral part of their Notre Dame experience. Their professional staff of licensed psychologists, social

workers, psychiatric providers, and masters-level psychologists-in-training are highly skilled in helping students address the difficulties they may encounter, and empowering them to make the most of the opportunities available to them at Notre Dame. The University Counseling Center specializes in treating the mental health concerns that are prevalent in a diverse university student body. The University Counseling Center is located in the University Health Center and can be reached at 631-7336. More information can be found by visiting <https://ucc.nd.edu/>. All services are free of charge and confidential.

The University has excellent athletic and exercise facilities; most are available free of charge. More information can be found at <https://recsports.nd.edu/>.

H. Career and Placement

The University's Graduate Career Services provides assistance with post-graduate placement and professional development through online services and the guidance of its graduate career consultants.

I. International and Religious Services

The International Student and Scholar Affairs office, in 105 Main Building, supports our F-1 and J-1 students on immigration and visa status matters, and serves as a liaison with sponsoring agencies and the U.S. government. Submit your inquiries to issa@nd.edu or call them at 631-1138.

Campus Ministry, 116 Coleman-Morse Center, 631-7800, offers programs and organizations to serve students' spiritual needs across a full range of faith traditions.

J. Graduate Student Life

A unit within the Division of Student Affairs and in cooperation with the Graduate School, Graduate Student life (<http://gradlife.nd.edu/>) is committed to enhancing the educational experience and quality of life for Notre Dame students pursuing advanced degrees. The Graduate Student Life website contains reference links for special events and programs, family resources and information regarding campus life in general. A helpful Q&A weblog to answer questions is also featured.

APPENDICES

A. ACADEMIC INTEGRITY

In questions involving academic integrity, the student is referred to the general policy found in the Graduate School Bulletin of Information. The department expects all students to maintain and promote the highest standards of personal honesty and professional integrity. These standards apply to examinations, assigned papers, projects and preparation of the thesis or dissertation. Violation of these standards, which includes, but is not limited to cheating in examinations, plagiarism and fraudulent practices in conducting research or reporting the results of such research, may result in suspension or dismissal.

Primary authority for judgment and decision on matters of academic integrity lies with the course instructor for issues that arise in the classroom, or the faculty research advisor for issues that arise in research. Unsettled disputes should be referred first to the director of graduate studies in the student's home department and next to the student's home department chair, each of whom can serve as arbiters at the department level. Any further appeal should be directed to the Graduate School.

B. FACULTY

For faculty affiliated with the Materials Science and Engineering program, click on the following:
<https://mse.nd.edu/people/>.

D. MATERIALS SCIENCE AND ENGINEERING GRADUATE COURSES

Materials Science and Engineering courses can be found on the Materials Science and Engineering Website.

<https://mse.nd.edu/doctoral-program/courses/>

E. Student Research Overview Template

The Microsoft Word Template (.docx) file for the research overview can be downloaded [here](#). This research overview should be reviewed and approved by your advisor before submitting for review by the Steering Committee.

Interdisciplinary Materials Science and Engineering program research overview

Student:

Date:

Advisor:

Department:

Interdisciplinary Mentor:

Interdisciplinary Mentor Department:

Year of study:

Research Title:

To be considered for the Materials Science and Engineering Program, the research overview must describe how the research fits within materials science and engineering. Materials science and engineering is most broadly concerned with understanding how the history of a material (e.g., processing, environment or use) influences its structure and composition, and thus its properties and performance. The understanding of processing-structure-property relationships is called the materials paradigm and central to materials research [1].

[1] W.D. Callister and D.G. Rethwisch, Materials Science and Engineering: An Introduction, 10th (or Earlier) Edition(s), Wiley, 2020.

More information on the interdisciplinary mentor can be found in section IV. Advising of the [Materials Science and Engineering Handbook](#).

Research Overview: One page maximum, Arial font size 10.

Include the following sections:

Background

(If available, include relevant preliminary data in your background section.)

Research Goals

(Emphasis should be on the goals of the research and future work. This should not be a re-stating of work that has already been completed. Explain how this research fits within materials science and engineering. Consider the guidance on page 1 of the template.)

Interdisciplinary Mentor

(Students, in consultation with their advisor, are requested to provide a paragraph describing the interdisciplinary nature of the research, and how the interdisciplinary mentor(s) will be engaged to provide expertise and/or resources through the tenure of the research.)

Impact

(Describe the anticipated impact and implications of your planned research on the field, materials science and engineering, and/or broader world.)

References

(not part of page limit)

F. Candidacy Exam Materials Statement Template

**Notre Dame Materials Science and Engineering Program
Candidacy Exam Materials Statement**

Please provide a brief summary of your research from the time the Steering Committee approved your research overview or the Executive Committee approved the fellowship proposal. Address the materials aspects in the next steps of your graduate research. (300 words max.) *(This statement is to be submitted along with your materials for oral candidacy to the MSE Steering Committee prior to your oral candidacy exam.)*

G. Dissertation Materials Statement Template

**Notre Dame Materials Science and Engineering Program
Dissertation Exam Materials Statement**

Please provide a brief summary of your research from the time the Steering Committee approved your doctoral candidacy materials. (200 words max.) *(This statement is to be submitted along with your dissertation materials to the MSE Steering Committee prior to your dissertation defense.)*