

PhD NanoSci & MicroSyst Engin

Doctor of Philosophy in Nanoscience and Microsystems Engineering

Under Review | Fall 2024

Proposal Information

Status	Workflow Status
Active	In Progress
	Faculty Senate Approval, Faculty Senate expand ▲
	Waiting for Approval Faculty Senate Approval
	Rick Holmes
	Nancy Middlebrook
	Changes
	<ul style="list-style-type: none">Program DescriptionConcentration RequiredAdmissions RequirementsGraduation RequirementsRequirements
	Show All ▼

Proposal Information

Proposed		Proposed
Sponsoring faculty/staff member		Sponsoring faculty/staff email
Nathan Jackson/Yvone Nelson		nelsony@unm.edu
Existing		Existing
Sponsoring faculty/staff member		Sponsoring faculty/staff email
College	Department	Campus
Graduate Interdisciplinary Studies	Nanoscience & Microsystems Engineering	Main Campus

Effective Term and Year

Proposed
Proposed Effective Term and Year
Fall 2024

Existing
Proposed Effective Term and Year
Fall 2006

Justification

Proposed
Program Justification

We are proposing edits and format changes to clarify program information and requirements due to formatting lost when the catalog was updated.

Existing
Program Justification

Proposed
Graduate program revision
No

Existing
Graduate program revision
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Program Category and Level

Program Category	Program Level	Degree, Minor, or Certificate Name
Program	Graduate	Doctor of Philosophy in Nanoscience and Microsystems Engineering
Degree Type		
Doctor of Philosophy		
Degree/Certificate Level		
Doctoral		
Is this program also offered online?		
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Associated Forms

Select any associated course forms that exist

Select any associated program forms that exist

Shared Credit and Dual Degree information

Interdepartmental Program

No

Catalog Information

Proposed

Program Description

The Ph.D. degree program in Nanoscience and Microsystems Engineering prepares individuals for careers in the emerging fields in Nanotechnology and Microsystems. The program is a collaborative effort among several departments in the College of Arts and Sciences and the School of Engineering, as well as the Anderson School of Management, with numerous cross-listed and team-taught courses. The participating departments are: Biochemistry, Biology, Civil, Construction, and Environmental Engineering, Chemical and Biological Engineering, Chemistry and Chemical Biology, Computer Science, Earth and Planetary Sciences, Electrical and Computer Engineering, Mathematics and Statistics, Mechanical Engineering, and Physics and Astronomy. Students who choose this degree program can continue to be advised by, supported by and conduct research with faculty in these departments. There are numerous courses in these departments that may be of interest as electives. Faculty in the Health Sciences Center and the UNM Cancer Research center also participate in the program.

Existing

Program Description

The M.S. and Ph.D. degree programs in Nanoscience and Microsystems Engineering prepare individuals for careers in the emerging fields in Nanotechnology and Microsystems. The program is a collaborative effort among several departments in the College of Arts and Sciences and the School of Engineering, as well as the Anderson School of Management, with numerous cross-listed and team-taught courses. The participating departments are: Biochemistry, Biology, Civil, Construction, and Environmental Engineering, Chemical and Biological Engineering, Chemistry and Chemical Biology, Computer Science, Earth and Planetary Sciences, Electrical and Computer Engineering, Mathematics and Statistics, Mechanical Engineering, and Physics and Astronomy. Students who choose this degree program can continue to be advised by, supported by and conduct research with faculty in these departments. There are numerous courses in these departments that may be of interest as electives (some of which are listed below) for students in the program. Faculty in the Health Sciences Center and the UNM Cancer Research center also participate in the program.

Proposed

Admissions Requirements

Ph.D. Admission Prerequisites. The general admission requirements described in the Graduate Program section of this Catalog apply to the Nanoscience and Microsystems Engineering program. Applicants who plan to apply to the program must have a bachelor's degree in a natural science or engineering field. All incoming students should meet a minimum level of competency indicated by passing grade in a math class of MATH **316 or higher. If needed, incoming students who are otherwise qualified may take MATH **316 during their first semester and pass with a grade of "B" or better.

Ph.D. Application Process. The general application process for domestic and international students is described in the Graduate Program section of this Catalog. In addition to meeting those requirements, applicants must submit the following for the Admissions Subcommittee review and selection process:

1. Letter of Intent from the applicant about why this program is of interest. (Approximately 250 words stating the rationale and motivation for entering the program.)
2. Three letters of recommendation.
3. Any other materials that are relevant to this application, such as experiential credit.
4. Departmental application, available online.

Ph.D. Admission and Advising Roles. The Admissions Subcommittee reviews applications and makes admission decisions. Selected applicants are sent a notice of acceptance. Students are encouraged to meet with the program director or program administrator to discuss fellowship opportunities, class enrollment and UNM standard procedures such as the details of becoming a student, obtaining an ID card and procedures for enrolling in classes.

Existing

Admissions Requirements

Ph.D. Application and Admission Process. For prospective doctoral students, the process of applying and being selected is the same as for applicants to the Master's program, with the Admissions Subcommittee assuming responsibility for reviewing applications and selecting candidates. Applicants who plan to apply to the program must have a bachelor's degree in a natural science or engineering field. All incoming students should meet a minimum level of competency indicated by passing grade in a math class of MATH **316 or higher. If needed, incoming students who are otherwise qualified may take MATH **316 during their first semester and pass with a grade of "B" or better or by taking and passing an equivalency exam that certifies their mathematical ability. Ph.D. Faculty Advisor/Mentor. Newly admitted doctoral students must also go through the process of selecting an advisor/mentor. They then request the Graduate Subcommittee that the Qualifying Exam be scheduled sometime during or immediately after they have completed all of the core courses. The program office aids students as needed in their selection process. Qualifying Examination Procedure. Students who wish to Advance to Candidacy must pass a program qualifying examination. This examination covers the four core subject areas listed in this section, and should be taken as soon as possible after entering the program. The Ph.D. qualifying exam consists of an independent, critical analysis of a research article by the student and the preparation of a research proposal. The student delivers a 30 minute presentation to critique the research paper and present the research proposal. The student is allowed two attempts for the exam. Ph.D. Committee on Doctoral Studies. The student and faculty mentor invite three faculty members to serve on the student's Dissertation Committee on Studies. The committee members help the student to plan a Program of Studies that is reflected on the student's Petition for Candidacy form. These courses meet the student's interests and needs which will be counted toward the degree. The Petition for Candidacy must be approved by the student's advisor and the Program Director prior to being submitted to Graduate Studies. The Dissertation Committee also supervises the student's progress and conducts the required exams. General guidelines for completion of the Doctor of Philosophy (Ph.D.) in Nanoscience and Microsystems Engineering are set forth in the Graduate Program section of this Catalog. To advancement to candidacy students must: Satisfactorily complete all course requirements. Pass a qualifying exam. Pass a comprehensive exam File all required paperwork by required time deadlines. The Ph.D. requires that students complete 48 credit hours of courses plus 18 credit hours of dissertation research credit (699). Overall, the basic requirements for Ph.D. candidates include four core courses and an ethics course, plus four courses in a concentration or in an area of focus, as recommended by the student's dissertation committee. These are minimum requirements. The actual number of thesis or dissertation credit hours in most cases is larger. Ph.D. candidates have a maximum of five years from the semester in which they pass the doctoral comprehensive examination to complete all of the degree requirements.

Proposed

Graduation Requirements

General guidelines for completion of the Doctor of Philosophy (Ph.D.) in Nanoscience and Microsystems Engineering are set forth in the Graduate Program section of this Catalog.

To advance to candidacy students must:

1. Satisfactorily complete all course requirements.
2. Pass a qualifying exam.
3. Pass a comprehensive exam.
4. File all required paperwork by published deadlines.

The Ph.D. requires that students complete 48 credit hours of courses plus 18 credit hours of dissertation credit (699). Overall, the basic requirements for Ph.D. candidates include four core courses and an ethics course, plus four courses in a concentration or in an area of focus, as recommended by the student's dissertation committee. These are minimum requirements. The actual number of thesis or dissertation credit hours in most cases is larger. Ph.D. candidates have a maximum of five years from the semester in which they pass the doctoral comprehensive examination to complete all of the degree requirements.

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Professional Credential/Licensure Program Information

Proposed

License/Certification associated with program

No

Existing

License/Certification associated with program

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Degree Information

Professional Accrediting Bodies

Degree Requirements

Requirements

- Complete all of the following
 - Complete the following:
 - NSMS510 - Chemistry and Physics at the Nanoscale (3)
 - NSMS512 - Characterization Methods for Nanostructures (3)
 - NSMS518 - Synthesis of Nanostructures (3)
 - NSMS519 - Advanced Micro- and Nanosystems Engineering (4)
 - Earn at least 1 credits from the following:
 - NSMS550 - Social and Ethical Issues in Nanotechnology (1 - 3)
 - Earn at least 12 credits from the following types of courses:
Select a concentration as recommended by the student's dissertation committee.
 - Earn at least 3 credits from the following types of courses:
An ethics course approved by advisor.
 - **Earn at least this many additional elective credits: 34**
 - **Elective credits may include: - up to 3 credits Seminar - up to 9 credits Research/Problems**
 - **General Electives - Any non-NSME electives taken for the satisfaction of degree requirements must be technical in nature and further the study of NSME subject areas. Electives must be approved by the faculty advisor and confirmed by the Graduate Program Director. Course offerings from Computer Science, Mathematics, Physics, Chemistry, Biology, or other departments in the School of Engineering are typically approved as electives, however, students may propose electives from any department.**
 - Earn at least 18 credits from the following:
 - NSMS699 - Dissertation (3 - 12)
 - Earn at least 19 credits from the following types of courses:
Electives. Overall, the basic requirements for Ph.D. candidates include four core courses and an ethics course, plus four courses in a concentration or in an area of focus, as recommended by the student's dissertation committee. These are minimum requirements. The actual number of thesis or dissertation credit hours in most cases is larger. Ph.D. candidates have a maximum of five years from the semester in which they pass the doctoral comprehensive examination to complete all of the degree requirements.

Grand Total Credits: 66

Concentrations

Program Concentrations

Code	Title
CON Func Mtrl PHD	Complex Functional Materials
CON Info Nano Tech PHD	Information Nanotechnology
CON Nano Bio Interface PHD	Nano-Bio Interfaces

Proposed

Concentration Required

No

Existing

Concentration Required

Yes

Emphases

Emphasis required

No

Emphasis Hours

Emphasis Rules

No Rules

Program Learning Outcomes

Proposed

Learning Outcomes

No changes to learning outcomes.

Existing

Learning Outcomes