

Under Review | Fall 2024

| 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 Description Degree Hours Admissions Requirements Graduation Requirements Requirements | |
| | Show All ▼ | |

| | |
|--|--|
| 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 |
| Graduate Interdisciplinary Studies | Nanoscience & Microsystems Engineering |
| | Campus |
| | 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

1. We are proposing to increase the required credit limit for the MS Option III (coursework) from 30 credits to 36 credits. Currently the total required credits for MS Option I (thesis option) and MS option III (coursework option) are the same. For this reason, we are seeing an abundance of students choosing or switching to the coursework option. Faculty and leadership in NSME feel that Option 1 (thesis) is more beneficial to students in the long run, but the coursework option is quicker which is why students are opting to go for this option. The NSME leadership feel that 30 credit hours of coursework option is not equivalent to 24 credit hours +6 thesis hours for Option 1. Therefore, we are requesting to increase the total number of credits required to get the Option III (coursework option) by 6 credits. This is the same number of credits needed for other interdisciplinary programs such as Optical Science Engineering. MS students taking a full load (9 credits per semester) can still finish in 2 years, which we think is acceptable.

2. 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

Program Level

Graduate

Degree, Minor, or Certificate Name

Master of Science in Nanoscience and
Microsystems Engineering

Degree Type

Master of Science

Degree/Certificate Level

Graduate

Plan Options

Plan I (Thesis)

Plan II (Non-thesis)

Plan III (Coursework only)

Proposed

Is this program also offered online?

No

Existing

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 M.S. 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

M.S. 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.

M.S. 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.

M.S. 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

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M.S. Faculty Advisor/Mentor. Students are responsible for selecting a faculty mentor who helps them establish a Committee on Studies. The program office aids students in their selection process. Ideally, students and faculty members agree about the advising/mentoring relationship, but for those who need assistance, the Director will request that the Admissions Subcommittee assist in this process.

M.S. Committee on Studies. The student and faculty mentor invite three faculty members to serve on the student's Committee on Studies. The committee members help the student to plan a Program of Studies—a list of courses that meets the student's interests and needs which are counted toward the degree. This plan must be approved by the student's advisor and the Program Director prior to being submitted to Graduate Studies. The Committee also supervises the student's progress and conducts the required thesis or other exams. If the student subsequently qualifies for entering the doctoral program, this committee can continue in the role of Doctoral Studies and Dissertation Committee to assist the student in completing the Ph.D.

M.S. General Degree Completion Requirements. The maximum time-to-degree for Master's students is seven years, during which time the student must be enrolled full time for at least three consecutive semesters. A student must take 9 credit hours to be considered a full-time student by financial aid. If the student has an assistantship, full time is considered to be 6 credit hours per semester. In order to complete the M.S., students must maintain a minimum cumulative grade point average of 3.0 in graduate-level courses taken in graduate status and a GPA of at least 3.0 for courses listed in the Program of Studies. Students cannot graduate with pending incompletes nor while on probation.

Professional Science Masters concentration. The M.S. in Nanoscience and Microsystems Engineering concentration in Professional Science Masters emphasizes the innovation and entrepreneurial skills necessary to bring discoveries in nanoscience to the marketplace. Candidates for this degree learn the fundamentals of nanoscience, receive hands-on training in microsystems and are introduced to entrepreneurship, innovation and project management. The degree may be completed within one year. This curriculum has been developed in concert with industry and is designed to address present and future professional career needs.

Degree Completion Requirements The M.S. in Nanoscience and Microsystems Engineering is offered under Plan I (thesis), Plan II (project), and Plan III (coursework only) according to the general requirements specified in Graduate Program section of this Catalog. General requirements are listed below.

Plan I (thesis) Completion of a total of 24 credit hours, including all core course requirements. Completion of 6 credit hours of thesis.

Plan II (project) Completion of a total of 32 credit hours, including all core course requirements and a maximum of 6 credit hours of Problems. Completion of the Master's Project under the direction of a faculty member (typically done as part of a Problems course).

Plan II (Professional Science Masters concentration) Completion of a total of 32 credit hours, including all core course requirements and other stipulated courses.

Plan III (coursework only) Completion of a total of 30 credit hours of course work, including all core course requirements.

Proposed

Graduation Requirements

M.S. General Degree Completion Requirements. The maximum time-to-degree for Master's students is seven years, during which time the student must be enrolled full time for at least three consecutive semesters. A student must take 9 credit hours to be considered a full-time student by financial aid. If the student has an assistantship, full time is considered to be 6 credit hours per semester. In order to complete the M.S., students must maintain a minimum cumulative grade point average of 3.0 in graduate-level courses taken in graduate status and a GPA of at least 3.0 for courses listed in the Program of Studies. Students cannot graduate with pending incompletes nor while on probation.

Degree Completion Requirements. The M.S. in Nanoscience and Microsystems Engineering is offered under Plan I (thesis), Plan II (project), and Plan III (coursework only) according to the general requirements specified in Graduate Program section of this Catalog. General requirements are listed below.

Plan I (Thesis)

1. Completion of a total of 24 credit hours, including all core course requirements.
2. Completion of 6 credit hours of thesis.

Plan II (Project)

1. Completion of a total of 32 credit hours, including all core course requirements and a maximum of 6 credit hours of Problems.
2. Completion of the Master's Project under the direction of a faculty member (typically done as part of a Problems course).

Plan III (Coursework Only)

1. Completion of a total of 36 credit hours of course work, including all core course requirements.

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.

Existing

Graduation Requirements

M.S. General Degree Completion Requirements. The maximum time-to-degree for Master's students is seven years, during which time the student must be enrolled full time for at least three consecutive semesters. A student must take 9 credit hours to be considered a full-time student by financial aid. If the student has an assistantship, full time is considered to be 6 credit hours per semester. In order to complete the M.S., students must maintain a minimum cumulative grade point average of 3.0 in graduate-level courses taken in graduate status and a GPA of at least 3.0 for courses listed in the Program of Studies. Students cannot graduate with pending incompletes nor while on probation. Professional Science Masters concentration. The M.S. in Nanoscience and Microsystems Engineering concentration in Professional Science Masters emphasizes the innovation and entrepreneurial skills necessary to bring discoveries in nanoscience to the marketplace. Candidates for this degree learn the fundamentals of nanoscience, receive hands-on training in microsystems and are introduced to entrepreneurship, innovation and project management. The degree may be completed within one year. This curriculum has been developed in concert with industry and is designed to address present and future professional career needs. Degree Completion Requirements The M.S. in Nanoscience and Microsystems Engineering is offered under Plan I (thesis), Plan II (project), and Plan III (coursework only) according to the general requirements specified in Graduate Program section of this Catalog. General requirements are listed below. Plan I (thesis) Completion of a total of 24 credit hours, including all core course requirements. Completion of 6 credit hours of thesis. Plan II (project) Completion of a total of 32 credit hours, including all core course requirements and a maximum of 6 credit hours of Problems. Completion of the Master's Project under the direction of a faculty member (typically done as part of a Problems course). Plan II (Professional Science Masters concentration) Completion of a total of 32 credit hours, including all core course requirements and other stipulated courses. Plan III (coursework only) Completion of a total of 30 credit hours of course work, including all core course requirements.

Professional Credential/Licensure Program Information

Proposed

License/Certification associated with program

No

Existing

License/Certification associated with program

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Degree Information

Proposed

Degree Hours

30 - 36

Minimum Major Hours

Existing

Degree Hours

30 - 38

Professional Accrediting Bodies

Degree Requirements

Requirements

- Complete 1 of the following

Plan I (Thesis)

- 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 10 credits from the following types of courses:
Electives or concentration, approved by advisor.
 - Earn at least 6 credits from the following:
 - NSMS599 - Master's Thesis (1 - 6)

Plan II (Project)

- 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 15 credits from the following types of courses:
Electives or concentration, approved by advisor.
 - Earn at least 3 credits from the following types of courses:
Completion of the Master's Project under the direction of a faculty member (typically done as part of a Problems course).

Plan II (Professional Science Masters concentration)

- 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)~~
 - Concentration:
 - Complete the following:
 - ~~MGMT513 - Technological Forecasting and Assessment (3)~~
 - ~~MGMT514 - Technological Entrepreneurship (3)~~
 - ~~MGMT516 - Entrepreneurial Finance in High Technology (3)~~
 - ~~MGMT556 - Starting New Business (3)~~
 - Earn at least 3 credits from the following:
 - ~~NSMS650 - Research (1 - 12)~~
 - Earn at least 4 credits from the following types of courses:

~~NSMS 595 ST: SMP MI and T Workshop/Seminar and NSMS 595 ST: Independent Project (Internship)~~

Plan III (Coursework only)

- Complete all of the following
 - Complete the following:
 - NSMS510 - Chemistry and Physics at the Nanoscale (3)
 - NSMS574 - Tissue Engineering (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 ~~16~~ **22** credits from the following types of courses:
Electives, approved by advisor.

Grand Total Credits: 30 - 36

Concentrations

Program Concentrations

| Code | Title |
|---------------------------|------------------------------|
| CON Info Nano Tech MS | Information Nanotechnology |
| CON Nano Bio Interface MS | Nano-Bio Interfaces |
| CON Func Mtrl MS | Complex Functional Materials |
| CON Prof Sci Mast | Professional Science Masters |

Concentration Required

No

Emphases

Emphasis required

No

Emphasis Hours

Emphasis Rules

No Rules

Program Learning Outcomes

Proposed

Learning Outcomes

No change to learning outcomes.

Existing

Learning Outcomes