

MS Nucl Engin

Master of Science in Nuclear Engineering

Under Review | Fall 2025

Proposal Information

Status

Active

Workflow Status

In Progress

Refresh  **Form Submission, Proposer** collapse ▼

Submitted for Approval | Proposer

✓ Yvone' Nelson | 11/13/2024 1:59 PM

Department Chair Approval, Nuclear Engineering

Approved | Department Chair

✓ Charles Fleddermann | 11/13/2024 2:08 PM

Registrar Technical Check Approval, Registrar Technical Check

Approved | Registrar Technical Check

✓ Michael Raine | 11/14/2024 10:03 AM

— Maggie Sumruld

College/School Approval, School of Engineering

Approved | College or School approver

✓ Shuang Luan | 11/14/2024 10:28 AM

Library Approval, Main Campus Library

Approved | Library Approval

✓ Sever Bordeianu | 11/14/2024 5:21 PM

SGPC Approval, Faculty Senate Graduate and Professional Committee

Approved | Chair

✓ Robben Brown | 2/06/2025 11:26 AM

FSCC Member notification, Faculty Senate Curriculum Committee

Notification Sent | Faculty Senate Curriculum Committee Member

☑ Antoinette Abeyta

☑ Joe Anderson

☑ Randi Archuleta

☑ Laura Belmonte

☑ Justin Bendell

☑ Isabella Goss

☑ Sara Ice

☑ Megan Jacobs

☑ Joan Lucas

☑ Justine Ponce

☑ Mary Rice

☑ John Russell

☑ Jennifer Schneider

☑ Julia So

☑ SueNoell Stone

☑ Jonathan Wheeler

Faculty Senate Curriculum Committee Approval, Faculty Senate Curriculum Committee

Approved | Faculty Senate Curriculum Committee Chair

- Janet Vassilev
- ✓ Nicole Capehart

FSCC voted to approve

3/31/2025 10:02 PM

Provost Approval, Main Campus Provost

Approved | Provost

- ✓ Pamela Cheek | 4/15/2025 1:37 PM

Faculty Senate Approval, Faculty Senate

Waiting for Approval | Faculty Senate Approval

Nancy Middlebrook
Theresa Sherman

External Review - HED CIP code approval, External Review

Approval | HED CIP code approval

Michael Raine
Anna Gay

Reg. Final Approval/Processing, Registrar

Approval | Registrar final approval

Michael Raine
Maggie Sumruld

Notification, Proposer

Notification | Proposer

Yvone' Nelson

Notification, Faculty Senate Graduate and Professional Committee

Notification | Chair

Robben Brown

EMRT notification, EMRT users

Notification | EMRT user

Enrollment Mgt Reporting Team

Notification, LoboTrax Team

Notification | LoboTrax Staff

Sherri DeLeve
Paula Freitag
Hannah Epstein
Allie Martinez
Glenda Johnson

Changes

- Program Description
- Degree Hours
- Requirements
- participants
- Proposed Effective Term and Year

Show All ▼

Proposal Information

Proposed		Proposed
Sponsoring faculty/staff member		Sponsoring faculty/staff email
Charles Fleddermann		cbf@unm.edu
Existing		Existing
Sponsoring faculty/staff member		Sponsoring faculty/staff email
Adam Hecht		hecht@unm.edu
College	Department	Campus
School of Engineering	Nuclear Engineering	Main Campus

Effective Term and Year

Proposed

Proposed Effective Term and Year

Fall 2025

Existing

Proposed Effective Term and Year

Fall 2024

Justification

Proposed

Program Justification

Currently the NE MS Plan I requires 30 units and the MS Plan III requires 30 units. The MS Plan II professional degree has varying unit requirements depending on the program. We request to change the MS Plan III from 30 to 36 units. We request this change to be similar to other departments that require more units for the MS plan III. For example, Mechanical Engineering requires an additional 3 units for their MS Plan III compared with their MS Plan I. The Manufacturing Engineering concentration requires 6 units beyond their MS Plan I. In addition, the thesis and independent research helps students hone their expertise. We believe that the value of this is not compensated by merely 6 units of coursework and so we request the additional coursework units.

We are proposing edits to the program description to clarify that there are different requirements for Plan II based on the selected concentration and to change the description of the MS Plan III to reflect the increased credit hour requirement.

Existing

Program Justification

Previously listed core courses are not taught consistently for graduate students, so to avoid multiple memos providing exceptions for other courses to count, the faculty voted to remove the choose two from this list. NE 525 was already an approved core course but didn't transfer over correctly to this new system and should have been listed; we would like to keep this course for our NE core requirements for MS Plan I and III and PhD. Updated the hours requirements for MS Plan II (27 hours of coursework, 6 hours of practicum, NE 501 is not required) after consulting with Dr. Hecht.
Adding catalog updates 3/23. - hts

Graduate program revision

No

Program Category and Level

Program Category

Program

Program Level

Graduate

Degree, Minor, or Certificate Name

Master of Science in Nuclear Engineering

Degree Type

Master of Science

Degree/Certificate Level

Graduate

Plan Options

Plan I (Thesis)

Plan II (Non-thesis)

Plan III (Coursework only)

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

Information

The nuclear engineering research graduate programs at the University of New Mexico include nuclear criticality safety, radiation transport, reactor theory, single and two-phase flow in microgravity, space nuclear power, thermal-hydraulics, fusion energy, accelerator physics and engineering, occupational and environmental radiation protection, plasma physics, nuclear activation diagnostics, high energy density physics, reactor and shielding design, nuclear fuel irradiation behavior, theoretical and numerical methods in neutral and stochastic transport theory, charged particle transport, model-reference adaptive control of nuclear power plants, heat pipes for space application, computational methods for heat transfer and fluid flows, single phase laminar and combined flows, two-phase flows and probabilistic risk assessment.

The nuclear engineering laboratories are equipped with an AGN-201M nuclear training reactor; a hot cell facility with remote manipulators; a graphite pile; several solid-state detectors for alpha, beta and gamma radiation; computer-based data acquisition, analysis and control systems; and supporting radiation measurements systems. In addition to the well-equipped laboratories on campus, the advanced reactors and radiation equipment of Sandia National Laboratories, Los Alamos National Laboratory, Lovelace Respiratory Research Institute, and the Air Force Research Laboratory are utilized for instruction and research. The laboratories provide not only experimental facilities but access to high-performance supercomputers for carrying on advanced computational physics.

The department maintains a computer pod for student use, equipped with PCs with a wide selection of software.

Additional information on programs and facilities may be obtained by contacting either the graduate advisor or the department chairperson.

Master of Science in Nuclear Engineering

The Master of Science (M.S.) in Nuclear Engineering is a "traditional" nuclear engineering program. Graduates in engineering or science from any recognized college or university may apply for admission to graduate study in nuclear engineering. Students planning to do graduate work in nuclear engineering should focus on physics, mathematics and nuclear engineering in their undergraduate coursework in addition to acquiring competence in one of the branches of engineering or science. Undergraduate coursework in the following is recommended: atomic and nuclear physics, advanced applied mathematics, computer programming, thermodynamics and heat transfer, fluid mechanics, principles of circuits, materials science, nuclear measurements, reactor physics, and instrumentation.

A GPA of 3.0 in the last two years of undergraduate study, and/or in previous engineering graduate study, is normally required for admission. In addition, the GRE is required of all Nuclear Engineering applicants.

The M.S. is offered under **Plan I**, **Plan II**, and **Plan III** options.

- Plan I (thesis) requires 30 credit hours with 24 credit hours of coursework and 6 credit hours of thesis. Of the 24 credit hours of coursework, a minimum of 9 credit hours is required at the 500-level with a maximum of 3 credit hours in problems courses.

- Plan II (non-thesis) has different requirements for different concentrations. More detail is given under the specific concentrations: Health Physics, Medical Physics, or Entrepreneurship and Technology Management. Completion of a Master's project under the direction of a faculty member is also required.
- Plan III (coursework only) requires 36 credit hours of coursework including a maximum of 6 credit hours of problems courses.

A maximum of 3 credit hours of NE 501 can be applied towards the degree. Additional coursework is chosen with the approval of the Graduate Advisor according to student interest in fusion, fission, or waste management areas.

All candidates for the M.S. degree must satisfactorily pass a final examination which emphasizes the fundamental principles and applications of nuclear engineering. This examination is normally the thesis defense for Plan I students, and is normally based on a short-term project for Plan II students, including those in the one-year program. The examination is conducted by a committee of at least three faculty members. This committee is formed in consultation with the student's research advisor or project advisor and is approved by the Department Chairperson.

Shared-Credit Undergraduate/Graduate Degrees Program

Undergraduate students in the School of Engineering may seek admission to the M.S. in Nuclear Engineering under the Shared-Credit Undergraduate/Graduate Degrees Program. See the School of Engineering section of this Catalog for specific admission information and requirements.

Interdisciplinary Program

Computational Science and Engineering: The Computational Science and Engineering interdisciplinary graduate certificate program prepares students to effectively use high-performance computing within their disciplines and is open to graduate students in this department. See the School of Engineering section of this Catalog.

Existing

Program Description

Information

The nuclear engineering research graduate programs at the University of New Mexico include nuclear criticality safety, radiation transport, reactor theory, single and two-phase flow in microgravity, space nuclear power, thermal-hydraulics, fusion energy, accelerator physics and engineering, occupational and environmental radiation protection, plasma physics, nuclear activation diagnostics, high energy density physics, reactor and shielding design, nuclear fuel irradiation behavior, theoretical and numerical methods in neutral and stochastic transport theory, charged particle transport, model-reference adaptive control of nuclear power plants, heat pipes for space application, computational methods for heat transfer and fluid flows, single phase laminar and combined flows, two-phase flows and probabilistic risk assessment.

The nuclear engineering laboratories are equipped with an AGN-201M nuclear training reactor; a hot cell facility with remote manipulators; a graphite pile; several solid-state detectors for alpha, beta and gamma radiation; computer-based data acquisition, analysis and control systems; and supporting radiation measurements systems. In addition to the well-equipped laboratories on campus, the advanced reactors and radiation equipment of Sandia National Laboratories, Los Alamos National Laboratory, Lovelace Respiratory Research Institute, and the Air Force Research Laboratory are utilized for instruction and research. The laboratories provide not only experimental facilities but access to high-performance supercomputers for carrying on advanced computational physics.

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A GPA of 3.0 in the last two years of undergraduate study, and/or in previous engineering graduate study, is normally required for admission. In addition, the GRE is required of all Nuclear Engineering applicants.

The M.S. is offered under **Plan I**, **Plan II**, and **Plan III** options.

- Plan I (thesis) requires 30 credit hours with 24 credit hours of coursework and 6 credit hours of thesis. Of the 24 credit hours of coursework, a minimum of 9 credit hours is required at the 500-level with a maximum of 3 credit hours in problems courses.
- Plan II (non-thesis) requires 33 credit hours of coursework including a maximum of 6 credit hours for problems courses and a minimum of 12 credit hours in 500-level courses. Completion of a Master's project under the direction of a faculty member is also required.
- Plan III (coursework only) requires 30 credit hours of coursework including a maximum of 6 credit hours of problems courses.

A program that allows the Plan II to be completed in one calendar year is also offered. This program should be requested at the time of application and should begin in the summer or fall semester. The program typically includes a course load of 14 credit hours in the fall semester (two core courses, two electives and graduate seminar), 13 credit hours in the spring semester (two core courses, two electives and graduate seminar) and 6 credit hours in the summer semester (elective courses and/or individual problems).

A maximum of 3 credit hours of NE 501 can be applied towards the degree. Additional coursework is chosen with the approval of the Graduate Advisor according to student interest in fusion, fission, or waste management areas.

All candidates for the M.S. degree must satisfactorily pass a final examination which emphasizes the fundamental principles and applications of nuclear engineering. This examination is normally the thesis defense for Plan I students, and is normally based on a short-term project for Plan II students, including those in the one-year program. The examination is conducted by a committee of at least three faculty members. This committee is formed in consultation with the student's research advisor or project advisor and is approved by the Department Chairperson.

Shared-Credit Undergraduate/Graduate Degrees Program

Undergraduate students in the School of Engineering may seek admission to the M.S. in Nuclear Engineering under the Shared-Credit Undergraduate/Graduate Degrees Program. See the School of Engineering section of this Catalog for specific admission information and requirements.

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Admissions Requirements

Students who do not have a background in nuclear reactor theory are also required to take NE 410/510 Nuclear Reactor Theory (NE 410 must be a B or better). Students with undergraduate degree fields other than nuclear engineering may be required to take certain undergraduate background courses determined by the graduate advisor. See department website for more information.

Graduation Requirements

Plan I

- All candidates for this plan must satisfactorily pass a final examination which emphasizes the fundamental principles and applications of nuclear engineering. This examination is normally the thesis defense for Plan I students. The examination is conducted by a committee of at least three faculty members. This committee is formed in consultation with the student's research advisor or project advisor and is approved by the Department Chairperson.

Plan II

- All candidates for this plan must satisfactorily pass a final examination which emphasizes the fundamental principles and applications of nuclear engineering. This examination is normally based on a short-term project (Practicum) for Plan II students, including those in the one-year program. The examination is conducted by a committee of at least three faculty members. This committee is formed in consultation with the student's research advisor or project advisor and is approved by the Department Chairperson.

Plan III

- Successful completion of required coursework.

Additional information on graduation requirements can be found at the UNM Graduate Studies website.

Professional Credential/Licensure Program Information

License/Certification associated with program

No

Degree Information

Proposed
Degree Hours
30 - 36

Minimum Major Hours

Existing
Degree Hours
30 - 34

Professional Accrediting Bodies

Degree Requirements

Requirements

- Complete 1 of the following

Plan I (Thesis)

- Complete all of the following
 - Earn at least 3 credits from the following:
 - NE501 - Nuclear Engineering Seminar (1)
 - Complete the following:
 - NE525 - Methods of Analysis in Chemical, Biological, and Nuclear Engineering (3)
 - Earn at least 6 credits from the following:
 - NE599 - Master's Thesis (1 - 6)
 - Earn at least 18 credits from the following types of courses:
Electives
- Of the 24 credit hours of coursework required for Plan 1, a minimum of 9 credit hours is required at the 500-level. No more than 3 credit hours in problems courses may count toward the degree.

Plan II (Non-Thesis)

- Complete all of the following
 - Complete the following:
 - NE523L—Environmental Measurements Laboratory- (1—4)
 - NE524—Interaction of Radiation with Matter- (3)
 - NE528—External Radiation Dosimetry- (3)
 - NE529—Internal Radiation Dosimetry- (3)
 - NE527—Radiation Biology for Engineers and Scientists- (3)
 - Earn at least 6 credits from the following:
 - NE591—Practicum- (3—6)
 - Earn at least 12 credits from the following types of courses:
Electives. These electives are chosen from areas of interest such as waste management, nuclear power, or calculational methods.
- Completion of a Master's project (NE 591—Practicum) under the direction of a faculty member is also required.

Plan II (Non-Thesis)

- Complete all of the following

- Course requirements are listed under the specific concentrations.
- For Health Physics and Medical Physics: Completion of a Master's project (NE 591 - Practicum) under the direction of a faculty member is also required.

Plan III (Coursework)

- Complete all of the following
 - Earn at least 3 credits from the following:
 - NE501 - Nuclear Engineering Seminar (1)
 - Complete the following:
 - NE525 - Methods of Analysis in Chemical, Biological, and Nuclear Engineering (3)
 - Earn at least ~~24~~ **30** credits from the following types of courses:
Electives
- Plan III requires ~~30~~ **36** credit hours of coursework (no more than 6 credit hours of problems courses may count toward the degree).

Grand Total Credits: 30 - 36

Concentrations

Program Concentrations

Code	Title
CON Health Physics	Health Physics
CON Entrep Tech Mgmt Nuc Engr	Entrepreneurship and Technology Management
CON Med Phys	Medical Physics

Concentration Required

No

Emphases

Emphasis required	Emphasis Hours
N/A	

Emphasis Rules

No Rules

Program Learning Outcomes

Learning Outcomes

- Demonstrate knowledge of engineering and science fundamentals appropriate for the discipline and specialization.
- Demonstrate depth of knowledge in their specialization.
- Demonstrate the ability to conduct original and independent research.
- Demonstrate the ability to perform critical review of literature in their area of specialization.
- Be able to communicate effectively.