

Master of Science - Materials and Nuclear Engineering

Plan Description

The Master of Science degree is intended to provide the student with a solid background in either applied nuclear science and engineering, with an emphasis in used fuel management, criticality, or radiation detection, or material science and engineering, with an emphasis in materials performance. The program consists of two master's degree subplans: Materials Engineering and Nuclear Engineering.

The materials engineering subplan consists of a core curriculum in material science, metallurgy, and materials performance, which is to be augmented by advanced level classes in corrosion engineering, physical metallurgy, mechanical metallurgy, mechanics of materials, and nuclear materials.

The nuclear engineering subplan consists of a core curriculum in applied nuclear science and engineering, coupled with advanced classes in the student's sub discipline. **The nuclear engineering subplan has an online option.**

For more information about your program including your graduate program handbook and learning outcomes please visit the [Degree Directory](#).

Plan Admission Requirements

Application deadlines

Applications available on the [UNLV Graduate College website](#).

In addition to the general requirements for admission to the Graduate College, an applicant for the M. S. program must complete the following requirements:

1. Applicants must complete the on-line process in the Grad Rebel Gateway system.
2. Mechanical Engineering applicants must provide two additional items while completing the process in the Grad Rebel Gateway system:
 1. A written statement of purpose indicating interests and objectives in working toward a M. S. degree.
 2. Two letters of recommendation using the online recommendation system. There is no specified format. Each letter should detail the potential of the applicant for success in this M. S. program.
3. The applicant must have a bachelor's degree in engineering or a closely related discipline. Admitted students with non-engineering backgrounds will be required to complete a set of courses that will assure successful completion of the M. S. specialization and qualify the student to sit for the Fundamentals of Engineering (FE) exam. The Graduate Program Committee or Graduate Coordinator will specify a list of required undergraduate courses that must be completed within the first year. These courses are in addition to those required for the graduate degree.
4. The applicant must submit an official copy of the Graduate Record Examination (GRE) test scores. The GRE university code for UNLV is 4861. The Mechanical Engineering Department code is 1502. The **minimum required preferred** score is at or above 70 percentile range in the quantitative reasoning section. The Graduate Program Committee

can modify this requirement if necessary. The GRE requirement is waived for students participating in the Integrated BS-MS subplan.

5. The GPC will examine the applicant's academic record and will make the final determination of the applicant's admissibility to the M. S. program. In general, a minimum post-baccalaureate GPA of 3.00 on a 4.00 scale or equivalent is required for admission in addition to a GPA of 3.00 on a 4.00 scale or equivalent in all engineering courses.
6. All domestic and international applicants must review and follow the [Graduate College Admission and Registration Requirements](#).

The Integrated BS-MS degree program is designed to provide high-achieving UNLV Mechanical Engineering undergraduate students with the opportunity to take graduate courses that can count toward both the B. S. and M. S. ME degree programs at UNLV. This will hopefully encourage them to continue with a graduate degree by reducing the time needed for degree completion. Up to nine credits of approved graduate-level course work can be taken as technical electives for the grade of B or better during the senior year and those credits will be waived for the graduate degree. The GRE requirement is waived for students participating in the Integrated BS-MS subplan. The following conditions are needed to enroll in the Integrated BS-MS program:

1. A minimum of two semesters of full-time enrollment in B. S. of Mechanical Engineering program is required.
2. Applications are normally submitted with two semesters remaining in the senior year.
3. A minimum of 90 credits of course work applicable to the B. S. of Mechanical Engineering degree with a cumulative GPA of 3.3 or higher must be completed before beginning the joint degree program.
4. Student has to choose the thesis option.

Students are accepted into a degree program as described in the Graduate Catalog. The faculty and corresponding sub-disciplines and sub-plans within the described programs are subject to change at any time.

Plan Requirements

See Subplan Requirements below.

[Subplan 1: Non-Thesis](#)

[Subplan 2: Thesis](#)

[Subplan 3: Integrated BS-MS](#)

[Subplan 4: Nuclear Engineering-Online](#)

Subplan 1 Requirements: Non-Thesis

Total Credits Required: 30

Course Requirements

Required Courses - Credits: 9

Select one of the following specializations and complete three courses:

[Before] *Materials Engineering*

ME 622 - Nanomaterials for Energy Applications

ME 630 Corrosion Engineering	3
ME 646 Composite Materials	3
ME 695 Special Topics in Engineering	1-4
ME 732 Mechanical Metallurgy	3
ME 734 Fracture of Engineering Materials	3
ME 741 Energy and Variational Methods in Applied Mechanics I	3

[Before]

Nuclear Engineering

ME 655 Fundamentals of Nuclear Engineering	3
ME 706 Convective Heat Transfer	3
ME 754 Introduction to Nuclear Criticality Safety	3
ME 755 Nuclear Criticality Safety Engineering	3
ME 756 Monte Carlo Methods in Nuclear Engineering	3
ME 757 Radiation Monitoring and Safeguards Systems	3
ME 758 Accelerator Applications in Nuclear Engineering	3
ME 760 Waste Management And The Nuclear Fuel Cycle	3
ME 762 Nuclear Power Engineering	3
ME 763 Nuclear Reactor Analysis	3

[After]

PHYS 631 Nuclear and Elementary Particle Physics	3
--	---

[After] Or

RDCH 701 Applied Nuclear Physics	3
----------------------------------	---

Electives - Credits: 18

Complete 18 credits of elective coursework from within the College of Engineering. Courses from outside the College of Engineering may be taken with advisor approval.

Suggested Electives for Materials Engineering subplan

ME 650 Physical Metallurgy	3
ME 670 Experimental Mechanics of Materials	3
ME 742 Energy and Variational Methods in Applied Mechanics II	3

Suggested Electives for Nuclear Engineering subplan

ME 615 Design of Thermal Systems	3
ME 702 Computational Fluid Dynamics	3
ME 705 Conduction Heat Transfer	3
ME 707 Radiation Heat Transfer	3
ME 708 Convective Boiling and Condensation	3
ME 711 Advanced Thermodynamics	3

Design Project - Credits: 3

ME 796 Design Project in Mechanical Engineering	1 - 3
---	-------

Degree Requirements

1. Requires 30 credits of approved graduate courses. At least 18 credits must be earned from 700-level courses, and 15 credits must be in engineering.
2. Students must make satisfactory progress toward degree completion as defined below:
 1. File an approved degree program before the completion of nine credits of coursework.
 2. Complete at least six credits of the approved program per calendar year.
 3. Maintain a grade point average (GPA) of 3.00 on a 4.00 scale with no grades below C. Grades of C- or below are not acceptable.
3. Students must comply with Graduate College policy. If progress is not satisfactory, probation and separation may result, in accordance with the rules of the Graduate College.

Graduation Requirements

1. The student must submit all required forms to the Graduate College as well as apply for graduation up to two semesters prior to completing their degree requirements.
2. Successfully complete a design project.

Subplan 2 Requirements: Thesis

Total Credits Required: 30

Course Requirements

Required Courses - Credits: 9

Select one of the following specializations and complete three courses:

[Before]

Materials Engineering

ME 622 – Nanomaterials for Energy Application

ME 630 Corrosion Engineering	3
ME 646 Composite Materials	3
ME 695 Special Topics in Engineering	1-4
ME 732 Mechanical Metallurgy	3
ME 734 Fracture of Engineering Materials	3
ME 741 Energy and Variational Methods in Applied Mechanics I	3

[After]

Nuclear Engineering

ME 655 Fundamentals of Nuclear Engineering	3
ME 706 Convective Heat Transfer	3
ME 754 Introduction to Nuclear Criticality Safety	3
ME 755 Nuclear Criticality Safety Engineering	3
ME 756 Monte Carlo Methods in Nuclear Engineering	3
ME 757 Radiation Monitoring and Safeguards Systems	3
ME 758 Accelerator Applications in Nuclear Engineering	3
ME 760 Waste Management And The Nuclear Fuel Cycle	3
ME 762 Nuclear Power Engineering	3
ME 763 Nuclear Reactor Analysis	3

[After]

PHYS 631 Nuclear and Elementary Particle Physics	3
--	---

[After] Or

RDCH 701 Applied Nuclear Physics	3
----------------------------------	---

Electives - Credits: 15

Complete 15 credits of elective coursework from within the College of Engineering. Courses from outside the College of Engineering may be taken with advisor approval.

Suggested Electives for Materials Engineering subplan

ME 650 Physical Metallurgy	3
ME 670 Experimental Mechanics of Materials	3
ME 742 Energy and Variational Methods in Applied Mechanics II	3

Suggested Electives for Nuclear Engineering subplan

ME 615 Design of Thermal Systems	3
ME 702 Computational Fluid Dynamics	3
ME 705 Conduction Heat Transfer	3
ME 707 Radiation Heat Transfer	3
ME 708 Convective Boiling and Condensation	3
ME 711 Advanced Thermodynamics	3

Thesis - Credits: 6

ME 797 Thesis in Mechanical Engineering	3 – 6
---	-------

Degree Requirements

- Requires 24 credits of approved graduate courses plus six credits of work associated with the master's level thesis, for a total of 30 credits. At least 15 credits must be earned from 700-level courses, and at least 15 credits must be in engineering. The final examination will include a defense of thesis.
- Students must make satisfactory progress toward degree completion as defined below:
 - File an approved degree program before the completion of nine credits of coursework.
 - Complete at least six credits of the approved program per calendar year.
 - Maintain a grade point average (GPA) of 3.00 on a 4.00 scale with no grades below C. Grades of C- or below are not acceptable.
- Students must comply with Graduate College policy. If progress is not satisfactory, probation and separation may result, in accordance with the rules of the Graduate College.
- The student must identify a Thesis Advisor within the first semester of joining the program. The student, in consultation with their Advisor, will form a Thesis Committee that includes at least four members:
 - One Thesis Advisor. A student may have two co-Advisors but they count as one committee member.
 - Two Mechanical Engineering Department faculty members.
 - One Graduate College representative. The student, in consultation with their Advisor, is responsible for inviting a committee member from within the university but outside the Mechanical Engineering Department. This person is responsible for ensuring consistency and fairness throughout the UNLV graduate programs.

Graduation Requirements

1. The student must submit all required forms to the Graduate College as well as apply for graduation up to two semesters prior to completing their degree requirements.
2. The student must submit and successfully defend their thesis by the posted deadline. The defense must be advertised and is open to the public.
3. After the thesis defense, the student must electronically submit a properly formatted pdf copy of their thesis to the Graduate College for format check. Once the thesis format has been approved by the Graduate College, the student will submit the approved electronic version to ProQuest. Deadlines for thesis defenses, format check submissions, and the final ProQuest submission can be found [here](#).

Subplan 3 Requirements: Integrated BS-MS

Total Credits Required: 21-27

Students admitted into this subplan have taken 3, 6 or 9 credits of graduate level courses that were applied toward their B.S. degree in Mechanical Engineering at UNLV. These credits reduce the total needed to complete the M.S. degree.

Course Requirements

Required Courses - Credits: 9

Select one of the following specializations and complete three courses:

[Before] *Materials Engineering*

ME 622 - Nanomaterials for Energy Applications

ME 630 Corrosion Engineering	3
ME 646 Composite Materials	3
ME 695 Special Topics in Engineering	1-4
ME 732 Mechanical Metallurgy	3
ME 734 Fracture of Engineering Materials	3
ME 741 Energy and Variational Methods in Applied Mechanics I	3

[Before]

Nuclear Engineering

ME 655 Fundamentals of Nuclear Engineering	3
ME 754 Introduction to Nuclear Criticality Safety	3
ME 706 Convective Heat Transfer	3
ME 755 Nuclear Criticality Safety Engineering	3
ME 756 Monte Carlo Methods in Nuclear Engineering	3
ME 757 Radiation Monitoring and Safeguards Systems	3
ME 758 Accelerator Applications in Nuclear Engineering	3

ME 760 Waste Management And The Nuclear Fuel Cycle	3
ME 762 Nuclear Power Engineering	3
ME 763 Nuclear Reactor Analysis [After]	3
PHYS 631 Nuclear and Elementary Particle Physics [After] Or	3
RDCH 701 Applied Nuclear Physics	3

Electives - Credits: 6-12

Complete 6-12 credits of elective coursework from within the College of Engineering. Courses from outside the College of Engineering may be taken with advisor approval.

Suggested Electives for Materials Engineering subplan

ME 615 Design of Thermal Systems	3
ME 650 Physical Metallurgy	3
ME 670 Experimental Mechanics of Materials	3
ME 742 Energy and Variational Methods in Applied Mechanics II	3

Suggested Electives for Nuclear Engineering subplan

ME 615 Design of Thermal Systems	3
ME 702 Computational Fluid Dynamics	3
ME 705 Conduction Heat Transfer	3
ME 707 Radiation Heat Transfer	3
ME 708 Convective Boiling and Condensation	3
ME 711 Advanced Thermodynamics	3

Thesis - Credits: 6

ME 797 Thesis in Mechanical Engineering	3 – 6
---	-------

Degree Requirements

1. Total credits required depends on the total number of approved graduate-level course work taken as technical electives (with a grade of B or better) during the senior year.
2. Requires 15-21 credits of approved graduate courses plus six credits of work associated with the master's level thesis, for a total of 21-27 credits. At least 15 credits must be earned from 700-level courses, and at least 15 credits must be in engineering. The final examination will include a defense of thesis.

3. Students must make satisfactory progress toward degree completion as defined below:
 1. File an approved degree program before the completion of nine credits of coursework.
 2. Complete at least six credits of the approved program per calendar year.
 3. Maintain a grade point average (GPA) of 3.00 on a 4.00 scale with no grades below C. Grades of C- or below are not acceptable.
4. Only those courses in which a student received a grade of C or better may be used for graduate credit. Students must comply with Graduate College policy.
5. The student must identify a Thesis Advisor within the first semester of joining the program. The student, in consultation with their Advisor, will form a Thesis Committee that includes at least four members:
 1. One Thesis Advisor. A student may have two co-Advisors but they count as one committee member.
 2. Two Mechanical Engineering Department faculty members.
 3. One Graduate College representative. The student, in consultation with their Advisor, is responsible for inviting a committee member from within the university but outside the Mechanical Engineering Department. This person is responsible for ensuring consistency and fairness throughout the UNLV graduate programs.

Graduation Requirements

1. The student must submit all required forms to the Graduate College as well as apply for graduation up to two semesters prior to completing their degree requirements.
2. The student must submit and successfully defend their thesis by the posted deadline. The defense must be advertised and is open to the public.
3. After the thesis defense, the student must electronically submit a properly formatted pdf copy of their thesis to the Graduate College for format check. Once the thesis format has been approved by the Graduate College, the student will submit the approved electronic version to ProQuest. Deadlines for thesis defenses, format check submissions, and the final ProQuest submission can be found [here](#).

New Core Subplan 4 Requirements: Nuclear Engineering-Online

Total Credits Required: 30

New Core Course Requirements

New-Core Required Courses – Credits: 21

Complete 21 credits from the list below:

ME 655 Fundamentals of Nuclear Engineering	3
ME 754 Introduction to Nuclear Criticality Safety	3
ME 755 Nuclear Criticality Safety Engineering	3
ME 756 Monte Carlo Methods in Nuclear Engineering	3
ME 757 Radiation Monitoring and Safeguards Systems	3
ME 758 Accelerator Applications in Nuclear Engineering	3
ME 760 Waste Management And The Nuclear Fuel Cycle	3
[Before]ME 761 – Probabilistic Risk Assessment	3
ME 762 Nuclear Power Engineering	3
ME 763 Nuclear Reactor Analysis	3

New-Core Elective Courses – Credits: 6

Complete 6 credits of elective coursework from within the College of Engineering. Courses from outside the College of Engineering may be taken with advisor approval.

New-Core Design Project – Credits: 3

ME 796 Design Project in Mechanical Engineering	1 – 3
---	-------

New-Core Degree Requirements

- Requires 30 credits of approved graduate courses. At least 18 credits must be earned from 700-level courses and 15 credits must be in engineering.
- Students must make satisfactory progress toward degree completion as defined below:
 - File an approved degree program before the completion of nine credits of coursework.
 - Complete at least six credits of the approved program per calendar year.
 - Maintain a grade point average (GPA) of 3.00 on a 4.00 scale with no grades below C. Grades of C- or below are not acceptable.
- Students must comply with Graduate College policy. If progress is not satisfactory, probation and separation may result, in accordance with the policies of the Graduate College.

4. **Courses numbered below 600 do not count toward the credits required for the M. S. degree.**

New Core Graduation Requirements

1. **The student must submit all required forms to the Graduate College as well as apply for graduation up to two semesters prior to completing their degree requirements.**
2. ~~The student must submit and successfully defend their thesis by the posted deadline. The defense must be advertised and is open to the public. After the thesis defense, the student must electronically submit~~ **Successfully complete a properly formatted pdf copy of their thesis to the Graduate College for format check. Once the thesis format has been approved by the Graduate College, the student will submit the approved electronic version to ProQuest. Deadlines for thesis defenses, format check submissions, and the final ProQuest submission can be found here** **design project.**

Plan Graduation Requirements

Refer to your subplan for Graduation Requirements.

Subplan 1: Non-Thesis

Subplan 2: Thesis

Subplan 3: Integrated BS-MS

Subplan 4: Nuclear Engineering Online