

# MATERIALS SCIENCE, M.S.

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The Master of Science in Materials Science is an interdisciplinary program administered cooperatively by the physics, chemistry, and engineering graduate faculty. Persons holding baccalaureate degrees in chemistry, engineering, materials science, physics, or related disciplines are eligible for admission.

The program is designed to provide the knowledge, analytical skills, and research experience necessary to prepared students for technical jobs and doctoral degree programs in the interdisciplinary field of Materials Science. Therefore, the curriculum includes an overview of materials science and current research areas, in-depth study of relevant physical theories, and applied research. All students are required to complete a master's thesis. The thesis research component of the program is typically coordinated through the Center for Materials Research. However, research may also be conducted off campus through special programs at federal research facilities such as NASA Langley Research Center or National Laboratories, with prior approval of the thesis advisor.

Upon completion of the Master of Science in Materials Science program, students will demonstrate the following competencies:

- Ability to apply fundamental and current materials science knowledge to solve problems related to materials structure, properties, applications, and their relationships,
- Ability to design, plan and perform experiments for materials preparation and characterization,
- Ability to prepare and communicate advanced professional reports orally and in writing, including appropriate reference to relevant technical literature, and
- Demonstrate professional and ethical behavior as a materials scientist.

All general policies and procedures of the Norfolk State University Graduate School are in effect, except those that are superseded by the following specific policies of the Master of Science in Materials Science program. The program is governed by the Graduate Council, which meets monthly during the regular academic year. Between meetings, the program is administered by the Graduate Program Coordinator, who also provides academic advising for graduate students prior to their selection of a research advisor.

## Minimum Degree Requirements

All students are required to complete a total of 33 credit hours, including research and thesis preparation credits. This requirement includes the following 18 credit hours of core courses:

Code	Title	Credits
CHM 545	Mathematical Method	3
MSE 530	Materials Science	3
MSE 533	Polymers/Composites	3
MSE 535	Electronic and Optic Material	3
MSE 575	Basic Instrumentation for Material Science	3
PHY 580	Quantum Mechanics for Material Science	3

In addition to the core courses, students must complete nine (9) hours of approved technical electives and six (6) hours of research in Materials Science. Preparation of a thesis and oral thesis defense is required. Students are expected to present their findings at local and national conferences and to participate in related workshops and short courses as determined by the research advisor and by the Thesis Committee.

## Academics Standards

In order to graduate, students must complete the curriculum with a minimum 3.0 grade point average on a 4.0 scale. Each student's progress is reviewed at the end of each semester by the student's Research Advisor. The system of grading is as follows:

Grade	Grade Points	Interpretation
A	4.0	Excellent
A-	3.70	Excellent
B+	3.30	Good
B	3.00	Satisfactory
B-	2.70	Fair
C+	Below 2.7 <sup>1</sup>	Unsatisfactory

<sup>1</sup> Course must be repeated to fulfill graduation requirement.

Students with a GPA of 3.00 or higher are considered to be in good academic standing. In order to receive teaching or research assistantships, students must generally be in good academic standing, register for a minimum of nine (9) credit hours of approved course work each semester, and be making normal progress toward degree completion.

Failure to maintain the required 3.0 GPA results in probationary status or suspension from the program. (Note: Undergraduate level courses may not be included in the calculation of the hours earned, or the calculation of the GPA.)

Hours Earned	Probation GPA	Suspension GPA
0-9	2.00-2.99	1.99 and below
10-19	2.3-2.99	2.29 and below
20-29	2.50-2.99	2.49 and below
30 or more	2.8-2.99	2.79 and below

Students on probationary status generally do not receive renewals of teaching or research assistantships and are not eligible for tuition grants. Students who were admitted on a provisional basis will not be changed to regular status unless the required 3.0 GPA is obtained.

Students placed on suspension are not permitted to enroll in additional courses in the Materials Science program until reinstatement is granted by the Materials Science Graduate Committee. The request for reinstatement should include explanation of mitigating circumstances surrounding past academic performance and/or justification for predicting future success in the program if reinstatement is granted. The Materials Science Graduate Committee will review the request and may interview the suspended student prior to making a final recommendation. The Committee may require successful completion of relevant undergraduate courses, or other conditions as a requirement for reinstatement.

## Summary of Graduation Requirements

Subject Area	Credits
Major Requirements	18
Electives	9
Other Requirements	6
<b>Total Credit Hours</b>	<b>33</b>

## Curriculum

### Core Courses

Course	Title	Credits
<b>First Year</b>		
MSE 530	Materials Science	3
CHM 545	Mathematical Method	3
MSE 533	Polymers/Composites	3
MSE 535	Electronic and Optic Material	3
MSE 575	Basic Instrumentation for Material Science	3
PHY 580	Quantum Mechanics for Material Science	3
<b>Credits</b>		<b>18</b>
<b>Second Year</b>		
Technical Elective (p. 2)		3
Technical Elective (p. 2)		3
MSE 697	Research I	3
Technical Elective (p. 2)		3
MATS 799	Thesis	3
<b>Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>33</b>

### Technical Electives

Code	Title	Credits
CHM 633	Molecular Dynamics	3
CHM 663	Atomic and Molecular Spectroscopy	3
PHY 653	Solid State Physics	3
PHY 675	Electricity and Magnetism	3
MATS 610	Special Topics	3
MATS 710	Special Topics II	3
EEN 650	Microelectromechanical Systems (mems)	3
EEN 661	Optics and Lasers	3
EEN 663	Solid State Devices	3
MSE 607	Materials for Nanotechnology	3
MSE 609	Introduction to Computational Materials Science	3
MSE 660	Organic Optoelectronic Materials & Devices	3
MSE 703	Materials & Devices for Solar Energy Conversion	3
MSE 704	Thin Film Phenomena	3
OEN 540	Lasers and Photonics	3
OEN 560	Optical Communications I	3
OEN 630	Opto-Electronic Devices	3
OEN 661	Optics and lasers	3
<b>Total Credits</b>		<b>54</b>

## Admission Requirements

The application requirements for the Master of Science Program in Materials Science are as follows:

1. A bachelor's degree in Chemistry, Physics, Materials Science, Engineering or a related field from a regionally accredited institution and have a 3.0 grade point average on a 4.0 scale.
2. Submission of a complete application including the following:
  - a. Completed Application Forms
  - b. Application Fee
  - c. Statement of purpose of at least 500 words explaining how the program will advance your career goals
  - d. Updated Resume
  - e. At least three Letters of Recommendation from persons who are qualified to evaluate your academic and research experience
  - f. Official Transcripts
  - g. TOEFL scores for international applicants, minimum score of 80 (Internet) or 550 (Paper).

Admission to the Master's program in Materials Science may be regular or provisional. For regular admission, applicants must have a bachelor's degree in chemistry, physics, engineering, materials science, or a related field (as long as evidence for completion of mathematics, chemistry and physics pre-requisite courses is provided) from a regionally accredited institution and have a 3.0 grade point average on a 4.0 scale. Equivalent degrees from foreign institutions may also be accepted.

Provisional admission may be granted to applicants who do not meet the criteria for regular admission. Upon the completion of nine (9) or more graduate credits with a 3.0 or better, the student may petition the Materials Science Graduate Committee for conversion from conditional to regular status.

### Non-Degree Status

Non-degree status may be granted to a person who has a baccalaureate degree in an appropriate field and who wishes to take particular courses without pursuing a graduate degree. The courses may be taken on a credit or a non-credit basis. Generally, a maximum of nine credit hours with a 3.0 average or above may be applied toward degree requirements if the non-degree student is subsequently admitted to the Master of Science in Materials Science program. Non-degree students are ineligible for fellowships or assistantships administered by the Materials Science Graduate Committee.

### Transfer Credits

Generally, a maximum of nine (9) credit hours of graduate work at another accredited institution may be accepted as transfer credit, provided that the conditions of the Graduate School are met. However, under unusual circumstances, the Materials Science Graduate Committee may recommend that additional credits be accepted toward degree requirements. Transfer students should consult the Program Coordinator for further information regarding transfer credits.

### Residence Requirements

Candidates for the Master of Science in Materials Science must be enrolled at Norfolk State University for a minimum of two semesters prior to graduation. Thesis research must be conducted under the supervision of a regular or adjunct NSU faculty member approved by the Materials Science Graduate Committee.

**Re-admission**

A student planning to interrupt his/her approved plan of study should consult his/her advisor. In some cases, continuous registration may be required by the Graduate School, or the filing of a "continuous matriculation" form may be required. Re-admission to the program after an absence of a semester or longer is not automatic and requires the filing of an admission application.