Department of Materials Science and Engineering

For more information about this department, including contact information, visit the department (http://www.mse.ncsu.edu).

Engineering Building I, Room 3002
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What is Materials Science and Engineering?

Most of the technological innovations that we enjoy today are driven by the discovery of new materials. The future of our world depends on the discovery of new materials that are environmentally friendly, lightweight, sustainable and responsive. The design of novel materials will enable vehicles that are lighter and more fuel-efficient due to redesigned frames and tires; cell phones and laptops with ultra-thin damage-resistant glass for displays; biomaterials that repair and replace parts of the human body; soft robots that can safely interact with humans; new bionics; and materials for water purification.

MSE at NC State

The Department of Materials Science and Engineering at NC State is well-known as a small and friendly department that provides unique and high-impact opportunities for undergraduate students, including small class sizes, a hands-on laboratory, close interactions with world-renowned faculty, undergraduate research opportunities and high-quality laboratory and senior design experiences.

Advanced Degree Opportunity

More than 25 percent of all MSE B.S. degree recipients are enrolled in a graduate degree program at places such as MIT, UC Berkeley, Penn State, Georgia Tech, Purdue and NC State.

What is the Curriculum Like?

The materials engineer must understand the wide range of phenomena that occur in all classes of materials: metals, polymers, ceramics, and composites. The MSE curriculum includes fundamental courses in thermodynamics, kinetics and structure, followed by more applied courses that cover mechanical, thermal, electrical, magnetic and optical properties of materials. Two laboratory courses introduce students to analytical methods used to characterize the structure of materials at all length scales and to measure properties of all classes of materials. Cutting-edge technologies in materials science and engineering such as nanotechnology, biomaterials, computer modeling and forensics (materials degradation and failure analysis) are covered. Five technical electives are included, which allow students to select from a broad range of courses in materials processing, engineering, chemistry, physics, mathematics and other disciplines. The flexibility afforded by these technical electives allows students to customize their education to prepare them for careers in industry or for graduate school.

The two-semester capstone senior design sequence provides a bridge between concepts learned in the classroom and practical application of these concepts in an industrial setting. Teams of students work on real-world materials problems supported by local industrial sponsors.

The materials science and engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, and leads to the degree Bachelor of Science in Materials Science and Engineering. In addition the the base curriculum in Materials Science and Engineering, the department also offers curriculum concentrations in biomaterials and nanomaterials.

An accelerated 5-year BS/MS program is available for advanced study and further specialization. Graduate degrees are also offered (consult the Graduate Catalog (http://www.ncsu.edu/grad/catalog/)).

How Does MSE at NC State Compare to Other Departments?

The mission of the NC State Department of Materials Science and Engineering is to provide students with a sound materials science and engineering education, advance the understanding and application of scientific principles, enhance economic development, and improve the quality of life of our citizens through teaching, research, and outreach programs.

Materials Science and Engineering at NCSU is a small and friendly department, and we are consistently ranked in the top 20 nationally by US News and World Report. Students, professors and professional staff all get to know each other. There is plenty of opportunity for personal attention, for learning, for professional growth and for social gathering.

Program Educational Objectives

With the background knowledge in science, engineering, critical thinking and teamwork provided by the MSE curriculum, our alumni are fully prepared to achieve one or more of the following within five years of graduation:

• Practice materials engineering in academic, industrial, government or entrepreneurial organizations.
• Earn an advanced degree such as MS, PhD or MBA, leading to a career in academia, research and development, or technical management.
• Be promoted into leadership roles in their chosen career.
• Demonstrate by their participation in technical societies, community service, and professional activities, a high degree of service and ethical responsibility to their professional field and the community.

Faculty

Head
Donald W. Brenner, Department Head and Kobe Steel Distinguished Professor

Associate Head
Franky So and Yaroslava Yingling

Director of Graduate Programs
Lew Reynolds
Director of Undergraduate Programs
Yaroslava G. Yingling, Professor and Director of Undergraduate Program

Professors
A. Amassian
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D. Brenner
J. Cuomo
D. Irving
A. Ivanisevic
J. Jones
C. Koch
T. LaBean
J. Narayan
R.J. Spontak
J. B. Tracy
Y. G. Yingling

Associate Professor
V. Augustyn
N. Balke
R. Collazo
R. Gupta
J. Kasichainula

Assistant Professor
K. Ahadi
W. Gao

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Research Associate Professor
M. Cuchiara

Research Assistant Professor
A. Kwanza

Professor Emeriti
K. Bachmann
H. Conrad
R.F. Davis
E. Dickey
K. Havner
J.J. Hren
J.P. Maria
J. Russ
R. Scattergood
Y. Zhu

Associate Member of the Faculty
H. Ade, (Physics)
N. Allbritton, (Biomedical Engineering)
D. Aspnes, (Physics)
S.M. Bedair, (Electrical and Computer Engineering)
M. Dickey, (Chemical and Biomolecular Engineering)
J. Genzer, (Chemical and Biomolecular Engineering)
R. Gorga, (Textile Engineering)
C. Hall, (Chemical and Biomolecular Engineering)
O. Harrysson, (Industrial and Systems Engineering)
A. Hawari, (Nuclear Engineering)
J. Jur, (Textile Engineering)
J. Krim, (Physics)
D. Kumar, (Physics)
H. Lamb, (Chemical and Biomolecular Engineering)
F. Ligler, (Biomedical Engineering)
Y. Liu
J. Martin, (Chemistry)
V. Misra, (Electrical and Computer Engineering)
K. Murty, (Nuclear Engineering)
R. Narayan, (Biomedical Engineering)
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M. Pasquinelli, (Forest Biomaterials)
D. Vashaee, (Electrical and Computer Engineering)
S. Shannon, (Nuclear Engineering)
O. Velev, (Chemical and Biomolecular Engineering)
X. Zhang
Y. Zhu

Adjunct Faculty
N. Biswas
B. Farmer
M. Fiedler
E. Fuller
R. Kirste
T. Luo
S. Mathaudhu
E. McLamore
A. Melechko
J.T. Prater
P. Russell
O. Shenderova

Plans
• Materials Science and Engineering (BS) (http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs/)
• Materials Science and Engineering (BS): Biomaterials Concentration (http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs-biomaterials-concentration/)
• Materials Science and Engineering (BS): Nanomaterials Concentration (http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs-nanomaterials-concentration/)
• Materials Science and Engineering (Minor) (http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-minor/)