

# Department of Materials Science and Engineering

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Materials Science and Engineering (MSE) is a department dedicated to student success. In our program, you will learn from world-renowned faculty in an intimate classroom setting, gain hands-on experience in lab courses, and participate in practical senior design projects that will prepare you for real-world challenges. Beyond the classroom, you will have access to a variety of enriching experiential learning opportunities including research, student leadership roles, study abroad programs, and internships. You will also benefit from having a dedicated Academic Advisor who will guide you through your college career by helping you navigate academic requirements, explore career paths, and maximize your educational experience.

## What is Materials Science and Engineering?

Material Science and Engineering is a part of every industry whether you realize it or not. We form the building blocks for every single consumer product, industry, and discipline of engineering. Everything in the engineered world is made of materials, including but not limited to polymers, metals, ceramics, electronic materials, semiconductors, nanomaterials, and biomaterials. Materials scientists invent new materials that exhibit better performance, are lighter, cheaper, stronger, or are produced via more sustainable processing techniques.

## Curriculum

At NC State, Materials Science and Engineering students are trained to understand the complexities of all classes of material. Our curriculum starts with core courses in thermodynamics, kinetics, and structure, followed by advanced courses in mechanical, thermal, electrical, magnetic, and optical properties.

Hands-on learning is emphasized through two laboratory courses, where students explore analytical methods for characterizing the structure of materials at all length scales and measuring properties of all classes of materials. Our program covers cutting-edge technologies like nanotechnology, biomaterials, computer modeling, and materials forensics (degradation and failure analysis).

With five technical electives, students can tailor their education with courses in materials processing, engineering, chemistry, physics, mathematics, and beyond. This flexibility allows students to prepare for diverse career paths in industry or pursue graduate studies.

In our capstone senior design sequence, spanning two semesters, students bridge theoretical concepts with practical applications in an industrial context. Collaborating in teams, students tackle real-world materials challenges with support from local industry partners.

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET (<https://www.abet.org>).

## MSE Program Highlights

- Two concentrations are offered: Nanomaterials and Biomaterials
- A 5-year Accelerated Bachelor's/Master's (ABM) program (<https://www.mse.ncsu.edu/undergraduate/abm/>) is available for advanced study and further specialization.

- More than 25 percent of all MSE B.S. degree recipients enroll in a graduate degree program at places such as MIT, UC Berkeley, Penn State, Georgia Tech, Purdue, and NC State.
- We are consistently ranked in the top 20 nationally by US News and World Report

## Admission

Students complete the standard set of engineering first-year courses, which include courses in the humanities, chemistry, mathematics, physics, and computing. Students may apply to join the Department of Materials Science and Engineering as degree-seeking students via the CODA process (<https://www.engr.ncsu.edu/academics/undergrad/coda/>).

## 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, Ph.D., 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.

## Contact Information

3002 Engineering Building 1 (EB1)  
911 Partners Way, Raleigh NC 27695-7907  
919.515.2377

### Website

## Faculty

### Head

Donald Brenner , *Department Head and Kobe Steel Distinguished Professor*

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### Associate Head

Franky So, *Associate Head and Walter and Ida Freeman Distinguished Professor*

Yaroslava Yingling, *Associate Head, Director of Undergraduate Programs, Kobe Steel Distinguished Professor*

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### Director of Graduate Programs

Douglas Irving, *Graduate Program Director and Professor*

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## Director of Undergraduate Programs

Yaroslava Yingling, *Associate Head, Director of Undergraduate Programs, Kobe Steel Distinguished Professor*

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## Professors

Aram Amassian, *Professor*

Donald Brenner, *Department Head and Kobe Steel Distinguished Professor*

Ramón Collazo, *Professor and University Faculty Scholar*

Jerry Cuomo, *Distinguished Research Professor*

Douglas Irving, *Graduate Program Director and Professor*

Jacob Jones, *Kobe Steel Distinguished Professor*

Thomas LaBean, *Professor*

Jagdish Narayan, *John C. Fan Distinguished Professor*

Zlatko Sitar, *Kobe Steel Distinguished Professor*

Richard Spontak, *Professor*

Martin Thuo, *Professor*

Joseph Tracy, *Professor and University Faculty Scholar*

Yaroslava Yingling, *Associate Head, Director of Undergraduate Programs, Kobe Steel Distinguished Professor*

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## Associate Professors

Veronica Augustyn, *Associate Professor, Jake & Jennifer Hooks Distinguished Scholar*

Nina Balke, *Associate Professor*

Rajeev Gupta, *Associate Professor*

Jag Kasichainula, *Associate Professor*

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## Assistant Professors

Bharat Gwalani, *Assistant Professor*

Yin Liu, *Assistant Professor*

Martin Seifrid, *Assistant Professor*

Ruijuan Xu, *Assistant Professor*

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## Teaching Professor

Alexey Gulyuk, *Teaching Professor*

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## Lecturer

Sharon Thorne, *Lecturer*

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## Research Associate Professor

Maude Cuchiara, *STEPS Managing Director and Research Associate Professor*

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## Research Assistant Professor

Albert Kwansa, *Assistant Research Professor*

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## Professor Emeriti

M. Balik

R.F. Davis

E. Dickey

C. Koch

J.P. Maria

K. Moazed

R. Scattergood

Y. Zhu

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## 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/>)