NC STATE Engineering

Department of Materials Science and Engineering

Materials Informatics Graduate Certificate Program

What is the Materials Informatics Graduate Certificate Program?

The Materials Informatics (MI) Graduate Certificate Program (GCP) is designed for interdisciplinary graduate education at the intersection of materials science, engineering, and data science with the aim of preparing the next generation of materials engineers given the growing demand for data-science skills and knowledge of the artificial intelligence.

The skills and knowledge obtained will serve as foundation for the understanding of materials informatics and high throughput materials discovery that will improve career prospects.

Why Study Materials Informatics?

As the use of data science tools matures and spreads to different industries and domains, the demand for professionals with domain knowledge and the ability to handle heterogeneous data is increasing.

Up to 34% higher salary

For data scientists in comparison to other analysts on LinkedIn.

Linda Burtch, "The Burtch Works Study Salaries of Data Scientists & Predictive Analytics Professionals," 2019.

56% Increase

Job postings on LinkedIn for data scientists in 2019.

Kumaresh Pattabiraman, "LinkedIn's Most Promising Jobs of 2019," 2019.

96% Increase

Job postings on LinkedIn for machine learning engineers in 2019.

Kumaresh Pattabiraman, "LinkedIn's Most Promising Jobs of 2019," 2019.

Certificate Completion Requirements

The MI GCP requires a total of four classes (12 credit hours), including the core course MSE 723 (3 credit hours) and three MSE and ST or MA elective courses (9 credit hours). The fourth course will be taken from outside of the student's degree department. For example, an MSE student's fourth course must be from the ST or MA list (below).

**signifies courses that are offered online*

REQUIRED COURSE

MSE 723* Materials Informatics

MSE ELECTIVE COURSES

(choose at least 1 of the following)

MSE 710* Elements of Crystallography and Diffraction

MSE 721* Nanoscale Simulations and Modeling

MSE 724* Quantitative Materials Characterization Techniques

ST/MA ELECTIVE COURSES

(choose at least 1 of the following)

ST 517* Statistical Methods I

ST 540 Applied Bayesian Analysis

ST 533 Applied Spatial Statistics

MA 540* Uncertainty Quantification for Physical and Biological Models

Additional Information

MI GCP: mse.ncsu.edu/migcp/
Engineering Online: engineeringonline.ncsu.edu
Course Registration: ncsu.edu/registrar/

Contact Information

MI GCP Coordinator
Yaroslava Yingling, Professor of Materials Science and Engineering
919-515-2624, yara_yingling@ncsu.edu

How to Apply

Apply through the Graduate School at applygrad.ncsu.edu/apply/

Application Deadlines

Spring Admission: October 1
Fall Admission: March 1

Admission Requirements

BS degree in the sciences or engineering from an accredited four-year college or university, and have an overall (or major) grade point average (GPA) of at least 3.0 on a 4-point scale.

Potential applicants without the prior background in Materials Science and Engineering are advised to complete MSE 500 prior to applying, although success in that course does not guarantee admission into the certificate program.

Academic Performance Requirements

- A minimum of a 3.000 grade point average (GPA) on all coursework taken at NC State must be maintained.
- All courses taken for certificate credit must be letter-graded and completed with a grade of "B" or better. Credit-only courses cannot be used for certificate credit.
- All grades on courses taken towards the GCP in courses at the 500-level and above are included in the GPA. Any courses taken at the 400 level and below are not eligible for certificate credit and subsequently do not affect the graduate GPA.
- All GCP requirements must be completed within four (4) calendar years, beginning with the date the student commences courses applicable to the GCP.

Transferring Courses

- Transfer credit from other institutions is not allowed for the GCP. All coursework must be registered through NC State.
- Up to two courses of post-baccalaureate coursework taken at NC State, if not already used in another graduate program, may be transferred into the GCP. All transfer credit must carry a grade of B or better.

Upon completion of the Materials Informatics Graduate Certificate Program, students should be able to:

Understand the relationship between materials design and data-driven techniques

Describe and analyze data available from various types of materials characterization methods

Describe available machine learning techniques and materials databases

Apply available tools for structure property prediction of materials

Identify sources of bias and uncertainty in materials data and analysis results

Identify a machine-learning algorithm with the desired properties for a given materials problem

Demonstrate an understanding of key materials informatics concepts and components

Understand the MI problems and capabilities associated with the design of different types of materials