Approved by the Board of Trustees

November 14, 2024

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 Board Meeting

 November 14, 2024

# ESTABLISH THE BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING + DATA SCIENCE, THE GRAINGER COLLEGE OF ENGINEERING, URBANA

**Action:** Establish the Bachelor of Science in Materials Science and Engineering + Data Science, The Grainger College of Engineering

**Funding:** No new funding required

The chancellor, University of Illinois Urbana-Champaign, and vice president, University of Illinois System, with the advice of the University of Illinois Urbana-Champaign Senate, recommends approval of a proposal from The Grainger College of Engineering to establish the Bachelor of Science in Materials Science and Engineering + Data Science (BS in MatSE + DS).

The proposal to establish the BS in MatSE + DS is part of the University of Illinois Urbana-Champaign’s “X + DS Degree” initiative. The initiative’s first programs (Bachelor of Science degrees in Accountancy + Data Science, Astronomy + Data Science, Finance + Data Science, and Information Science + Data Science) were approved by the Board of Trustees on July 22, 2021, with an additional program, Business + Data Science, approved on July 21, 2022. Two more programs, the Bachelor of Science in Liberal Arts and Sciences in Molecular and Cellular Biology + Data Science and the BS in Chemical Engineering + Data Science, were approved by the Board of Trustees on July 11, 2024.

In 2017, the College of Liberal Arts and Sciences, The Grainger College of Engineering, School of Information Sciences, and Gies College of Business formed a collaborative task force to explore opportunities for undergraduate data science education at the University of Illinois Urbana-Champaign. In 2019, based on recommendations from this task force, the deans of these four academic units agreed to support a shared framework for these “X + DS” programs. The framework includes a set of core competencies with a reference standard set of courses and activities that fulfill the data science portion of these programs. A Data Science Education Committee was formed to review how proposed majors provide the expected competencies and features of X + DS programs in a manner that is appropriate for their students. This committee will also keep track of offerings related to data science to facilitate collaboration and reduce redundancy, connect undergraduate data science education resources across the university, advise colleges on matters related to undergraduate data science education, and review X + DS degree proposals to provide comment on how they meet expectations for and engage collaboratively and strategically with the university’s resources in data science education.

Ubiquitous digital technology and the generation of massive amounts of data are rapidly transforming society and multiple fields of inquiry. Data science is emerging as a subject of great importance in many domains of human and scholastic endeavor. This is especially true in materials science and engineering, where multiple national policy documents have called for an integration of data science with materials science to accelerate the discovery and development of new materials. Educating the next generation workforce is a key element. The proposed BS in MatSE + DS is a degree involving the study of data science in the context of materials science and engineering. There has been a growth of data science in recent years across all disciplines, including that of engineering, and specifically as it pertains to the fields of materials science and engineering. The areas of study and research in materials science and engineering increasingly involve modeling, simulation, analysis of materials informatics, and use of computational methods. Being able to gather, organize, interpret, and analyze the large amount of data that is produced from these efforts is becoming an increasingly in-demand skill set for employers and graduate programs.

One of the primary motivations for developing this program is the market demand for students trained in collecting, cataloging, analyzing, and interpreting large quantities of data and applying it in the context of the materials science and engineering fields of study. Graduates of the program will be uniquely trained in the core areas served by the traditional materials science and engineering degree as well, as the emerging field of data science and data analytics. The Bureau of Labor Statistics predicts growth in data science jobs to be far higher than average, with starting salaries for data science graduates higher than average engineering graduates. Linking data science expertise with that of the specific discipline of materials science and engineering makes the program appealing for those who have an interest in the materials science and engineering discipline but also are interested in computational sciences and data analysis and want to improve their job and career growth prospects by adding to their portfolio a field that is growing rapidly.

Based on enrollment projections, the courses required for the MatSE + DS program have capacity or can be expanded using differential tuition revenue. No new or additional facilities, significant improvements to existing facilities, or additional resources from the University Library are needed. No increase in faculty is required, as the college currently has the capacity to accommodate the expected minor increases in enrollments resulting from this program. Students will utilize existing career and advising services.

The Board action recommended in this item complies in all material respects with applicable State and federal laws, University of Illinois *Statutes*, *The General Rules Concerning University Organization and Procedure*, and Board of Trustees policies and directives.

The executive vice president and vice president for academic affairs concurs with this recommendation. The University Senates Conference has indicated that no further Senate jurisdiction is involved.

The president of the University of Illinois System recommends approval. This action is subject to further review by the Illinois Board of Higher Education.