

Data-Enabled Computational Engineering and Science

The Data-Enabled Computational Engineering and Science (DECES) program targets students with recently obtained Bachelor of Science (BS) degrees in Engineering, Applied Mathematics, Computer Science, Physical Sciences, and related disciplines, who are interested in pursuing careers that involve advanced modeling and simulation in engineering and physical sciences. This program will also be of interest to research staff as well as working professionals whose success on the job depends on their ability to perform high-fidelity engineering simulations with data assimilation. Data-Enabled Computational Engineering and Science is an inherently interdisciplinary field requiring in-depth knowledge of advanced mathematics, numerical methods and their computer implementation, engineering sciences, and methods in the emerging field of Data Science. Given the composition of Brown's School of Engineering and Applied Math faculty, we are uniquely positioned to offer such a program using a combined Engineering and Applied Math graduate curriculum.

Program Requirements:

Two courses in Engineering, such as: 2

ENGN 1750	Advanced Mechanics of Solids
ENGN 2010	Mathematical Methods in Engineering and Physics I
ENGN 2020	Mathematical Methods in Engineering and Physics II
ENGN 2210	Continuum Mechanics
ENGN 2220	Mechanics of Solids
ENGN 2340	Computational Methods in Structural Mechanics
ENGN 2410	Thermodynamics of Materials
ENGN 2520	Pattern Recognition and Machine Learning
ENGN 2810	Fluid Mechanics I
ENGN 2820	Fluid Mechanics II
ENGN 2912B	Scientific Programming in C++
ENGN 2912V	Deep Learning for Scientists and Engineers
ENGN 2605	Image Understanding
ENGN 2790	Quantum Optics
ENGN 2980	Special Projects, Reading, Research and Design
ENGN 2930	Atomistic Modeling of Materials

Two courses in Applied Mathematics, such as: 2

APMA 1690	Computational Probability and Statistics
APMA 2070	Deep Learning for Scientists & Engineers
APMA 2190	Nonlinear Dynamical Systems I
APMA 2550	Numerical Solution of Partial Differential Equations I
APMA 2560	Numerical Solution of Partial Differential Equations II
APMA 2570B	Numerical Solution of Partial Differential Equations III
APMA 2580A	Computational Fluid Dynamics
APMA 2630	Theory of Probability I
APMA 2822B	Introduction to Parallel Computing on Heterogeneous (CPU+GPU) Systems

Two courses in data science/high performance computing 2

Two additional courses. To ensure depth these may be taken in Engineering, Applied Mathematics, Data Science, or other relevant disciplines.

2

Total Credits

8

For more information on admission and program requirements for the Data-Enabled Computational Engineering and Science program, please visit <https://computational.engineering.brown.edu/>

Please view sample course plans based on Sc.M. Thesis or Non-Thesis and Curriculum options at <https://computational.engineering.brown.edu/program-and-schedule/> (<https://computational.engineering.brown.edu/program-and-schedule/>)