

Software Engineering Systems, MS

Website (<http://www.coe.neu.edu/degrees/ms-cse/>)

The Software Engineering Systems program takes a sociotechnical, engineering approach to software. This engineering foundation is designed to enable students to embrace real-world complexity as a golden opportunity, especially for the more technically advanced student. We are committed to shaping our students to be intuitive problem solvers, experienced engineering architects, and result leaders who will have a great impact at the exciting three-way intersection of computer science, engineering, and ethics.

Our program offers a multitude of courses in big-data engineering and analytics in addition to supplementary courses that are required to deliver the data-analytics results in a meaningful way to management. We cover data management, advanced data management, business intelligence, column databases, data science, and big-data engineering. We offer advanced functional programming using the powerful Scala language and a course on advanced data science as well as cloud computing. Multi-thread concurrent computing is also offered as it is important for synchronizing a huge set of servers working in parallel to do large-scale analytics to make things run faster by a hundredfold increase in speed. Due to the high-level mathematical operations required to run these programs, only software engineers have the capacity to work in such complicated areas. Only they can make the necessary mathematical algorithms execute quickly enough to get the finest results.

Our engineers become fluent in data science for the sake of building the actual system. They study how to write machine-learning algorithms on top of statistical packages.

- Students study the fundamentals of logical computing formulation and program construction as well as the mathematical modeling and analysis of algorithms—an essential aspect of data science analytics.
- Students study clustering techniques, along with topic modeling and classification and logical regression techniques, as well as Bayesian statistics.
- Students study how to configure and operate a Hadoop environment (large clusters of commodity hardware) and in the process how to integrate data from diverse sources, to move and manage data through big-data platforms (in-house or in the cloud). Data ingestion, the filtering and firing of millions of operations to run over large clusters of commodity hardware, is a software-engineering technique that we teach our students how to perform through Scala, multi-threading, Spark programming, and “map-reduce” techniques.
- We show students how to make the business case for analytics projects and how to follow an execution road map that involves understanding the architectures underpinning such gigantic platforms as well as the resourcing and cost issues.

Graduate Certificate Options

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Software Engineering Systems with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Software Engineering Systems in addition to earning a Graduate Certificate in Engineering Leadership (<http://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-leadership-graduate-certificate/>). Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate will require 16 hours of advisor-approved software design engineering technical courses.

Program Requirements

This program does not accept any transfer credit. All 32 credits must be completed from the CSYE, DAMG, and IS program coursework specified.

Core Requirements

Code	Title	Hours
CSYE 6200	Concepts of Object-Oriented Design	4
INFO 6205	Program Structure and Algorithms	4

Options

Complete one of the following options:

COURSEWORK OPTION

Code	Title	Hours
Complete 24 semester hours from the following lists toward the elective requirement:		24
CSYE		

A maximum of 12 semester hours may be taken from the following list toward the elective requirement:

DAMG or INFO (INFO 6250 excluded)

THESIS OPTION ¹

Code	Title	Hours
CSYE 7990	Thesis	8
Complete 16 semester hours from the following lists toward the elective requirement:		16
CSYE		

A maximum of 8 semester hours may be taken from the following list toward the elective requirement:

DAMG or INFO (INFO 6250 excluded)

Program Credit/GPA Requirements

32 total semester hours required

Minimum 3.000 GPA required

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Students who elect to pursue the thesis option must first propose a topic and adviser for their thesis and receive approval from the program director.