

MS in Economics and Computation  
Departments of Computer Science and Economics  
Sample Course Selections  
March 9, 2019

Formal program requirements <http://econ.duke.edu/msec/program-requirements> are quite flexible -- in part because at Duke we encourage students to tailor programs to meet their specific needs, and in part because the MSEC student body is inherently heterogeneous in terms of background and specific interests. However, it is useful to outline possible **illustrative** course sequences that will be appropriate for incoming students with different backgrounds.

Please note that:

- The conventional load is 3 (9 course credits) graduate courses per semester. A fourth course, graduate or undergraduate, can be added, generally with the advisor's permission. Undergraduate courses do not count toward degree requirements. Non-native speakers of English also should allow time for required English language courses.
- The program normally takes 4 semesters to complete (or 3 semesters and a summer term), though some students do complete the program in 3 semesters.
- Students must be enrolled as full-time students during their first three semesters (barring medical reasons approved by the Dean of the Graduate School). Specifically, this means taking 9 credits (3 full courses) of graduate course work. During the final, graduating semester students can be enrolled part-time, but must be enrolled in at least one course that is part of the degree requirements to maintain enrollment.
- Each student will choose a particular set of courses: there is no specified path, as interests will differ. However, we do ask that you run your plans by both CS and Econ academic advisers.
- The MSEC degree requirement is 30 credit hours (10 full courses) of which no more than 6 hours can be for independent capstone research (independent study) if you go that route. At least 12 credits must come from Computer Science courses numbered 500 or higher and at least 12 must be in Economics, again numbered 500 or higher.
- English language courses do not count toward these requirements. However, nearly everyone will easily exceed the minimum number of course requirement credits.
- Most MSEC students will wish to work as Research or Teaching Assistants. While you should register your availability with SSRI (contact Alexandra Cooper), Economics, and Computer Science, we encourage you not to take on additional duties in your first semester in residence. It is not difficult to find RA or TA positions if you are doing satisfactory academic work; consequently, you should be selective!
- Students must receive a grade of B- or better to have courses counted as part of their earned graduate credit.
- Students must maintain a GPA of 3.00 or greater to be in good academic standing and to graduate.

**Example 1: good Economics background; limited Computer Science background**

Fall 2019	Spring 2020 (plus Summer 2020 if relevant)	Fall 2020	Spring 2021
<b>Sample Core Courses</b>			
Econ 601 MA microeconomic theory	Econ 605 advanced microeconomics or Econ 620 game theory	Compsci 570 artificial intelligence	Compsci 590 computational microeconomics
Econ 608 MA econometrics	Compsci 590 computational microeconomics	Econ 690 financial econometrics	Compsci 516 data intensive computing systems
Compsci 531 algorithms	Compsci 571 probabilistic machine learning	Econ 690 structural modeling and computational techniques	Compsci 671 advanced machine learning
<b>Likely Electives</b>			
Sta 611 Intro to graduate statistics	Econ 602 MA macroeconomic theory	Econ 601 or 602	Econ 883 PhD econometrics of market design
Math 731 advanced calculus (intro to real analysis)	Sta 602 bayesian statistics	Compsci 532 design & analysis of algorithms	Econ 705
	Econ 613 applied (micro) econometrics	Econ 612 time series econometrics	Econ 706 PhD macroeconomics II
	Econ 612 time series econometrics	Econ 701 PhD microeconomics	Econ 707 PhD econometrics II
	BA 950+ PhD courses in finance	Econ 702 PhD macroeconomics	Econ 881 PhD seminars in mechanism design, dynamic discrete choice
	Econ 667 Computer Modeling	Econ 703 PhD econometrics	Econ 882 PhD seminars in macroeconomics & finance
	Econ 676 empirical asset pricing		

**Example 2: good Computer Science background; limited Economics background**

Fall 2019	Spring 2020 (plus Summer 2020 if relevant)	Fall 2020	Spring 2021
<b>Sample Core Courses</b>			
Econ 555 International Trade	Compsci 671 advanced machine learning	Econ 601 MA microeconomic theory	Econ 606 computational macroeconomics
Econ 608 MA econometrics	Econ 612 time series econometrics	Compsci 516 data intensive computing systems	Econ 605 advanced microeconomics or Econ 620 game theory
Compsci 531 algorithms	Econ 667 computer modeling	Econ 690 Structural modeling and computational techniques	Compsci 520 numerical analysis
Compsci 516 data intensive computing systems		Compsci 571D Advanced Machine Learning	Compsci 590 computational microeconomics
		Compsci 570 artificial intelligence	
<b>Likely Electives</b>			
Sta 611 Intro to graduate statistics	Sta 602 bayesian statistics (601 and 602 are substantially the same courses: 601 is taught in the fall and intended for Stat PhD students)	Econ 690 Financial Econometrics	Econ 707 PhD econometrics II
Math 731 advanced calculus (intro to real analysis)	Econ 613 applied (micro) econometrics	Econ 703 PhD econometrics	Econ 881 PhD seminars in mechanism design, dynamic discrete choice
	Econ 676 Empirical Asset Pricing	BA 950+ PhD courses in finance	
	Econ 564 Competitive Strategy & Industrial Organization	Compsci 632 Approximation Algorithms	
	Econ 581 Investment Strategies		

**Example 3: good Computer Science and Economics background**

Fall 2019	Spring 2020 (plus Summer 2020 if relevant)	Fall 2020	Spring 2021
<b>Sample Core Courses</b>			
Econ 601 MA microeconomic theory	Econ 605 advanced microeconomics or Econ 620 game theory	Compsci 570 artificial intelligence	Econ 620 game theory or Econ 690 contract theory
Econ 608 MA econometrics	Compsci 571 machine learning	Econ 690 financial econometrics	Sta 602 bayesian statistics
Compsci 531 algorithms	Econ 612 time series econometrics	Compsci 571D Advanced Machine Learning	Econ 690 Structural modeling and computational techniques
Compsci 590 computational microeconomics	Compsci 671 advanced machine learning		Compsci 520 numerical analysis
<b>Likely Electives</b>			
Sta 611 intro to graduate statistics	Sta 602 bayesian statistics (601 and 602 are substantially the same courses: 601 is taught in the fall and intended for Stat PhD students)	Econ 601 or 602	Econ 883 PhD econometrics of market design
Math 731 advanced calculus (intro to real analysis)	Econ 613 applied (micro) econometrics	Econ 612 time series econometrics	Econ 707 PhD econometrics II
Sta 601 bayesian statistics	Econ 667 computer modeling for policy analysis	Econ 701 PhD microeconomics	Econ 881 PhD seminars in mechanism design, dynamic discrete choice
Econ 703 PhD econometrics	Econ 606 computational macroeconomics	Econ 702 PhD macroeconomics	Econ 882 PhD seminars in macroeconomics & finance
Compsci 590 advanced topics: privacy	Compsci 590 algorithms: decision-making at scale	Econ 703 PhD econometrics	Compsci 590 advanced topics: computer security
BA 912 Dynamic programming & optimal Control		BA 950+ PhD courses in finance	BA 915 stochastic models
		Compsci 632 approximation algorithms	