

ECONOMICS AND COMPUTATION

Economics and Computation

Gain the skills you need to enter the fast-growing field of digital markets with your BS in Economics and Computation from UM-Dearborn!

This degree offers a cutting edge combination of economics and computer science. The modern economy is defined by large digital markets and social networks. Managing these complex marketplaces requires skills from both economics and computer science.

In Economics and Computation you will learn in-demand skills in programming, data management, as well as economics and quantitative analysis, useful for shaping markets and incentives. With this degree you will be able to work in areas such as economic modeling and simulation, business optimization, AI and machine learning, and market analysis with big data.

Students can earn Bachelor of Science in Economics and Computation by taking a combination of online and in person classes.

Economics & Computation Honors Designation

To be recognized as graduating with honors in economics & computation, students must (1) complete all the requirements for their Economics and Computation degree at UM-Dearborn; (2) complete one or more 4000-level economics courses and earn a B+ or higher in each course; (3) complete an Honors research paper as part of a 4-credit hour Directed Research (ECON 499) and earn a B+ or higher; and (4) graduate with an overall 3.25 GPA at UM-Dearborn and a 3.5 GPA in upper level ECON courses.

Students are expected to apply for candidate status for the Honors Award during or before the first term of their senior year at UM-Dearborn. Requirements for *candidate status* include being an Economics and Computation major, having a cumulative 3.25 GPA at UM-Dearborn, having successfully completed at least one core theory course (ECON 301/ECON 302/ECON 305), and earning a 3.5 GPA average in upper level ECON classes.

Dearborn Discovery Core (General Education)

All students must satisfy the University's Dearborn Discovery Core requirements (http://catalog.umd.umich.edu/undergraduate/gen_ed_ddc/), in addition to the requirements for the major. Students must also complete all CASL Degree Requirements. (<http://catalog.umd.umich.edu/undergraduate/college-arts-sciences-letters/>)

Prerequisites to the Major

Code	Title	Credit Hours
CIS 1501	CS I for Data Scientists	4
CIS 2001	CS II for Data Scientists	4
ECON 201	Prin: Macroeconomics	3
ECON 202	Prin: Microeconomics	3
MATH 115	Calculus I	4
MATH 116	Calculus II	4

MATH 227	Introduction to Linear Algebra	3
MATH 276 or CIS 275	Discrete Math Meth Compr Engr Discrete Structures I	4
STAT 305	Introduction to Data Science for All	3
Total Credit Hours		32

Major Requirements

Code	Title	Credit Hours
Core courses		20
CIS 350	Data Struc and Algorithm Anlys	
CIS 421	Database Mgmt Systems	
ECON 301	Intermediate Macroeconomics ^{1,2}	
ECON 302	Intermediate Microeconomics ^{1,2}	
STAT 325	Applied Statistics I ^{1,2}	
Economics and Computation Electives		18-20
Economics Electives: Select 4 additional upper level ECON courses (300/400/4000+ level; excluding ECON 305 and ECON 499) ³		
Computation Electives: Select one courses from the following:		
CIS 3200	Data Science II	
CIS 405	Algorithm Analysis & Design	
CIS 479	Intro to Artificial Intel	
CIS 483	Deep Learning	
STAT 327	Statistical Computing	
Capstone		4
One 4000+ level ECON course.		
Total Credit Hours		42-44

¹ Core courses ECON 301, ECON 302, STAT 325 should be taken no later than the junior year.

² Only one of the three courses may be transferred to UM-D

³ Only 4 credits of economics internship (ECON 398), can be applied to the major requirement.

Notes:

- At least 20 of the 42-44 upper level credit hours in the major must be elected at UM-D.

Learning Goals

1. Economic knowledge: Learn the fundamental concepts, theories, and methodology of economics.

- Learn how to access extant economic knowledge. Develop an understanding of established economic knowledge and schools of thought
- (perspectives).

2. Critical thinking skills: Develop the ability to integrate and apply economic concepts and models to the analysis of problems and to the development and evaluation of economic policy.

- Learn how to develop and evaluate economic arguments.
- Learn to view economic phenomena broadly in a social, environmental, and policy context.

3. Quantitative skills: Develop the ability to collect appropriate data and conduct quantitative analyses in order to measure economic phenomena, test economic theories, evaluate policies, and make decisions.

- Develop information literacy, including the ability to evaluate information sources
- Learn how to develop testable research hypotheses based on economic questions.
- Learn how to collect, clean, and prepare data for the testing of research hypotheses.
- Master fundamental and intermediate quantitative (mathematical and statistical) analysis skills.
- Draw appropriate conclusions based on the analysis of the results and understand their limitations and implications.

4. Modeling skills: Learn how to build and analyze economic models.

- Gain an understanding of the underlying assumptions and resulting limitations of economic models.
- Master the mathematical skills necessary to understand and interpret economic models.
- Learn how to draw quantitative and qualitative economic implications from models.
- Learn how to infer policy implications from economic models.

5. Computational skills: Learn how to effectively utilize programming and software to solve problems, and apply it to large-scale data.

- Be able to analyze a complex computing problem and apply principles of computing to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements.

6. Communication and collaboration skills: Develop the ability to effectively communicate in written and oral form in groups and individually.

- Be able to explain economic concepts, theories, and models to a general audience in written and in oral presentations.
- Be able to explain statistical and modeling approaches to an expert and non-expert audience in written and in oral presentations.
- Be able to explain an economic problem and possible solutions to both general and economic audiences in writing and in oral presentations.
- Develop the ability to work cooperatively and productively as part of a team.