

ECONOMICS AND COMPUTATION

Economics and Computation

The Bachelor of Science (BS) in Economics and Computation offers students a comprehensive preparation for professional careers that integrate economics and computer science. This interdisciplinary major equips students with a diverse set of skills in economics, programming, and data science, all of which are highly sought-after in the business world and academia. The program is tailored for students with a keen interest in pursuing academic or professional paths at the intersection of these two disciplines. Graduates are well-equipped for further studies in economics, computer science, and other STEM-related fields.

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 Comptr 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.