DATA SCIENCE BACHELOR OF SCIENCE

Leading to a Bachelor of Science Degree in Data Science

The Bachelor of Science in Data Science program provides students with a foundation in the fields of statistics and computer science in addition to data-insightful topics such as machine learning, data mining, and data visualization. The curriculum provides hands-on training in data science software for the data analysis lifecycle, including data acquisition, data management, data analysis, model development and deployment, and visualization. Throughout the curriculum, students are made aware of the ethical implications of the elements of the data analysis lifecycle. Students acquire the skillset to be competitive in the job market and apply these skills directly in the work environment through two required co-op work semesters.

Program Educational Objectives

- Apply Mathematical concepts to model real-world problems, implement solutions, and validate outcomes
- Effectively use data science software for data analysis lifecycle: data acquisition, data management, data preparation and integration, data analysis, model development and deployment, and visualization
- Demonstrate competencies in statistical analysis and fundamental computational concepts
- Communicate data findings effectively to an audience, in oral, visual, and/or written formats
- Be aware of the ethical consequences of data-informed decision-making

Student Outcomes

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply theory, techniques, and tools throughout the data analysis lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.

Three Year Program

Total Required Credits: 120

Course	Title	Credits
First Year		
Fall Semester		
COMP1000	COMPUTER SCIENCE I	4
MATH1776	CALCULUS 1A	2
MATH1777	CALCULUS 1B	2
MATH2300	DISCRETE MATHEMATICS	4
English Sequence		4
Science Elective		4
	BIOL1100,BIOL1700, BIOL2200, BIOL3000, CHEM1100,CHEM1600,PHYS1250 PHYS1750,PHYS2000 will satisfy the SCIENCE elective requirement. BIOL2990,CHEM2990,PHYS2990, BIOL3800, CHEM3800 and PHYS3800 require School approval	
	Credits	**20**
Spring Semester		
COMP1050	COMPUTER SCIENCE II	4
MATH1550	FOUNDATIONS OF APPLIED MATHEMATICS	4
MATH1876	CALCULUS 2A	2
MATH1877	CALCULUS 2B	2
English Sequence		4
Science Elective		4
	BIOL1100,BIOL1700, BIOL2200, BIOL3000, CHEM1100,CHEM1600,PHYS1250 PHYS1750,PHYS2000 will satisfy the SCIENCE elective requirement. BIOL2990,CHEM2990,PHYS2990, BIOL3800, CHEM3800 and PHYS3800 require School approval	
	Credits	**20**
Second Year		
Fall Semester		
COMP2000	DATA STRUCTURES	4
COMP2650	DATABASES	4
MATH2100	PROBABILITY & STATISTICS FOR ENGINEERS	4
COMM4335	SEE IT AND SAY IT WITH DATA VIZ	4
HSS Elective*		4
	Credits	**20**
Spring Semester		
COMP2350	ALGORITHMS	4
COMP3125	DATA SCIENCE FUNDAMENTALS	4
MATH2200	ADVANCED STATISTICS	4
MATH2025	MULTIVARIABLE CALCULUS	4
MATH2860	LINEAR ALGEBRA & MATRIX THEORY	4
	Credits	**20**
Summer Semester		
COOP3500	COOP EDUCATION 1	
	Credits	**0**
Third Year		
Fall Semester		
COMP/MATH4050	MACHINE LEARNING	4
DATA3010	DATA MINING	4
Data Science Elective [1]		4
Data Science Elective [1]		4
HSS Elective*		4
	Credits	**20**
Spring Semester		
COOP4500	COOP EDUCATION 2	0
	Credits	**0**

Course	Title	Credits
Summer Semester		
DATA5500	SENIOR DESIGN	4
Data Science Elective [1]		4
Data Science Elective [1]		4
HSS Elective*		4
General Elective [2]		4
	Credits	**20**
	Total Credits	**120**

ENGL/HSS Note

Students are required to complete:

- At least one course in Humanities: CSAS, HSSI, HIST, HUMN, LITR and PHIL
- At least one course in the Social Sciences: CSAS, HSSI, COMM, ECON, ENVM, POLS, PSYC and SOCL
- The remaining course from either the Humanities or Social Sciences category.

Students with a three English course sequence may use the third English course to satisfy a Humanities requirement.

A minimum of 20 credits total, including English, humanities, and social science credit, is required to complete the humanities and social sciences graduation requirement.

At least one of the HSS electives must be an Ethics course.

Math Placement (https://catalog.wit.edu/academic-policies-procedures/ug/math-placement/) may alter the course schedule above.

Data Science Electives

A total of 16 semester credit hours of technical electives must be taken as a part of the program. Students may choose, after consultation with their primary advisor, among the electives offered each semester. Technical elective courses include the following courses. The school may add to the list of available electives on a semester by semester basis.

Course	Title	Credits
MATH1950	FINANCIAL MATHEMATICS	4
MATH2250	TIME SERIES	4
MATH2425	CRYPTOLOGY	4
MATH3150	STOCHASTIC PROCESSES	4
MATH3200	DIFFERENTIAL GEOMETRY	4
MATH3225	FUNCTIONAL ANALYSIS	4
MATH3250	HAZARD & CATASTROPHE MODELING	4
MATH3500	CALCULUS IV	4
MATH4050	MACHINE LEARNING	4
MATH4100	INDUSTRIAL PROBLEMS IN APPLIED MATHEMATICS	4
MATH4400	INTRODUCTION TO ABSTRACT ALGEBRA	4
MATH4475	ACTUARIAL MATHEMATICS	4
MATH4575	COMPLEX VARIABLES	4
MATH4875	REAL ANALYSIS I	4
MATH4975	REAL ANALYSIS II	4

Course	Title	Credits
MGMT2750	INTEGRATIVE FINANCIAL ACCOUNTING (requires School approval)	4
COMP4750	EMBEDDED ARTIFICIAL INTELLIGENCE	4
COMP4725	BIG DATA PROGRAMMING	4
COMP3725	SOCIAL NETWORK ANALYSIS	4
Any 2000-Level courses in BIOE,BIOL, BMED,CHEM,CIVE,COMP,ELEC,ELMC,ENGR,ENVM,MECH,PHYS,SCI will also count as Technical Electives* Prerequisites must be met and School approval is required.		
Any DATA course		

Four Year Program

Total Required Credits: 120

Course	Title	Credits
First Year		
Fall Semester		
COMP1000	COMPUTER SCIENCE I	4
MATH1776	CALCULUS 1A	2
MATH1777	CALCULUS 1B	2
MATH2300	DISCRETE MATHEMATICS	4
English Sequence		4
	Credits	**16**
Spring Semester		
COMP1050	COMPUTER SCIENCE II	4
MATH1550	FOUNDATIONS OF APPLIED MATHEMATICS	4
MATH1876	CALCULUS 2A	2
MATH1877	CALCULUS 2B	2
English Sequence		4
	Credits	**16**
Second Year		
Fall Semester		
COMP2000	DATA STRUCTURES	4
MATH2100	PROBABILITY & STATISTICS FOR ENGINEERS	4
MATH2860	LINEAR ALGEBRA & MATRIX THEORY	4
HSS Elective*		4
	Credits	**16**
Spring Semester		
COMP2350	ALGORITHMS	4
COMP3125	DATA SCIENCE FUNDAMENTALS	4
MATH2200	ADVANCED STATISTICS	4
General Elective		4
	Credits	**16**
Summer Semester		
COOP3000	PRE CO-OP WORK TERM (OPTIONAL)	1
	Credits	**1**
Third Year		
Fall Semester		
DATA3010	DATA MINING	4
COMP2650	DATABASES	4

Course	Title	Credits
COMM4335	SEE IT AND SAY IT WITH DATA VIZ	4
Science Elective		4

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	Credits	16
Spring Semester		
COOP3500	COOP EDUCATION 1	
	Credits	**0**
Summer Semester		
MATH2025	MULTIVARIABLE CALCULUS	4
Data Science Elective [1]		4
HSS Elective*		4
Science Elective		4

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	Credits	16
Fourth Year		
Fall Semester		
COMP/MATH4050	MACHINE LEARNING	4
Data Science Elective [1]		4
HSS Elective*		4
	Credits	**12**
Spring Semester		
COOP4500	COOP EDUCATION 2	
	Credits	**0**
Summer Semester		
DATA5500	SENIOR DESIGN	4
Data Science Elective [1]		4
Data Science Elective [1]		4
	Credits	**12**
	Total Credits	**121**

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