NEXUS IN DATA SCIENCE

Overview and Contact Information

Data science is an emerging discipline that integrates computational, programming, and statistical skills in applications across a range of fields. This discipline uses different types of data to create an accessible narrative and helps pose new questions, identify patterns, visualize trends, and make predictions using new techniques. Data scientists have the potential to offer novel insights, expand our ability to ask questions that push the limits of our understanding, and harness the creativity, critical thinking, and communication skills that form the core of a liberal arts education. The vast quantities of data created by modern life make data science possible but also drive the need for an approach to the discipline that takes privacy and other ethical considerations seriously.

See Also

- Data Science (Major) (http://catalog.mtholyoke.edu/areas-study/data-sci/)
- Computer Science (http://catalog.mtholyoke.edu/areas-study/computer-science/)
- Statistics (http://catalog.mtholyoke.edu/areas-study/statistics/)

Contact Information

Eleanor Townsley, Nexus director
Amber Douglas, track chair
Martha Hoopes, track chair

217G Dwight Hall
413-538-3010

Faculty

This area of study is administered by the Data Science committee:

Valerie Barr, Jean E. Sammet Professor of Computer Science, Teaching Spring Only

Martha Hoopes, Professor of Biological Sciences

Barbara Lerner, Professor of Computer Science

Jessica Sidman, Professor of Mathematics on the John Stewart Kennedy Foundation, Teaching Fall Only

Eleanor Townsley, Andrew W. Mellon Professor of Sociology and Director of Nexus, Teaching Fall Only

Mara Breen, Associate Professor of Psychology and Education

KC Haydon, Associate Professor of Psychology and Education

Katherine Lande, Associate Professor of Economics, Teaching Spring Only

Heather Pon-Barry, Associate Professor of Computer Science, Teaching Fall Only

Andy Reiter, Associate Professor of Politics and International Relations

Steven Schmeiser, Associate Professor of Economics, On Leave 2021-2022

Dylan Shepardson, Robert L. Rooke Associate Professor of Mathematics

Kate Singer, Associate Professor of English, Teaching Fall Only

Requirements for the Nexus

A minimum of 18 credits:

Code	Title	Credits
Four 4-credit courses, of which:		**16**
one must be in statistics at the 200 level or higher, from the list of courses approved for this Nexus		
one must be in computer science at the 200 level or higher, from the list of courses approved for this Nexus		
one must be in an application area (e.g., biology, economics, English, psychology, sociology) at the 200 level or higher, from the list of courses approved for this Nexus		
one is an elective course that demonstrates an interest in data science and that may be taken at the 100 level and must be taken before the internship		
Note: at least one of these four courses must be an approved 300-level capstone course that goes into depth in statistics, computer science, or a data science application area. Appropriate courses include: COMSC-335, ECON-320, SOCI-316NT, STAT-340 or STAT-344 [2]		
Completion of the UAF application stages 1 and 2 [1]		
A substantive internship		
COLL-211	Reflecting Back: Connecting Internship and Research to Your Liberal Arts Education	2
A presentation at LEAP Symposium		
Total Credits		**18**

[1] Or a fifth class with approval of the track chair

[2] Other capstone courses would require prior approval from the Nexus committee

Additional Specifications

- In one of the four courses for this Nexus, students must work intimately with data to explore, visualize, contextualize, and present conclusions.
- The sequence of a Nexus is part of what makes it unique. Students must complete at least one of their four courses towards the Nexus and UAF application stages 1 and 2 before the internship or research project. COLL-211 is taken after the internship or research project and culminates in a presentation at LEAP Symposium.

Courses Counting toward the Nexus

Courses other than those listed below may count toward the Nexus. Students should consult the Nexus track chair for consideration of courses not on the list.

Code	Title	Credits
Astronomy		
ASTR-226	Cosmology	4
ASTR-228	Astrophysics I: Stars and Galaxies	4
Biological Sciences		
BIOL-223	Ecology	4
BIOL-234	Biostatistics	4
Computer Science		

COMSC-100	Computing and the Digital World	4
COMSC-106	Fundamentals of Applied Computing	4
COMSC-133DV	Data Visualization: Design and Perception	4
COMSC-151DS	Introduction to Computational Problem Solving: 'Big Data'	4
COMSC-205	Data Structures	4
COMSC-311	Theory of Computation	4
COMSC-312	Algorithms	4
COMSC-334	Artificial Intelligence	4
COMSC-335	Machine Learning	4
COMSC-341NL	Topics: 'Natural Language Processing'	4
COMSC-343	Programming Language Design and Implementation	4
Economics		
ECON-220	Introduction to Econometrics	4
ECON-320	Econometrics	4
Environmental Studies		
ENVST-200	Environmental Science	4
Geography		
GEOG-205	Mapping and Spatial Analysis	4
GEOG-210	GIS for the Social Sciences and Humanities	4
GEOG-320	Research with Geospatial Technologies	4
International Relations		
IR-200	Research Methods	4
Mathematics		
MATH-211	Linear Algebra	4
MATH-301	Real Analysis	4
MATH-339PT	Topics in Applied Mathematics: 'Optimization'	4
MATH-342	Probability	4
Philosophy		
PHIL-180DE	Topics in Applied Philosophy: 'Data Ethics'	4
Psychology		
PSYCH-201	Statistics	4
PSYCH-204	Research Methods in Psychology	4
PSYCH-310AP	Laboratory in Social Psychology: 'Community-Based Participatory Action Research'	4
PSYCH-310QR	Laboratory in Social Psychology: 'Qualitative Research in Psychology'	4
PSYCH-330RD	Lab in Developmental Psychology: 'Laboratory in Romantic Development: Observational Coding Methodology'	4
Sociology		
SOCI-225	Social Science Research and Data Analysis	4
SOCI-316ST	Special Topics in Sociology: 'Storytelling Sociology: Data for the People'	4
Statistics		
STAT-242	Intermediate Statistics	4
STAT-331	Design of Experiments	4
STAT-340	Applied Regression Methods	4
STAT-343	Mathematical Statistics	4
STAT-344TM	Seminar in Statistics and Scientific Research: 'Time Series Analysis'	4