UNIVERSITY SENATE | LEGISLATION APPROVAL | #20-21-35

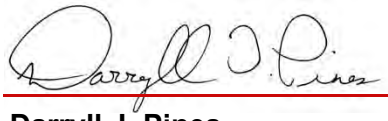
Approved by the Senate on April 6, 2021

PCC Proposal to Establish a Bachelor of Science in Social Data Science (Senate Document #20-21-35)

TO **Darryll J. Pines | President**

FROM **Laura Dugan | Chair, University Senate**

I am pleased to forward the accompanying legislation for your consideration and approval. Valérie Orlando, Chair of the Programs, Curricula, & Courses Committee, presented the PCC Proposal to Establish a Bachelor of Science in Social Data Science (Senate Document #20-21-35), which the University Senate approved at its meeting on April 6, 2021. Please inform the Senate of your decision and any administrative action related to your conclusion.

Approved:  **Date:** **04-09-2021**

Darryll J. Pines
President

Copies of this approval and the accompanying legislation will be forwarded to:

Ann G. Wylie, Interim Senior Vice President and Provost
Reka Montfort, Executive Secretary and Director, University Senate
Michael Poterala, Vice President and General Counsel
Cynthia Hale, Associate Vice President for Finance and Personnel
John Bertot, Associate Provost for Faculty Affairs
Elizabeth Beise, Associate Provost for Academic Planning & Programs
Rhonda Smith, Acting Director, Division of Academic Affairs
Gregory Ball, Dean, College of Behavioral and Social Sciences
Katherine Russell, Associate Dean, College of Behavioral and Social Sciences
Kate Izsak, Assistant Dean for Academic Affairs, College of Information Studies
Valérie Orlando, Chair, Senate Programs, Curricula, and Courses Committee

Establish a Bachelor of Science in Social Data Science (PCC 20070)

PRESENTED BY	**Valerie Orlando, Chair, Senate Programs, Curricula, and Courses Committee**
REVIEW DATES	**SEC – February 23, 2021 | SENATE – March 3, 2021**
VOTING METHOD	**In a single vote**
RELEVANT POLICY/DOCUMENT	**NA**
NECESSARY APPROVALS	**Senate, President, University System of Maryland Board of Regents, and Maryland Higher Education Commission**

ISSUE

The Colleges of Behavioral and Social Science (BSOS) and Information Studies (iSchool) propose to establish a Bachelor of Science in Social Data Science. The program is predicated on the notion that creating information products that capture aspects of human behavior requires an increasingly complex set of skills and knowledge. The practice of social data science encompasses all elements of the data life cycle, including measure conceptualization, data gathering, management, manipulation, analysis, presentation, archiving, and re-use. Data and theory are inextricably intertwined – understanding social science theory is essential for effective and appropriate construction, analysis, and use of social data. This program will combine the expertise of BSOS and INFO faculty members to prepare students to effectively, ethically and efficiently create high quality information products, such as datasets, visualizations, and models, about human activity and behavior.

Students take a set of core courses housed primarily in the iSchool and BSOS's Joint Program in Survey Methodology (JPSM). They then select a BSOS cognate discipline, in which they train in relevant theory and methods, from among the following options: African American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, or Sociology. Students may not enroll in a double-major or double-degree with the Social Data Science major and the BSOS major of their cognate area because of the significant overlap in coursework.

The program requires 51-59 credits. The core courses include foundational courses in programming, statistics, mathematics, and data science, as well as upper-level courses in database design, data privacy and security, ethics, data sources and manipulation, data visualization, survey fundamentals, and questionnaire design. Students also take a set of cognate courses in a BSOS discipline that include introductory benchmark courses, upper-level method and theory courses, and a set of restricted electives that will allow students to deepen their knowledge of the discipline and apply data science principles to social science research and practice. Students finish the program by taking a required capstone course.

Understanding data science is becoming increasingly important in a variety of fields as data sets grow larger and larger. Just as important is understanding the ethical, legal, and social

responsibilities that must be maintained at all stages of the effort. This program's core courses will prepare students to work with data science practices, technologies, tools, and sources across disciplines and industries, while the cognate courses will provide students with opportunities to apply these skills in a particular social science context.

This proposal was approved by the Senate Programs, Curricula, and Courses committee on February 5, 2021.

RECOMMENDATION(S)

The Senate Committee on Programs, Curricula, and Courses recommends that the Senate approve this bachelor's degree program.

COMMITTEE WORK

The committee considered this proposal at its meeting on February 5, 2021. BSOS Associate Dean Katherine Russell and iSchool Assistant Dean Kate Izsak presented the proposal and answered questions from the committee. The proposal was approved by the committee.

ALTERNATIVES

The Senate could decline to approve this new bachelor's degree program.

RISKS

If the Senate declines to approve this degree program, the university will lose an opportunity to provide an innovative, interdisciplinary major that prepares students for the expanding field of data science.

FINANCIAL IMPLICATIONS

This program proposal is part of an emerging campus-wide strategy to increase opportunities for undergraduate students to gain knowledge and skills that are widely applied across many disciplines, including the social sciences as is the focus here. Expenditures identified in the proposal represent the best estimate of what would be required to launch a successful program. Resources to deliver it, along with the companion efforts in other colleges, are still in the process of being identified. If endorsed by the Senate and approved by the President, the proposal will move forward to the state for approval only after a financial plan has been completed.

761: SOCIAL DATA SCIENCE

In Workflow

1. BSOS Curriculum Manager (khall@umd.edu; gdenbow@umd.edu)
2. INFO Curriculum Manager (emilyd@umd.edu; kworboys@umd.edu)
3. BSOS PCC Chair (khall@umd.edu)
4. INFO PCC Chair (bsbutler@umd.edu; kworboys@umd.edu)
5. BSOS Dean (khall@umd.edu; krussell@umd.edu; jmcgloin@umd.edu)
6. INFO Dean (bsbutler@umd.edu; kworboys@umd.edu; marzullo@umd.edu)
7. Academic Affairs Curriculum Manager (mcolson@umd.edu)
8. Senate PCC Chair (mcolson@umd.edu; vorlando@umd.edu)
9. University Senate Chair (mcolson@umd.edu)
10. President (mcolson@umd.edu)
11. Board of Regents (mcolson@umd.edu)
12. MHEC (mcolson@umd.edu)
13. Provost Office (mcolson@umd.edu)
14. Undergraduate Catalog Manager (lyokoi@umd.edu; wbryan@umd.edu)

Approval Path

1. Tue, 12 Jan 2021 19:46:21 GMT
   Kristi Hall (khall): Approved for BSOS Curriculum Manager
2. Tue, 12 Jan 2021 20:00:40 GMT
   Katherine Izsak (kworboys): Approved for INFO Curriculum Manager
3. Tue, 12 Jan 2021 20:01:26 GMT
   Kristi Hall (khall): Approved for BSOS PCC Chair
4. Tue, 12 Jan 2021 20:57:46 GMT
   Katherine Izsak (kworboys): Approved for INFO PCC Chair
5. Tue, 12 Jan 2021 21:15:50 GMT
   Katherine Russell (krussell): Approved for BSOS Dean
6. Tue, 12 Jan 2021 21:37:49 GMT
   Katherine Izsak (kworboys): Approved for INFO Dean
7. Fri, 29 Jan 2021 21:43:03 GMT
   Michael Colson (mcolson): Approved for Academic Affairs Curriculum Manager
8. Sat, 06 Feb 2021 09:14:32 GMT
   Valerie Orlando (vorlando): Approved for Senate PCC Chair

New Program Proposal

Date Submitted: Tue, 12 Jan 2021 19:40:42 GMT

Viewing: 761 : Social Data Science

Last edit: Tue, 16 Feb 2021 16:32:48 GMT

Changes proposed by: Katherine Izsak (kworboys)

Program Name

Social Data Science

Program Status

Proposed

Effective Term

Fall 2022

Catalog Year

2022-2023

Program Level

Undergraduate Program

Program Type

Undergraduate Major

Delivery Method

On Campus

Colleges

College
Information Studies
Behavioral and Social Sciences

Degree(s) Awarded

Degree Awarded
Bachelor of Science

Proposal Contact

Kate Izsak, kworboys@umd.edu

Proposal Summary

This is a proposal to establish a Bachelor of Science in Social Data Science. The undergraduate major will sit jointly within two colleges: College of Information Studies (iSchool) and College of Behavioral and Social Sciences (BSOS). The program is predicated on the notion that creating information products that capture aspects of human behavior requires an increasingly complex set of skills and knowledge. The program will prepare students to effectively, ethically and efficiently create high quality information products, such as datasets, visualizations, and models, about human activity and behavior. Students take a set of core courses housed primarily in the iSchool and BSOS's Joint Program in Survey Methodology (JPSM). They then select a cognate social science discipline, in which they train in relevant theory and methods, from among the following options: African-American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, or Sociology.

(PCC Log Number 20070)

Program and Catalog Information

Provide the catalog description of the proposed program. As part of the description, please indicate any areas of concentration or specializations that will be offered.

Creating information products that capture aspects of human behavior requires an increasingly complex set of skills and knowledge. This program combines the expertise of faculty members from the College of Information Studies (iSchool) and the College of Behavioral and Social Sciences (BSOS) to prepare students to effectively, ethically and efficiently create high quality information products, such as datasets, visualizations, and models, about human activity and behavior. This critical suite of knowledge and skills is essential in many domains, including government, healthcare, sustainability, economics, entertainment, human rights, equity, and others. Students take a set of core courses housed primarily in the iSchool and BSOS's Joint Program in Survey Methodology (JPSM). They then select a cognate discipline, in which they train in relevant theory and methods, from among the following options: African-American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, or Sociology.

Restriction: Students may not enroll in a double-major or double-degree with the Social Data Science major and the BSOS major of their cognate area because of the significant overlap in coursework.

Catalog Program Requirements:

Major course requirements consist of core courses and cognate courses in one of the following cognates: African American Studies, Anthropology, Economics, Geographical Sciences, Government & Politics, Psychology, and Sociology. Students will not be permitted to add a double-major or a double-degree with Social Data Science and the BSOS major associated with their cognate area. Both core courses and cognate courses include benchmark courses. Failure of a student to complete both sets of benchmark courses within the timeline indicated may result in probation and/or dismissal from the major. Benchmark I courses must be completed with a C- or higher within the first two semesters of the program. Benchmark II courses must be completed within the first three semesters of the program.

Social Data Sciences Requirements

Course	Title	Credits
Benchmark I Core Courses:		
INST126	Introduction to Programming for Information Science	3

or GEOG276	Principles of Python Programming and Geocomputing	
STAT100	Elementary Statistics and Probability	3
Math Course (Based on Cognate Requirement):		3
For African-American Studies, Anthropology, Government & Politics, and Sociology Cognates:		
MATH115	Precalculus	
For Economics, Geographical Sciences, and Psychology Cognates:		
MATH120	Elementary Calculus I	
Additional Core Courses:		
BSOS233	Course BSOS233 Not Found (Data Science for Social Sciences)	3
Choose One:		3
INST326	Object-Oriented Programming for Information Science	
BSOS326	Python Programming for the Social Sciences (Python Programming for the Social Sciences)	
GEOG376	Introduction to Computer Programming for GIS	
INST327	Database Design and Modeling	3
INST366	Privacy, Security and Ethics for Big Data	3
INST414	Data Science Techniques	3
INST447	Data Sources and Manipulation	3
INST462	Introduction to Data Visualization	3
SURV400	Fundamentals of Survey and Data Science	3
SURV430	Fundamentals of Questionnaire Design	3
Capstone		
INST492	Course INST492 Not Found (Integrated Capstone for Social Data Science)	3
Cognate Courses (see below for specific requirements)		**12-20**
Total Credits		**51-59**

African American Studies Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
AASP101	Public Policy and the Black Community	3
AASP210	Intro to Research Design and Analysis in African American Studies	3
Cognate I Requirement:		
AASP395	Fundamentals of Quantitative Research in Socio-Cultural Perspective	3
Cognate II Requirement:		
Nine credits from the following list:		9
AASP301	Applied Policy Analysis and the Black Community	
AASP310	African Slave Trade	
AASP313	Black Women in United States History	
AASP314	The Civil Rights Movement	
AASP400	Directed Readings in African American Studies	
AASP402	Classic Readings in African American Studies	
AASP411	Black Resistance Movements	
AASP441	Science, Technology, and the Black Community	
AASP443	Blacks and the Law	
AASP499	Advanced Topics in Public Policy and the Black Community	
Total Credits		**18**

Anthropology Cognate

Students in the Anthropology cognate choose one of three tracks: Health, Heritage, or Environment.

Course	Title	Credits
Health Track		
Benchmark II Health Track Cognate Courses:		
ANTH210	Introduction to Medical Anthropology and Global Health	3

INST314	Statistics for Information Science	3
Health Track Cognate I Requirement:		
ANTH310	Method & Theory in Medical Anthropology and Global Health	3
Health Track Cognate II Requirement:		
Nine credits from the following list:		9
ANTH411	Anthropology of Immigration and Health	
ANTH412	Hypermarginality and Urban Health	
ANTH413	Health Disparities in the United States	
ANTH415	Advanced Studies in Global Health	
ANTH416	Anthropology of Global Violence	
Heritage Track		
Benchmark II Heritage Track Cognate Courses:		
ANTH240	Introduction to Archaeology	3
INST314	Statistics for Information Science	3
Heritage Track Cognate I Requirement:		
ANTH340	Method and Theory in Archaeology	3
Heritage Track Cognate II Requirement:		
Nine credits from the following list:		9
ANTH341	Introduction to Zooarchaeology	
ANTH440	Theory and Practice of Historical Archaeology	
ANTH441	Archaeology of Diaspora	
ANTH447	Material Culture Studies in Archaeology	
ANTH448	Special Topics in Archaeology	
ANTH451	Environmental Archaeology	
ANTH464	Anthropology of Cultural Heritage	
ANTH496	Field Methods in Archaeology	
Environment Track		
Bookmark II Environment Track Cognate Courses:		
ANTH222	Introduction to Ecological and Evolutionary Anthropology	4
INST314	Statistics for Information Science	3
Environment Track Cognate I Requirement:		
ANTH322	Method and Theory in Ecological Anthropology	3
Environment Track Cognate II Requirement:		
Nine credits from the following list:		9
ANTH450	Theory and Practice of Environmental Anthropology	
ANTH454	Political Ecology	
ANTH456	Conservation and Indigenous People in South America	
ANTH462	Amazon Through Film	
ANTH467	Researching Environment and Culture	

Economics Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
ECON200	Principles of Microeconomics	3
ECON201	Principles of Macroeconomics	3
ECON230	Applied Economic Statistics	3
Cognate I Requirement:		
ECON305	Intermediate Macroeconomic Theory and Policy	3
or ECON306	Intermediate Microeconomic Theory & Policy	
Cognate II Requirement: [1]		
Six credits from the following list:		6
ECON305	Intermediate Macroeconomic Theory and Policy	

or ECON306	Intermediate Microeconomic Theory & Policy
ECON311	American Economic History Before the Civil War
ECON312	American Economic History After the Civil War
ECON315	Economic Development of Underdeveloped Areas
ECON317	Global Economic Policies
ECON330	Money and Banking
ECON340	International Economics
Total Credits	**18**

[1] The course taken for the Cognate I requirement may not also be used for the Cognate II requirement. No double-count for these two categories.

Geographical Sciences Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
GEOG202	Introduction to Human Geography	3
GEOG306	Introduction to Quantitative Methods for the Geographical Environmental Sciences	3
Cognate I Requirement:		
GEOG373	Geographic Information Systems	3
Cognate II Requirement:		
9 credits from the following list (six must be at the 400-level):		9
GEOG330	As the World Turns: Society and Sustainability in a Time of Great Change	
GEOG331	Introduction to Human Dimensions of Global Change	
GEOG332	Economic Geography	
GEOG333	The Social Geography of Metropolitan Areas in Global Perspective	
GEOG335	Population Geography	
GEOG415	Land Use, Climate Change, and Sustainability	
GEOG416	Conceptualizing and Modeling Human-Environmental Interactions	
GEOG421	Changing Geographies of China	
GEOG422	Changing Geographies of Sub-Saharan Africa	
GEOG432	Spatial Econometrics	
GEOG470	Spatial Data Algorithms	
GEOG473	Geographic Information Systems and Spatial Analysis	
GEOG475	Computer Cartography	
GEOG477	Mobile GIS Development	
Total Credits		**18**

Government and Politics Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
GVPT170	American Government	3
GVPT200	International Political Relations	3
GVPT201	Scope and Methods for Political Science Research	3
Cognate I Requirement:		
GVPT320	Advanced Empirical Research	3
Cognate II Requirement:		
Any six credits of GVPT coursework at the 300- or 400- levels		6
Total Credits		**18**

Psychology Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
PSYC100	Introduction to Psychology	3
PSYC200	Statistical Methods in Psychology	3

Cognate I Requirement:		
PSYC300	Research Methods in Psychology Laboratory	4
Cognate II Requirement:		
Nine credits from the following list:		9
PSYC330	Child Psychopathology	
PSYC332	Psychology of Human Sexuality	
PSYC334	Psychology of Interpersonal Relationships	
PSYC336	Psychology of Women	
PSYC341	Introduction to Memory and Cognition	
PSYC344	Health Psychology	
PSYC353	Adult Psychopathology	
PSYC354	Multicultural Psychology in the U.S.	
PSYC355	Developmental Psychology	
PSYC356	Psychology of Adolescence	
PSYC361	Survey of Industrial and Organizational Psychology	
PSYC362	Introduction to Negotiation	
PSYC416	Development of Attachment in Infancy and Childhood: Theory, Research, Methods, and Clinical Implications	
PSYC417	Data Science for Psychology and Neuroscience Majors	
PSYC420	Experimental Psychology: Social Psychology Laboratory	
PSYC424	Communication and Persuasion	
PSYC425	Psychology and Law	
PSYC432	Counseling Psychology: Theories, Research, and Practice	
PSYC435	Theories of Personality and Psychotherapy	
PSYC436	Introduction to Clinical Psychology: From Science to Practice	
PSYC437	The Assessment and Treatment of Addictive Behaviors	
PSYC440	Experimental Psychology: Cognitive Processes and Legal Applications	
PSYC450	Applying Psychology to the Workplace: Industrial Organizational Psychology Laboratory	
PSYC456	Research Methods in Developmental Psychology Laboratory	
PSYC460	Psychological Foundations of Personnel Selection and Training	
Total Credits		**19**

Sociology Cognate

Course	Title	Credits
Benchmark II Cognate Courses:		
SOCY100	Introduction to Sociology	3
SOCY201	Introductory Statistics for Sociology	4
Cognate I Requirement:		
SOCY202	Introduction to Research Methods in Sociology	4
Cognate II Requirement:		
Nine credits from the following list:		9
SOCY325	The Sociology of Gender	
SOCY335	Sociology of Health and Illness	
SOCY401	Intermediate Statistics for Sociologists	
SOCY405	Scarcity and Modern Society	
SOCY406	Globalization	
SOCY407	Explaining Social Change: Historical and Comparative Methods	
SOCY410	Social Demography	
SOCY411	Demographic Techniques	
SOCY412	Family Demography	
SOCY413	Sociology of Aging	
SOCY415	Environmental Sociology	

SOCY420	Qualitative Research Methods in Sociology
SOCY430	Social Structure and Identity
SOCY431	Principles of Organizations
SOCY432	Social Movements
SOCY441	Social Stratification and Inequality
SOCY442	The Black Middle Class
SOCY444	Sociology of Children
SOCY445	Sex and Love in Modern Society
SOCY457	Sociology of Law
SOCY464	Military Sociology
SOCY465	The Sociology of War
SOCY467	Sociology of Education
SOCY480	Researching the Middle East
SOCY490	Experimental Research Practicum
SOCY491	Experimental Research Design
Total Credits	**20**

****

The major course requirements and options are outlined below and in Appendix I. Failure of a student to complete both sets of benchmark courses within the timeline indicated may result in probation and/or dismissal from the major.

Please also note that some of the introductory courses for the social data science major could be used as service courses for students in other colleges/majors across campus, if the appropriate resources are available to scale-up the seats.

Benchmark I - The below courses must be completed with a C- or higher within the first two semesters of the program:

- Choose 1:
  - INST126 Introduction to Programming for Information Science (3). An introduction to computer programming for students with very limited or no previous programming experience. Topics include fundamental programming concepts such as variables, data types, assignments, arrays, conditionals, loops, functions, and I/O operations.
    - Minimum grade of C- in MATH115 or math eligibility of MATH140 or higher
  - GEOG276 Principles of Python Programming for Social and Environmental Sciences (3). Introduces conceptual and practical aspects of scientific computing using the Python programming language. The main focus is on developing proficiency for the basic elements of the development environment, foundational syntax including variables, logical operators, looping, conditional statements, nesting, and common programming patterns for mathematical and textual computing. In addition, essential data structures and functionality for scientific computing, such as arrays, dataframes, and data visualization will be introduced. Throughout the course, students will also become exposed to various applications in the domain of the social and environmental sciences.
- STAT100 Elementary Statistics and Probability (3). Simplest tests of statistical hypotheses; applications to before-and-after and matched pair studies. Events, probability, combinations, independence. Binomial probabilities, confidence limits. Random variables, expected values, median, variance. Tests based on ranks. Law of large numbers, normal approximation. Estimates of mean and variance.
  - Minimum grade of C- in MATH110, MATH112, MATH113, or MATH115; or math eligibility of STAT100
- Choose 1 depending on cognate math requirement:
  - MATH115 Precalculus (3). Preparation for MATH120, MATH130 or MATH140. Elementary functions and graphs: polynomials, rational functions, exponential and logarithmic functions, trigonometric functions. Algebraic techniques preparatory for calculus.
    - Must have math eligibility of MATH115 or higher; and math eligibility is based on the Math Placement Exam or the successful completion of MATH003 with appropriate eligibility
  - MATH120 Elementary Calculus I (3). Basic ideas of differential and integral calculus, with emphasis on elementary techniques of differentiation and applications.
    - 1 course with a minimum grade of C- from (MATH112, MATH113, MATH115)
    - Required for Economics, Geography and Psychology cognate areas.

Benchmark II (also counted as core cognate courses) - The below courses must be completed with a C- or higher within the first three semesters of the program:

- Introduction to the selected cognate discipline and cognate discipline statistics and/or empirical research course (6-9 credits total, depending on discipline)

- African-American Studies cognate students will take 6 credits:
  - AASP101 Public Policy and the Black Community (3). The impact of public policies on the black community and the role of the policy process in affecting the social, economic and political well-being of minorities. Particular attention given to the post-1960 to present era.
  - AASP210 Intro to Research Design and Analysis in African American Studies (3). Introduces students to quantitative and qualitative research methods used in social science with a focus on Black populations and African American Studies Research. Uses practical exercises, such as class surveys and mock focus groups, to examine fundamental concepts of the research process from conceptualization of research questions to interpretation of data and research articles. The course is designed for undergraduate students with little or no background knowledge in social science research methods.
- Anthropology cognate students will take 6-7 credits:
  - Choose 1 (choice determines whether a student is on the health, heritage, or environment track):
    - ANTH210 Introduction to Medical Anthropology and Global Health (3). An introduction to the central concepts in medical anthropology and the anthropology of global health. This course is a survey of anthropological notions of health, disease, and the body in cross-cultural and global contexts, including classic and contemporary texts. It will provide an examination of systems of knowledge and practice with regard to illness, healing, and global health inequities.
    - ANTH240 Introduction to Archaeology (3). Exploration of the variety of past human societies and cultures through archaeology, from the emergence of anatomically modern humans to the more recent historical past.
    - ANTH222 Introduction to Ecological and Evolutionary Anthropology (4). An introduction to the evolution of human physiology and human behavior, the relationship between hominid and non-hominid primates, and the study of relationships between a population of humans and their biophysical environment.
  - INST314 Statistics for Information Science (3). Basic concepts in statistics including measure construction, data exploration, hypothesis development, hypothesis testing, pattern identification, and statistical analysis. The course also provides an overview of commonly used data manipulation and analytic tools. Through homework assignments, projects, and in-class activities, you will practice working with these techniques and tools to create information resources that can be used in individual and organizational decision-making and problem-solving.
    - Minimum grade of C- in STAT100 and MATH115 (or higher) or minimum grade of C- in STAT100 and math eligibility of MATH115 or higher
    - Note: INST314 is used here because ANTH does not have a designated upper-level statistics course
- Economics cognate students will take 9 credits:
  - ECON200 Principles of Microeconomics (3). Introduces economic models used to analyze economic behavior by individuals and firms and consequent market outcomes. Applies conceptual analysis to several policy issues and surveys a variety of specific topics within the broad scope of microeconomics.
    - Minimum grade of C- in MATH107 or MATH110; or math eligibility of MATH113 or higher
  - ECON201 Principles of Macroeconomics (3). An introduction to how market economies behave at the aggregate level. The determination of national income/output and the problems of unemployment inflation, will be examined, along with monetary and fiscal policy.
    - Minimum grade of C- in MATH107 or MATH110; or math eligibility of MATH113 or higher
  - ECON230 Applied Economic Statistics (3). Introductory course to develop understanding of statistical concepts used in applied economics. Students will acquire skills needed to calculate and interpret statistical concepts, including descriptive statistics, probability, discrete and continuous distributions, sampling, point and interval estimations, hypothesis testing, basic analysis of variance, and simple linear regression models. Students will apply these concepts to data using both handheld calculators and spreadsheets(Excel), and students will be introduced to an econometric software package such as SPSS or SAS or R.
    - Math eligibility of MATH113 or higher; or 1 course with a minimum grade of C- from (MATH107, MATH110). And minimum grade of C- in ECON200 and ECON201
- Geography cognate students will take 6 credits:
  - GEOG202 Introduction to Human Geography (3). Introduction to what geographers do and how they do it. Systematic study of issues regarding social and cultural systems from a global to a local scale. Looks at the distribution of these variables and answers the question "Why here, and not there"?
  - GEOG306 Introduction to Quantitative Methods for the Geographic Environmental Sciences (3). Essentials in the quantitative analysis of spatial and other data, with a particular emphasis on statistics and programming. Topics include data display, data description and summary, statistical inference and significance tests, analysis of variance, correlation, regression, and some advanced concepts, such as matrix methods, principal component analysis, and spatial statistics. Students will develop expertise in data analysis using advanced statistical software.
- Government and Politics/International Relations cognate students will take 9 credits:

    - GVPT170 American Government (3). A comprehensive study of national government in the United States.
    - GVPT200 International Political Relations (3). A study of the major factors underlying international relations, the causes of conflict and cooperation among international actors, the role of international institutions, the interactions of domestic and foreign policies, and major issues in security, economy and the environment.
    - GVPT201 Scope and Method for Political Science Research (3). An introduction to empirical research in political science.
  - Psychology cognate students will take 6 credits:
    - PSYC100 Introduction to Psychology (3). A basic introductory course, intended to bring the student into contact with the major problems confronting psychology and the more important attempts at their solution.
    - PSYC200 Statistical Methods in Psychology (3). A basic introduction to quantitative methods used in psychological research.
      - Minimum grade of C- in PSYC100 and 1 course with minimum C- from (MATH107, MATH111, MATH120, MATH130, MATH136, MATH140, STAT100)
  - Sociology cognate students will take 6 credits:
    - SOCY100 Introduction to Sociology (3). The fundamental concepts and principles of sociology. Includes consideration of culture, patterns of social interaction, norms, values, social institutions, stratification, and social change.
    - SOCY201 Introduction to Statistics (3). Elementary descriptive and inferential statistics. Construction and percentaging of bivariate contingency tables; frequency distributions and graphic presentations; measures of central tendency and dispersion; parametric and nonparametric measures of association and correlation; regression; probability; hypothesis testing; the normal, binomial and chi-square distributions; point and interval estimates.
      - Minimum grade of C- in SOCY100 and 1 one course from (MATH107 or MATH111)

Major core courses (27 credits):

- BSOS233 Data Science for Social Sciences (3). An introduction to modern methods of data analysis for social scientists. This course emphasizes teaching students who have no previous coding experience how to analyze data and extract meaning in a social science context. Students will gain critical programming skills and learn inferential thinking through examples and projects with real-world relevance.
- Choose 1:
  - INST326 Object-Oriented Programming (3). An introduction to programming, emphasizing understanding and implementation of applications using object-oriented techniques. Topics to be covered include program design and testing as well as implementation of programs.
    - Minimum grade of C- in INST126
  - BSOS326: Python Programming for the Social Sciences (3). Python has become the most powerful programming language in advanced statistics and data analytics. It includes expansive packages for data handling and processing, including the latest developments in machine learning, and offers Integrated Development Environments (IDE) for code development, testing, debugging, and graphical representation. In addition, python is deployed on virtually all high performance computing clusters, taking advantage of multi-processing, large memory, and GPU enhanced computing environments. This course offers a thorough introduction to python and those packages that are fundamental to data processing and analysis, image processing, natural language processing, machine learning.
  - GEOG376 Programming for Geographic Analysis (3). Covers conceptual and practical aspects of geospatial data modeling and analysis techniques using the Python programming language. The main focus is on developing a solid understanding of the programmatic conventions needed to create, manipulate, and process geospatial data types, such as point, line, & polygon vectors, networks, trajectories, and space-time extensions. In addition, students will develop a proficiency in applying these data structures to perform automated geospatial analysis, such as GIS operations, agent-based models, Markov models, and spatial statistics.
- INST327 Database Design and Modeling (3). Introduction to databases, the relational model, entity-relationship diagrams, user-oriented database design and normalization, and Structured Query Language (SQL). Through labs, tests, and a project, students develop both theoretical and practical knowledge of relational database systems.
  - Must update prerequisites to: 1 minimum grade of C- from (INST126, GEOG276)
- INST366 Privacy, Security and Ethics for Big Data (3). Evaluates major privacy and security questions raised by big data, Internet of things (IoT), wearables, ubiquitous sensing, social sharing platforms, and other AI-driven systems. Covers history of research ethics and considers how ethical frameworks can and should be applied to digital data.
  - Must update prerequisites to: Minimum C- in INST126; minimum grade of C- in STAT100; 1 minimum grade of C- from (AASP101, ANTH210, ANTH260, ECON200, ECON201, GEOG202, GVPT170, PSYC100, SOCY100)
- INST414 Data Science Techniques (3). An exploration of how to extract insights from large-scale datasets. The course will cover the complete analytical funnel from data extraction and cleaning to data analysis and insights interpretation and visualization. The data analysis component will focus on techniques in both supervised and unsupervised learning to extract information from datasets. Topics will include clustering, classification, and regression techniques. Through homework assignments, a project, exams and in-class activities, students will practice working with these techniques and tools to extract relevant information from structured and unstructured data.

    - Must update prerequisites to: Minimum grade of C- in STAT100; 1 course with a minimum grade of C- from (INST 201, INST301, BSOS233); 1 minimum grade of C- from (INST126, GEOG276); 1 minimum grade of C- from (AASP101, ANTH210, ANTH260, ECON200, ECON201, GEOG202, GVPT170, PSYC100, SOCY100); 1 minimum grade of C- from (ECON230, GEOG306, GVPT201, INST314, PSYC200, SOCY201)
- INST447 Data Sources and Manipulation (3). Examines approaches to locating, acquiring, manipulating, and disseminating data. Imperfection, biases, and other problems in data are examined, and methods for identifying and correcting such problems are introduced. The course covers other topics such as automated collection of large data sets, and extracting, transforming, and reformatting a variety of data and file types.
    - Must update prerequisites to: Minimum grade of C- in STAT100; minimum grade of C- in INST327; 1 course with a minimum grade of C- from (INST 201, INST301, BSOS233); 1 minimum grade of C- from (INST126, GEOG276); 1 minimum grade of C- from (AASP101, ANTH210, ANTH260, ECON200, ECON201, GEOG202, GVPT170, PSYC100, SOCY100); 1 minimum grade of C- from (ECON230, GEOG306, GVPT201, INST314, PSYC200, SOCY201); 1 minimum grade of C- from (BSOS331, GEOG273, INST326)
- INST462 Data Visualization (3). Exploration of the theories, methods, and techniques of visualization of information, including the effects of human perception, the aesthetics of information design, the mechanics of visual display, and the semiotics of iconography.
    - Must update prerequisites to: Minimum grade of C- in STAT100; 1 course with a minimum grade of C- from (INST 201, INST301, BSOS233); 1 minimum grade of C- from (INST126, GEOG276); 1 minimum grade of C- from (AASP101, ANTH210, ANTH260, ECON200, ECON201, GEOG202, GVPT170, PSYC100, SOCY100); 1 minimum grade of C- from (ECON230, GEOG306, GVPT201, INST314, PSYC200, SOCY201)
- SURV400 Fundamentals of Survey and Data Science (3). The course introduces the student to a set of principles of survey and data science that are the basis of standard practices in these fields. The course exposes the student to key terminology and concepts of collecting and analyzing data from surveys and other data sources to gain insights and to test hypotheses about the nature of human and social behavior and interaction. It will also present a framework that will allow the student to evaluate the influence of different error sources on the quality of data.
    - Minimum C- in STAT100
- SURV430 Questionnaire Design and Evaluation (3). Introduction to the scientific literature on the design, testing and evaluation of survey questionnaires, together with hands-on application of the methods discussed in class.

Capstone Course (3 credits):

- INST492 Integrated Capstone for Social Data Science (3). The capstone provides a platform for Social Data Science students where they can apply a subset of the concepts, methods, and tools they learn as part of the Social Data Science program to addressing an information problem or fulfilling an information need. (NEW)
    - A minimum grade of C- in BSOS233, INST366, INST414, INST447, INST462, SURV400, SURV430; a minimum grade of C- from (INST326, BSOS326, GEOG276)

Cognate courses (6-9 credits, depending on cognate discipline):

Appendix I provides an outline of the cognate course options. Please note that a student will not be permitted to add a double-major or a double-degree with Social Data Science and the BSOS major associated with their cognate area.

African-American Studies cognate students will take 9 total cognate credits:

- AASP395 Fundamentals of Quantitative Research in Socio-Cultural Perspective (3). Introduction to quantitative methods for African American Studies majors in the cultural and social analysis concentration. Basics of survey design and experimental design and data analysis and use of statistical software programs.
- 6 credits in the department at the 300- or 400-level, to be chosen from the following courses:
    - AASP301 Applied Policy Analysis and the Black Community (3). Development and application of the tools needed for examining the effectiveness of alternative policy options confronting minority communities. Review policy research methods used in forming and evaluating policies. Examination of the policy process.
        - Minimum grade of C- or better in AASP101 and (ECON200 or ECON201)
    - AASP310 African Slave Trade (3). The relationship of the slave trade of Africans to the development of British capitalism and its industrial revolution; and to the economic and social development of the Americas.
        - Minimum C- in AASP100 or AASP202
    - AASP313 Black Women in United States History (3). Black American women's history from slavery to the present. Focused on gaining a fuller understanding of the effect of race, class and gender on the life cycles and multiple roles of Black women as mothers, daughters, wives, workers and social-change agents.
    - AASP314 The Civil Rights Movement (3). Survey of the twentieth century civil rights movement from the desegregation of UM Law School through the National Black Political Congress in Gary in 1972. Major themes include leadership, legal and constitutional challenges, non-violence, Black Power, and Pan-Africanism.
        - Minimum C- in AASP100 or HIST157
    - AASP400 Directed Readings in African American Studies (3). The readings will be directed by the faculty of African American Studies. Topics to be covered will be chosen to meet the needs and interests of individual students.

- AASP402 Classic Readings in African American Studies (3). Classic readings of the social, economic and political status of blacks and other minorities in the United States and the Americas.
- AASP411 Black Resistance Movements (3). A comparative study of the black resistance movements in Africa and America; analysis of their interrelationships as well as their impact on contemporary pan-Africanism.
  - Minimum C- in AASP100
- AASP441 Science, Technology, and the Black Community (3). Scientific knowledge and skills in solving technological and social problems, particularly those faced by the black community. Examines the evolution and development of African and African American contributions to science. Surveys the impact of technological changes on minority communities.
  - Minimum C- in one course from (HIST255, AASP202, AASP100)
- AASP443 Blacks and the Law (3). The relationship between black Americans and the law, particularly criminal law, criminal institutions and the criminal justice system. Examines historical changes in the legal status of blacks and changes in the causes of racial disparities in criminal involvement and punishments.
  - Minimum C- in one course from (HIST255, AASP202, AASP100)
- AASP499 Advanced Topics in Public Policy and the Black Community (3). Examination of specific areas of policy development and evaluation in black and other communities. Application of advanced tools of policy analysis, especially quantitative, statistical and micro-economic analysis.

Anthropology cognate students will take 9 credits from their selected track:

- Selected track is determined by introductory course taken in Benchmark II
  - ANTH210 initiates the health track
  - ANTH240 initiates the heritage track
  - ANTH222 initiates the environment track
- Health track:
  - ANTH310 Method & Theory in Medical Anthropology and Global Health (3). Provides a critical perspective to global health that encompasses key political, economic, and cultural factors associated with the nature and magnitude of global health issues such as HIV/AIDS, tuberculosis and malaria, paying particular attention to how poverty and inequalities within and between societies has accelerated current global health challenges. Introduces students to how medical anthropologists have contributed to the debates surrounding the globalization of health.
    - Minimum C- in ANTH210
  - 6 credits from among the following courses:
    - ANTH411 Anthropology of Immigration and Health (3). The United Nations estimates that some 230 million people around the world are migrants who live outside their country of birth. This course focuses on these migrant populations, considering the implications of movement across borders and settlement in new societies on their health and well-being. We will investigate the social, political, and economic structures that shape disease and illness and produce differential access to health care for migrants. Within that context, we will explore the health effects of migration itself and particular health conditions from which migrants suffer. We will also examine how migrants interface with differently configured health care systems as well as strategies they and their advocates use to promote health and well-being.
    - ANTH412 Hypermarginality and Urban Health (3). Using perspectives from medical and urban anthropology, we examine the phenomenon of hypermarginality--the clustering of extreme poverty, chronic disease, addiction, violence and trauma in certain social and spatial contexts, often urban. We will explore both the broader social, political, and economic structures of exclusion that produce hypermarginality, as well as the illness experiences associated with these conditions. As we consider both social suffering and the related institutional responses, we will also discuss the role of anthropological approaches in national discussions about health inequities.
    - ANTH413 Health Disparities in the United States (3). Powerful economic, political, social, and cultural forces shape who gets sick, what illnesses/diseases they get, how they are treated while seeking care, what treatment options they have, and what their ultimate health outcomes are. The goal of the course is to understand these processes through the lens of critical medical anthropology
    - ANTH415 Advanced Studies in Global Health (3). Extends understandings of diverse health conditions facing world populations today and the science being made around them. Critically examines key issues in global aid and public health, with an emphasis on the theories, concepts, and methods of anthropology.
    - ANTH416 Anthropology of Global Violence (3). An examination of anthropological approaches to the study of violence, drawing from key texts to analyze how violence operates along a continuum: from routine, sometimes invisible forms of violence embedded in everyday life, to more overt and exceptional forms. Consideration of the role of ethnography in elucidating both the subjective experiences of violence and the ways in which violence is embedded in institutions, structures, and global political-economic processes. Analysis of the specific relationships between violence, health, mental health, and trauma in local and global contexts.
- Heritage track (9 credits from among the following courses):

- ANTH340 Method and Theory in Archaeology (3). Theory, method, and practice which guides modern anthropological archaeology. Includes research design and execution (from survey through excavation and interpretation), the reconstruction of aspects of past cultures, and the understanding of cultural change and meaning.
  - Minimum C- in ANTH240
- 6 credits from among the following courses:
  - ANTH341 Introduction to Zooarchaeology (3). Zooarchaeology is the study of animal remains, especially bones, from archaeological contexts. This course will address both methodology as well as many of the main issues in contemporary zooarchaeology. Zooarchaeology stands at the intersection of a number of social and biological sciences, such as Biology, Osteology, Ecology, History, Anthropology and Economics. We will discuss basic animal osteology and the concepts and practices behind the identification of animal remains from archaeological contexts. We will cover the nature of the data in zooarchaeology, especially issues around using proxy data.
  - ANTH440 Theory and Practice of Historical Archaeology (3). Historical archaeology enhances cultural heritage by providing voice for groups who were often unable to record their own histories, such as women, laborers, working class families, and enslaved people. The course provides insight into issues related to race, gender, and ethnicity as they relate to multicultural histories.
    - Minimum C- in ANTH240
  - ANTH441 Archaeology of Diaspora (3). "Diaspora" is defined, theorized, deconstructed, and employed throughout the social sciences. There are context specific relations that define who leaves, when, and how they are received in the new place of settlement. Over the course of the semester the class will actively and critically examine the relevance of historical archaeology and material culture studies in the understanding of the formation, experiences, and transformation of diasporic groups over time and space.
    - Minimum C- in ANTH240
  - ANTH447 Material Culture Studies in Archaeology (3). An in-depth introduction to the world of material culture studies with a focus on the methods and theories in historical archaeology. Students will look at archaeological data as historical documents, commodities and as symbols expressing ideas.
    - Minimum C- in ANTH240
  - ANTH448 Special Topics in Archaeology (3). Advanced topics in archaeological research, corresponding to new theoretical developments, faculty research interests, or specialties of visiting scholars. Prerequisites may vary with course topic; check with the department for requirements.
    - Minimum C- in ANTH240
  - ANTH451 Environmental Archaeology (3). An overview of modern environmental archaeology as a tool for the interdisciplinary investigation of past and present global change and to engage the long term past with current issues of sustainability and rapid environmental change.
  - ANTH464 Anthropology of Cultural Heritage (3). A global exploration of how the past is remade in the present. Covers the breadth of scope and specific interventions of heritage practice at the global scale, including the social, political, economic, and ethical dimensions of cultural heritage.
    - Minimum C- in ANTH260
  - ANTH496 Field Methods in Archaeology (6). Field training in the techniques of archaeological survey and excavation.
- Environment track
  - ANTH322 Method and Theory in Ecological Anthropology (3). A theoretical consideration of ecological anthropology, focusing on issues related to cooperation, the management of common property, resilience, and sustainability. Explores the methods of sociocultural anthropology, including ethnology, evolutionary game theory and agent-based modeling; and natural-science approaches including behavioral and systems ecology.
    - 1 course with a minimum grade of C- from (ANTH220, ANTH222)
  - 6 credits from among the following courses:
    - ANTH450 Theory and Practice of Environmental Anthropology (3). An overview of contemporary application of cultural theory and methods to environmental problems. Topics include the use of theories of culture, cognitive approaches, discourse analysis, and political ecology. Case studies from anthropology, other social sciences, humanities, conservation, and environmental history are used to demonstrate the applied value of a cultural-environmental approach.
    - ANTH454 Political Ecology (3). The use of the environment is contested and negotiated within historic and contemporary societies. Incorporating methods and perspectives from across the social sciences through specific case studies in the Americas, Europe, Asia and Africa, this course offers a survey to coupled human-environmental systems.
    - ANTH456 Conservation and Indigenous People in South America (3). Considers indigenous peoples and their relation to the lands on which they live, issues of traditional indigenous knowledge and land management as well as new contributions by indigenous peoples to changing landscapes. Reviews legal mechanisms and instruments through which indigenous peoples have rights to the resources they occupy and utilize. Taking specific cases and examining them through the lens of political and social ecology, the role of indigenous

peoples in local and worldwide conservation efforts is considered. Case studies will emphasize the indigenous peoples and conservation policies of Latin America.

- ANTH462 Amazon Through Film (3). An interdisciplinary course that utilizes film to consider the Amazon basin, its history, peoples, and landscapes through cinematic representations. The course places the films in the context of film history and critical theory. The course takes into consideration the Brazilian, North American, Mexican, European and Argentine creators of the films and their visions of Amazonia, as well as the audiences and markets to which the films are intended.
- ANTH467 Researching Environment and Culture (3). In this applied course, students use mixed methods to research a locally-based, environmental sustainability issue. Classroom time will be split between seminar discussions of theory, methods, and relevant case studies, and lab work focused on project development, data analysis, and report write up. Students are expected to spend additional time outside class on data collection, analysis, and writing.

Economics cognate students will take:

- Choose 1:
  - ECON305 Intermediate Macroeconomic Theory and Policy (3). Analysis of the determination of national income, employment, and price levels. Discussion of consumption, investment, inflation, and government fiscal and monetary policy.
    - Minimum grade of C- in ECON200 and ECON201 and 1 course with a minimum grade of C- from (MATH120, MATH130, MATH136, MATH140)
  - ECON306 Intermediate Microeconomic Theory and Policy (3). Analysis of the theories of consumer behavior, producer behavior, different market structures, and various sources of inefficient outcomes. Analysis of microeconomic policies designed to improve market outcomes.
    - Minimum grade of C- in ECON200 and ECON201 and 1 course with a minimum grade of C- from (MATH120, MATH130, MATH136, MATH140)
- 6 credits of coursework in the department at the 300- or 400- level, to be selected from the following courses:
  - ECON305 Intermediate Macroeconomic Theory and Policy (3). Analysis of the determination of national income, employment, and price levels. Discussion of consumption, investment, inflation, and government fiscal and monetary policy.
    - Minimum grade of C- in ECON200 and ECON201 and 1 course with a minimum grade of C- from (MATH120, MATH130, MATH136, MATH140)
    - Course may count only as Cognate I or Cognate II. It may not double-count.
  - ECON306 Intermediate Microeconomic Theory and Policy (3). Analysis of the theories of consumer behavior, producer behavior, different market structures, and various sources of inefficient outcomes. Analysis of microeconomic policies designed to improve market outcomes.
    - Course may count only as Cognate I or Cognate II. It may not double-count.
  - ECON311 American Economic History Before the Civil War (3). Economic concepts are used to analyze various aspects of the founding and early history of the U.S., including the British settlement of the North American colonies, the economics of the American Revolutionary war, the writing of the Constitution, the development of financial markets, policies on public lands and the spread of western agriculture, slavery, banking, and early industrialization.
    - Minimum grade of C- in ECON200 and ECON201
  - ECON312 American Economics After the Civil War (3). Topics include: the economics of the Civil War, the performance of southern agriculture in the late 19th century, the rise of large corporations, industrialization, the development of financial markets, the creation of the Federal Reserve Board, the economics of the Great Depression and the New Deal, the economic impact of World War II, and the rise of the modern service economy in the late 20th century.
    - Minimum grade of C- in ECON200 and ECON201
  - ECON315 Economic Development of Underdeveloped Areas (3). Analysis of the economic and social characteristics of underdeveloped areas. Recent theories of economic development, obstacles to development, policies and planning for development.
    - Minimum grade of C- in ECON200 and ECON201
  - ECON317 Global Economic Policies (3). Analysis of policy options and debates on fostering economic growth and development in a global economy where national boundaries are no longer relevant. Topics covered will include real loanable funds markets in both local and international contexts during normal conditions and during financial crises, the design of trade and industrial policies, and the role of the World Bank, IMF, WTO, and other international agencies as well as regional and bilateral trade agreements. Emerging economies will be emphasized.
    - Minimum grade of C- in ECON200 and ECON201
  - ECON330 Money and Banking (3). The structure of financial institutions and their role in the provision of money and near money. Analysis of the Federal Reserve System, the techniques of central banks, and the control of supply of financial assets in stabilization policy. Relationship of money and credit to economic activity and the price level.
    - Minimum grade of C- in ECON200 and ECON201

- ECON340 International Economics (3). Introduces economic models of international trade and finance. Analyzes policies designed to promote and restrict international trade and to manage exchange rates and impact international capital flows.
  - Minimum grade of C- in ECON200 and ECON201

Geography cognate students will take:

- GEOG373 Geographic Information Systems (3). Characteristics and organization of geographic data; creation and use of digital geospatial databases; metadata; spatial data models for thematic mapping and map analysis; use of geographic information system in society, government, and business. Practical training with use of advanced software and geographic databases.
- 9 credits from the following list, of which 6 must be at the 400-level:
  - GEOG330 As the World Turns: Society and Sustainability in a Time of Great Change (3). Cultural geography course on society and sustainability. Culture is the basic building block that is key to sustainability of societies. Course will cover sustainability of societies on different scales, examining local, regional, and worldwide issues. Sustainability will be examined as a key element of environmental sustainability. How societies adjust to rapid world change will be examined as a positive and/or negative factor in sustainability.
  - GEOG331 Introduction to Human Dimensions of Global Change (3). Introduction to global-scale interrelationship between human beings and the environment. The development of global issues including but not limited to the environment, food, energy, technology, population, and policy.
    - Minimum C- in ANTH220, ANTH260, GEOG202, or GEOG201
  - GEOG332 Economic Geography (3). Principles of managing scarce resources in a world where everyone faces tradeoffs across both time and space. Focuses on the relationship between globalization processes and changing patterns of locational advantages, production, trade, population, socioeconomic and environmental grace and sustainability.
  - GEOG333 The Social Geography of Metropolitan Areas in Global Perspective (3). A socio-spatial approach to human interaction within the urban environments: ways people perceive, define, behave in, and structure world cities and metropolitan areas. Cultural and social differences define spatial patterns of social activities which further define distinctions in distribution and interaction of people and their social institutions.
    - Minimum C- in GEOG201 and GEOG202
  - GEOG335 Population Geography (3). The spatial characteristics of population distribution and growth, migration, fertility and mortality from a global perspective. Basic population-environmental relationships; carrying capacity, density, and relationships to national development.
  - GEOG415 Land Use, Climate Change, and Sustainability (3). The issues of climate change and land use change as two interlinked global and regional environmental issues and their implications for society and resource use are explored.
    - Minimum C- in GEOG123 or GEOG306
  - GEOG416 Conceptualizing and Modeling Human-Environmental Interactions (3). Develops skills to carry out research that integrates environmental and economic aspects of sustainability by introducing extensively used quantitative tools for analyzing human-environmental interactions in the field of ecological economics. These include, e.g., index number calculations and decomposition analysis, Environmental Kuznets Curve (EKC), environmental input-output analysis and life-cycle analysis, and multi-criteria decisions aid (MCDA). Students will need laptops to run models during class.
    - Minimum C- in GEOG306, STAT100, MATH107, or MATH111; and (GEOG201 and GEOG202); and (GEOG331 or GEOG330).
    - Corequisite: MATH130, MATH140, or MATH120; or MATH220.
  - GEOG421 Changing Geographies of China (3). Covers physical geography, history, and economic and political systems of the world's most populous country. The major focus will be on geographical issues in China's contemporary development: agriculture, population, urbanization, resource and energy, and environment.
    - Minimum C- in GEOG202; and GEOG201; and (GEOG435, GEOG333, or GEOG332).
  - GEOG422 Changing Geographies of Sub-Saharan Africa (3). Students will develop an understanding of the geographic contexts of SubSaharan Africa, including an overview of the physical, bioclimatic, historical, cultural, political, demographic, health and economic geographies of Sub-Saharan Africa. Students will fill in the map of Africa by studying the spatial distribution within each of these geographic domains. In addition to an overview of geography South of the Sahara, the Congo will be taken as a more intensive case study through additional readings, lectures and discussions.
    - Minimum C- in GEOG201; and GEOG202; and (GEOG335 or GEOG333).
  - GEOG432 Spatial Econometrics (3). An introduction to modern econometric techniques in general and spatial econometrics in particular, using the popular open source statistical computer language R. A focus on using statistical computing to produce analytical reports for real-world applications, research papers, and dissertations.
    - Minimum C- in GEOG201; and GEOG202; and GEOG306; and GEOG332. Jointly offered with GEOG732.
  - GEOG470 Spatial Data Algorithms (3). Geometric primitives and algorithms for discrete and continuous spatial data processing. Point data representation and analysis: spatial data structures, neighbor finding and range queries, clustering algorithms. Terrain modeling: grids and TINs, algorithms and data structures for building and querying TINs, gridding and interpolation. Terrain analysis: segmentation through watershed computation, algorithms for visibility computation. Applications to LiDAR data processing and analysis for forest management, urban modeling, and coastal data mapping.

- Minimum C- in GEOG276 or permission of instructor.

- GEOG473 Geographic Information Systems and Spatial Analysis (3). Analytical uses of geographic information systems; data models for building geographic data bases; types of geographic data and spatial problems; practical experience using advanced software for thematic domains such as terrain analysis, land suitability modeling, demographic analysis, and transportation studies.
  - Minimum C- in GEOG306 and GEOG373
- GEOG475 Computer Cartography (3). An overview of the basic concepts and techniques that underlie digital map making and the broader field of geographic visualization for intermediate GIS users. This includes the use of color, map symbolization, map layout, and also the contribution to geographic visualization from the fields of scientific visualization, information visualization, and cognition. Fundamentals of dynamic map design and web mapping will be introduced through the use of animated and interactive maps.
  - Minimum C- in GEOG373 and GEOG306.
- GEOG477 Mobile GIS Development (3). Designed as an introduction to mobile GIS, to the programming concepts underlying mobile GIS development, and more importantly, to the design and implementation of a mobile GIS application. Covers how to develop, test, and publish mobile GIS native apps working across two mobile platforms: Android and iOS. This course will also try to leverage the capabilities of JavaScript, Swift, Google maps, ArcGIS Server and runtime SDK to develop and publish mobile GIS web apps.
  - Minimum C- in GEOG306, GEOG373, and GEOG376; and (GEOG473, GEOG475, or GEOG476). And MATH140 or MATH120; or must have completed MATH220.

Government and Politics/International Relations cognate students will take:

- GVPT320 Advanced Empirical Research (3). Allows students to build on the knowledge of statistical inference they gained from GVPT201. Topics include data collection, data cleaning, data analysis, and data visualization. By the time students complete this class, they will be able to do basic statistical modeling using OLS regression independently.
  - Minimum grade of C- in GVPT201
- Any 6 credits of GVPT coursework at the 300- or 400- levels
  - GVPT3XX or GVPT4XX

Psychology cognate students will take:

- PSYC300 Research Methods in Psychology Laboratory (3). A general introduction and overview to the fundamental theoretical, conceptual, and practical issues in psychological research in both the laboratory and the field.
  - Minimum grade of C- in PSYC200
- Choose 9 credits from among the following options:
  - PSYC330 Child Psychopathology (3). Etiology, diagnosis, prevention and treatment of emotional disorders of childhood and adolescence.
    - Minimum C- in PSYC100.
  - PSYC332 Psychology of Human Sexuality (3). A survey of historical and contemporary psychological views on a wide variety of sexual behaviors; theory and research bearing on the relationship between lifespan psychological development, psychological functioning, interpersonal processes and sexual behaviors; political and social issues involved in current sexual norms and practices.
    - Minimum C- in PSYC100.
  - PSYC334 Psychology of Interpersonal Relationships (3). Research, theory and their practical applications pertaining to the development, maintenance and dissolution of human relationships. Processes critical to successful relating (e.g., communication, bargaining, conflict resolution), and issues associated with troubled dyadic relations with equal partners (e.g., jealousy, spouse abuse, divorce).
    - Minimum C- in PSYC100.
  - PSYC336 Psychology of Women (3). A survey of the biology, life span development, socialization, personality, mental health, and special issues of women.
    - MInimum C- in PSYC100.
  - PSYC341 Introduction to Memory and Cognition (3). An introduction to the basic concepts of cognitive psychology, the scientific study of mental processes. Topics will include perception, attention, memory, reasoning, and language, with an emphasis on how findings from cognitive psychology can inform real-life thinking (e.g., memory strategies for studying, pitfalls of multitasking, and how/why our memories can fail us).
    - Minimum C- in PSYC200 and PSYC300.
  - PSYC344 Health Psychology (3). An examination of how psychological, biological, and social factors impact physical health and well-being. Students will use the biopsychosocial model to analyze topics including stress, health disparities, pain, addiction, disease states (e.g., cardiovascular disease, diabetes, cancer), and primary prevention.
    - Minimum C- in PSYC100.
  - PSYC353 Adult Psychopathology (3). The nature, diagnosis, etiology, and treatment of mental disorders.

- Minimum C- in PSYC100.

- PSYC354 Multicultural Psychology in the U.S. (3). What are the psychological implications of racism, sexism, homophobia and other structures of inequality in the United States? How do socio-cultural privilege and oppression influence individual and group thoughts, feelings, and behaviors? This course will take a current events focus to understanding multicultural and social justice issues in psychology with an emphasis on self-reflection, mental health, cross-cultural communication, and strategies for social change.
  - Minimum C- in PSYC100.
- PSYC355 Developmental Psychology (3). Survey of research and theory of psychological development from conception through childhood, stressing physiological, conceptual and behavioral changes, and the social and biological context in which individuals develop.
  - Minimum C- in PSYC100.
- PSYC356 Psychology of Adolescence (3). A description of adolescent development based on research and theory interrelating psychological, intellectual, and social changes during the teen years and the systems dealing with those changes.
  - Minimum C- in PSYC100.
- PSYC361 Survey of Industrial and Organizational Psychology (3). A general survey of the field of industrial organizational psychology including such topics as organizational entry (recruitment, selection, training, socialization); organizational psychology (motivation, leadership, job attitudes); and productivity in the work place (performance appraisal, absenteeism, turnover). The role that the larger environment plays in influencing work behaviors and work attitudes.
  - Minimum C- in PSYC100
- PSYC362 Introduction to Negotiation (3). Overview of the field of negotiation and the social-psychological and contextual factors that facilitate and inhibit successful negotiation agreements. Students will engage in a variety of negotiation exercises individually and as a team.
- PSYC416 Development of Attachment in Infancy and Childhood: Theory, Research, Methods, and Clinical Implications (3). Overview of the development of attachment during infancy and childhood, examining theory, research methods, research findings, and clinical implications. Students will observe videos of attachment assessments, lead class discussion of readings, make class presentations, and complete writing assignments.
  - Minimum C- in PSYC355.
- PSYC417 Data Science for Psychology and Neuroscience Majors (4). A large number of industry and academic jobs require basic programming and data analysis skills. This class represents an introduction to both. Students will learn to program in R and will briefly be introduced to Python, the two most popular programming languages for data science. Common constructs shared by a variety of procedural programming languages will be emphasized. Basic statistics and probability theory will be reviewed from a computational perspective, and more advanced topics introduced. During the course, students will simulate toy data sets which they will then analyze knowing how the data came about, as well as work with real data. The class is highly hands-on with a large number of in-class lab and homework projects. Expect to work a lot and move quickly. Because of the hands-on nature of the class, the overall focus is more on application and execution rather than theory. However, some theory is covered at a high level so that students are aware of why they are doing something, rather than mindlessly writing code.
  - Minimum C- in PSYC200 and PSYC300; and (MATH120, MATH130, or MATH140)
- PSYC420 Experimental Psychology: Social Psychology Laboratory (4). A laboratory course to provide a basic understanding of experimental method in social psychology and experience in conducting research on social processes.
  - Minimum C- in PSYC221 and PSYC300.
- PSYC424 Communication and Persuasion (3). Effect of social communication upon behavior and attitudes. Theory and research concerning attitude change and social influence.
  - Minimum C- in PSYC200 and PSYC221.
- PSYC425 Psychology and Law (3). An introduction to the intersection of psychology and the criminal justice system, known as the field of legal psychology. The material covered will span the course of the criminal justice process and examine each aspect from a psychological perspective beginning with profiling and moving on to eyewitness memory and judgements through perpetrator memories and interrogation techniques. These aspects will be evaluated with a research lens as well as an applied outlook.
  - Minimum C- in PSYC100, PSYC200, and PSYC300.
- PSYC432 Counseling Psychology: Theories, Research, and Practice (3). Analysis of research and intervention strategies developed and used by counseling psychologists. Historical and current trends in content and methodology.
  - Minimum C- in PSYC200.
- PSYC435 Theories of Personality and Psychotherapy (3). Major theories of personality and research methods and findings relevant to those theories.
  - Minimum C- in PSYC200.
- PSYC436 Introduction to Clinical Psychology: From Science to Practice (3). Critical analysis of clinical psychology, with particular emphasis on current developments and trends.

    - Minimum C- in PSYC300.
- PSYC437 The Assessment and Treatment of Addictive Behaviors (3). Explores the current research in assessment and treatment of addictive behaviors. Topics may include addictions in the areas of alcohol, drugs, nicotine, gambling, and eating.
    - Minimum C- in PSYC100; and 9 credits in PSYC courses.
- PSYC440 Experimental Psychology: Cognitive Processes and Legal Applications (4). A survey of the content, models, and methods in cognitive psychology with an emphasis on attention and encoding, recall, recognition, judgment, signal detection theory, and applying cognitive theories to situations in the legal system. Students integrate scientific theories with real-life legal situations. Course topics include research methodology in assessing and addressing cognitive mechanisms and how this understanding may help eyewitness and victim recall and recognition, perpetrator recall, assessing scientific theories of repression, and real life examples.
    - Minimum C- in PSYC341 and PSYC300.
- PSYC450 Applying Psychology to the Workplace: Industrial Organizational Psychology Laboratory (4). In this laboratory course, students use data analytic techniques, along with psychology theories and principles, to solve problems and provide recommendations to mock organizations. Along with learning theories in industrial-organizational psychology and statistical analysis, students will improve personal presentation skills that promote effective communication of information.
    - Minimum C- in PSYC300 and PSYC361.
- PSYC456 Research Methods in Developmental Psychology Laboratory (4). A presentation of major research designs used in developmental psychology and of the methodology used in developmental research, such as observational research, program evaluation, and laboratory experimentation.
    - MInimum C- in PSYC300.
- PSYC460 Psychological Foundations of Personnel Selection and Training (3). An examination of issues and processes involved in the design and evaluation of personnel selection and training programs in a variety of organizational settings: job, person and organizational analysis; organizational choice; development of predictors; evaluation of instructional and training systems; criteria for performance evaluation, promotion and training.
    - Minimum C- in PSYC200 and PSYC361.

Sociology cognate students will take:

- SOCY202 Introduction to Research Methods in Sociology (4). The underlying logic, major strategies, specific techniques and skills of sociological research. Research design, measurement, data collection, sampling, field research experiments, surveys, index and scale construction, data analysis, interpretation and report writing.
    - Minimum grade of C- in SOCY201
- 9 credits of relevant coursework at the 300- or 400-levels, to be chosen from among the following courses.
    - SOCY325 The Sociology of Gender (3). Institutional bases of gender roles and gender inequality, cultural perspectives on gender, gender socialization, feminism, and gender-role change. Emphasis on contemporary American society.
    - SOCY335 Sociology of Health and Illness (3). An exploration of the social model to studying health and illness: how meanings and experiences of health and illness are socially produced. How experiences are shaped by the interaction of external social environments (culture, community) and the internal environment (human body), and by socio-demographic variables (race, class, gender, etc.). Disparities in health and healthcare delivery, medicalization of society, determinants of health, social construction of illness, and the social organization of health care.
    - SOCY401 Intermediate Statistics for Sociologists (3). This is a course about multiple regression for undergraduate students and presumes that students taking this course will be both producers and consumers of multiple regression results. Students will work with the instructor to produce a research poster presentation based on secondary social science data. In addition to multivariable statistics, students will learn some statistical programming as well as how to organize a research presentation.
        - MInimum C- in SOCY201.
    - SOCY405 Scarcity and Modern Society (3). Resource depletion and the deterioration of the environment. Relationship to lifestyles, individual consumer choices, cultural values, and institutional failures. Projection of the future course of American society on the basis of the analysis of scarcity, theories of social change, current trends, social movements, government actions, and the futurist literature.
    - SOCY406 Globalization (3). An analysis of the forces driving globalization and its implications for THE SOCIAL WORLD; politics; culture (including American popular culture); technology; the media; the Internet; population flows; environmental changes and problems; other negative (or deviant) flows such as disease, crime and terrorism; inequality, as well as ways of dealing with or resisting globalization (alter-globalization).
    - SOCY407 Explaining Social Change: Historical and Comparative Methods (3). Examines social change from the perspective of comparative and historical sociology to get at the question, 'where are we now?' Students develop a critical appreciation of how scholars construct persuasive explanations for large-scale change focusing on four central questions: the origins of markets and industrial capitalism; the emergence of democracy as opposed to dictatorship; the causes and consequences of social revolution; and the logic of armed conflict.

Explanations offered for the changes in question as well as the methods employed are explored. Counterfactual hypotheticals for each central question--that is, what might have been, rather than what historically emerged--are considered.

- SOCY410 Social Demography (3). Types of demographic analysis; demographic data; population characteristics; migration; mortality; fertility; population theories; world population growth; population policy.
- SOCY411 Demographic Techniques (3). Basic techniques for analyzing population structure and demographic processes, including fertility, mortality and migration.
    - Minimum C- in SOCY201 and SOCY410.
- SOCY412 Family Demography (3). Family and population dynamics. Fertility issues, such as teenage pregnancy, the timing of parenthood, and family size; as they relate to family behavior, such as marital patterns, child care use, and work and the family. Policy issues that relate to demographic changes in the family.
- SOCY413 Sociology of Aging (3). The aging of the population is one of the major demographic changes affecting social institutions during the next century. Research demography, sociology, economics, epidemiology, psychology and public health are integrated to develop a broader understanding of the causes and consequences of population aging. A central focus is the diversity of experiences by age, gender, socioeconomic status and health.
- SOCY415 Environmental Sociology (3). Overview of the field and theoretical themes within the area of environmental sociology and technology. Current issues are explored including: environmental attitudes; environmental movements; environmental justice; globalization; global climate change; and garbage and food.
- SOCY420 Qualitative Research Methods in Sociology (3). Using the sociological imagination to independently explore research questions as designed by students. Readings will explore dilemmas qualitative researchers confront such as, how to conduct research ethically and how their background influences their findings and analysis. Students will learn how to collect data, analyze it, and present it to others.
- SOCY430 Social Structure and Identity (3). Theoretical issues in social psychology, focusing on social construction of identity. Identity formation and transformation in social process. Structural and cultural dimensions of social identity.
- SOCY431 Principles of Organizations (3). Structural and processual characteristics of organizations that make them effective for different purposes and in different environments. Effects of different institutional environments, small group processes, organizational networks, and leadership. Types of organizations studied include formal bureaucracies, professional organizations, and voluntary associations.
- SOCY432 Social Movements (3). Movements that seek change in the social and political structure of society. Origins, tactics, organization, recruitment, and success. Case studies come from such movements as labor, civil rights, student, feminist, environmental, neighborhood, and gay rights.
- SOCY441 Social Stratification and Inequality (3). The sociological study of social class, status, and power. Topics include theories of stratification, correlates of social position, functions and dysfunctions of social inequality, status inconsistency, and social mobility.
- SOCY442 The Black Middle Class (3). Students will learn about the Black Middle Class. They will examine and explore the historical context that led to the rise of a Black Middle Class. Innovative avenues into the Black Middle Class will also be examined, including various household and family formations. Finally, the course will cover the consequences of being in the The Black Middle Class, with an emphasis on residential segregation and racial identity.
- SOCY444 Sociology of Children (3). Socio-historical analysis of the changing nature and meaning of childhood. Analysis of social psychological, demographic, and socioeconomic aspects of contemporary children's lives, with a focus on peer groups, gender relations, family change, macroeconomic conditions, poverty, health, and educational well-being of children.
- SOCY445 Sex and Love in Modern Society (3). Sociological theories of sex and gender are used to explore empirical research on women's and men's sexual behavior and attitudes; variation in gendered sexuality by key social characteristics and how gendered sexuality is constructed and controlled; changes in sexuality over time and across relationship types, focusing on changes in sexual desire and behaviors and on the changing meaning of sex and marriage in U.S. society and other countries. Contemporary debates about sexuality will also be examined.
    - MInimum C- in SOCY201, SOCY202, SOCY203, and SOCY230.
- SOCY457 Sociology of Law (3). Social, political, and cultural sources of legal norms and concepts; and how the law shapes society and society shapes the law using sociological theoretical frameworks. The role of social change, social reproduction and inequality (including race, class, gender, and sexuality) to achieve certain objectives such as compliance, deterrence and social control.
- SOCY464 Military Sociology (3). Social change and the growth of military institutions. Complex formal military organizations. Military service as an occupation or profession. The sociology of military life. Relations between military institutions, civilian communities and society.
- SOCY465 The Sociology of War (3). The origin and development of armed forces as institutions, the social causes, operations and results of war as social conflict; the relations of peace and war and revolution in contemporary civilizations.
- SOCY467 Sociology of Education (3). Sociological analysis of educational institutions and their relation to society: goals and functions, the mechanisms of social control, and the impacts of stratification and social change. Study of the school as a formal organization, and the roles and subcultures of teachers and students.
- SOCY480 Researching the Middle East (3). Introduces religion, gender, and politics in the Middle East and North Africa. After an overview of the political and social history the focus will be on methods for carrying out fundamental issues facing Middle Eastern societies, including national identity, religion, gender relations and the status of women in the family, politics, education, and labor market.

- Minimum grade of C- in SOCY201, SOCY202, and SOCY203.

- SOCY490 Experimental Research Practicum (3). Hands-on experience in designing, conducting, and analyzing experimental research. Introduces students to causal inference in social scientific research, focusing on experimental designs. Students will get hands-on research experience running experimental studies in the group processes lab. Students will also work with the professor and graduate students in the department to develop a research idea that can be executed in the spring semester.
- SOCY491 Experimental Research Design (3). Students will finalize the design of their studies from the fall semester and carry out the research in this course. Introduces students to analyzing experimental data and presenting results from these data. Students will continue to get hands-on research experience running experimental studies in the group processes lab and working with the professor and graduate students in the department to further develop their projects.
  - Minimum C- in SOCY490.

Sample plan. Provide a term by term sample plan that shows how a hypothetical student would progress through the program to completion. It should be clear the length of time it will take for a typical student to graduate. For undergraduate programs, this should be the four-year plan.

Please see Appendix II.

List the intended student learning outcomes. In an attachment, provide the plan for assessing these outcomes.

Learning Outcomes
Student will be able to: - Design, execute, document, and disseminate research that applies tools and methods from data science to address a social science research question; - Develop expertise in specific contemporary social science theories and data science approaches to tackling research questions related to these theories; - Apply findings from social data science research to analyze the policy and design of socio-technical systems; and - Identify and analyze social, legal, and ethical and equity issues in social data science work and in the profession.

The iSchool will lead the assessment process for the program, in collaboration with the BSOS cognate departments. The result will be an annual learning outcomes assessment that is consistent with the expectations of the Provost's Commission on Learning Outcomes Assessment. It will mirror the successful model developed and implemented by the iSchool for the B.S. in Information Science.

Appendix IV provides two curriculum maps. The first maps core courses and required cognate courses to the program learning outcomes. The second maps core courses and required courses to the Washington CoLAB digital generalist learning outcomes. The third and fourth, respectively, map to the Washington CoLAB data science and machine learning outcomes.

The iSchool will work with BSOS cognate departments to develop a set of rubrics that individual faculty members will apply to work completed in their courses. There will be a rubric for each learning outcome, and all faculty members teaching in core courses will select an individual assignment to assess using the appropriate rubric(s). (The reason we have not selected assignments ahead of time is because different faculty may teach the same course with some variation, and assignments may not be identical each semester.) The items assessed will be direct measures of student learning and may include sections of exams, homework assignments, laboratory assignments, and final projects.

New Program Information

Mission and Purpose

Describe the program and explain how it fits the institutional mission statement and planning priorities.

The UMD mission statement includes a desire to create a climate of intellectual growth and mutual respect, that addresses policy issues critical to the state, nation, and world, that sits at the forefront of multi-disciplinary knowledge, and that improves student learning and success through expanded use of innovative teaching methods and opportunities for collaboration and engagement. More specifically, the 2016 UMD Strategic Plan highlights the importance of accomplishing these goals within "areas of national or global need." They identify data analytics, especially the process of creating and analyzing large data sets or big data, as an area of "almost desperate national need." The proposed Social Data Science program therefore falls squarely within UMD strategic priorities. The program will train students to create information products--datasets, visualizations, models--that capture important aspects of human activity and behavior. As the Strategic Plan notes, these skills are required for positions across a variety of industries, including government, healthcare, sustainability, economics, entertainment, human rights, equity and diversity, and many others. With the chance to focus not solely on data science, but also on well-established social and behavioral science disciplines, the Social Data Science program will provide the basis for asking and answering sound questions of big data on human activity and behavior and using the information products they create to influence policy and industry in profound ways.

Program Characteristics

What are the educational objectives of the program?

The practice of social data science encompasses all elements of the data life cycle, including measure conceptualization, data gathering, management, manipulation, analysis, presentation, archiving and re-use. Social data science poses critical ethical, legal, and social responsibilities

that must be maintained at all stages of the effort. Data and theory are inextricably intertwined – understanding social science theory is essential for effective and appropriate construction, analysis, and use of social data. As the technologies, tools, and sources of social data develop, we must train a wide and diverse array of people to be able to work with social data in order to advocate for their perspectives, needs, and communities.

Describe any selective admissions policy or special criteria for students interested in this program.

N/A

Summarize the factors that were considered in developing the proposed curriculum (such as recommendations of advisory or other groups, articulated workforce needs, standards set by disciplinary associations or specialized-accrediting groups, etc.).

In 2018, the National Academies of Sciences, Engineering, and Medicine released the report, Envisioning the Data Science Discipline: The Undergraduate Perspective. The National Academies indicated that the report was motivated by clear indications of a pervasive need to manage, analyze, and extract information from data across many industries and career sectors. The report defined data science as a complicated amalgam of disciplines and skill sets, requiring expertise in programming, statistics, ethics, and domain-specific knowledge. The report also noted that an explosion of data science careers requires a workforce with focused expertise.

The B.S. in Social Data Science integrates four primary principles from the National Academies report:
- Ethics should be a key focus in data science practice and education.
--The B.S. in Social Data Science integrates education in ethics throughout the curriculum, including:
---Integration of topics related to ethics and equity into all INST courses
E.g. INST126 Introduction to Programming for Information Science includes the learning outcome: “Explain how programming is situated in and reflects broader social and organizational structures, and the ethical and equity issues this entails”
---Inclusion of a course specifically focused on data ethics (INST366 Privacy and Security in Big Data)
---Capstone providing students an opportunity to work with data for real-world clients, in which students can develop hands-on experience with professional ethics through a project with the Administrative Data Resource Facility.
- Data science programs should demonstrate flexibility in the concepts, skills, tools, and methods taught to provide a “full data science experience” to students.
--The B.S. in Social Data Science focuses on flexibility in myriad ways, including:
---Opportunity to declare a cognate field in the social and behavioral sciences, which allows a student to customize the major according to their interests;
---Flexible and modest benchmark structures to prevent barriers to entry for students traditionally underrepresented in STEM disciplines;
---Shift in focus from advanced mathematics to the practice of applied data science, also intended to decrease barriers to entry for underrepresented students.
- Innovations in the infrastructure of silo-ed, departmentally focused institutions will create more collaborative and multidisciplinary data science programs. Data science curricula depend upon the integration of faculty from different disciplines, the utilization of varied pedagogies, and the leveraging of existing educational programs.
--The B.S. in Data Science is a pioneering effort in linking two Colleges together, one of which is very complex (BSOS). The program is also associated with the new Social Data Science (SoDa) Center, which is built upon cooperative structures between BSOS and the iSchool.
- Inclusion of students and faculty/staff who have historically been underrepresented in STEM careers, including data science, will be welcome and encouraged through recruitment of pre-college students, retention via inclusive rather than weeding introductory course work and community-building, and mentoring programs. As noted by the National Academies of Sciences, Engineering and Medicine (2018), “it is the responsibility of academic institutions to ensure inclusion and broad participation and engagement in data science programs” (p. 62). More specifically, “If data science is to avoid a similar decrease in participation that occurred in the 1980s in computer science among female students, it is imperative that underrepresented students are supported both academically and through mentorship, recognizing the opportunities that the field of data science presents and the value they can add to it” (p. 62).

The B.S. in Social Data Science also responds to the creation of the Greater Washington Partnerships Capital CoLAB’s micro-credential program, which accredits individual programs at the University of Maryland to train students in several categories: digital generalism, data science, and machine learning. The program has been built with the goal of allowing any student completing the program to earn the Digital Generalist, Data Science, and Machine Learning badges. These badges will allow students access to a coalition of local employers and will also allow UMD to pilot an effort to allow students to demonstrate expertise beyond their transcripts, which is a major focus of the “New Educational Paradigms” Deans’ Council sub-committee, convened in fall 2020.

Identify specific actions and strategies that will be utilized to recruit and retain a diverse student body.

The concepts of diversity, equity, and inclusion (DEI) sit at the core of both BSOS and iSchool values. Perhaps first and foremost, educators and scholars from both Colleges serve as powerful thought leaders in anti-racism scholarship. One example from BSOS is the Department of Sociology’s Critical Race Initiative (CRI), which identifies a goal of “racial uplift activism through scholarship, teaching, community-based participatory research, and social policy.” An example from the iSchool is the Trace Research and Development Center, which is a pioneer in the field of technology and disability and which applies engineering, computer science, disability studies, public policy, and information science to prevent barriers to information and telecommunication technologies, with a stated goal of a “world that is accessible and usable by people of all ages and all abilities.” And the program itself is grounded in the importance of applying DEI principles across the curriculum. Social Data Science courses include content important in understanding diversity issues including serving underrepresented groups and institutions, meeting unique needs for diversity promotion, and developing capacity in all sizes and types of organizations. Both Colleges have also implemented TerrrapinSTRONG onboarding for all new

undergraduates and have programs aimed at helping faculty members build more DEI content into their courses--BSOS runs the Anti-Black Racism Initiative, and the iSchool runs the the Anti-Black Racism Teaching Symposium.

In addition, both Colleges focus on recruiting, retaining and graduating student talent from a range of backgrounds, with special attention to the barriers facing URM students. Both BSOS and the I-School enroll a higher proportion of URM undergraduate students than the campus overall, 24% in BSOS and 30% in the I-School in fall 2020. (Enrollment table is available in Appendix III.)

This level of diverse student recruitment and retention is supported by a range of programs across both Colleges. For instance, BSOS oversees the Promoting Achievement and Diversity in Economics (PADE) retention program, while the iSchool fosters such affinity groups and student support programs as the iDiversity Student Group and the iSchool Students of Color Collective.

Relationship to Other Units or Institutions

If a required or recommended course is o#ered by another department, discuss how the additional students will not unduly burden that department's faculty and resources. Discuss any other potential impacts on another department, such as academic content that may significantly overlap with existing programs. Use space below for any comments. Otherwise, attach supporting correspondence.

A letter from the Department of Mathematics regarding use of STAT100 as a benchmark is attached. Please see Appendix V.

Accreditation and Licensure. Will the program need to be accredited? If so, indicate the accrediting agency. Also, indicate if students will expect to be licensed or certified in order to engage in or be successful in the program's target occupation.

N/A

Describe any cooperative arrangements with other institutions or organizations that will be important for the success of this program.

The iSchool and BSOS are co-authors of this proposal. Discussions with the Math Department over use of STAT100 as a benchmark are detailed in their attached letter in Appendix V.

Faculty and Organization

Who will provide academic direction and oversight for the program? In an attachment, please indicate the faculty involved in the program. Include their titles, credentials, and courses they may teach for the program.

All courses in the program will be taught by TTK or PTK with academic appointments in the iSchool and/or BSOS College/Departments.

Indicate who will provide the administrative coordination for the program

The program will be managed by one Undergraduate Program Director from the iSchool and one Undergraduate Program Director from BSOS. Directors will have faculty appointments in their respective colleges (I-School or BSOS). The Faculty Directors will co-chair a curricular committee to provide faculty oversight of academic and pedagogical strategies, policies for student recruitment, and curricular planning for the major. They will also serve as the department-level PCC Committee for the major. Each BSOS department offering a cognate field will have a representative on the curricular committee, who will each serve as the primary point of contact for their respective cognate areas. One student will also participate as a voting member. Ex-officio members will include a representative from the Deans' offices in both Colleges and at least one advisor or student services representative from each College.

Resource Needs and Sources

Each new program is required to have a library assessment prepared by the University Libraries in order to determine any new library resources that may be required. This assessment must be done by the University Libraries. Add as an attachment.

This is pending, with an estimated completion date of January 29. When it is added, it will be Appendix VII.

Discuss the adequacy of physical facilities, infrastructure and instructional equipment.

Existing iSchool and BSOS facilities will support the new major. However, a 5-year ramp-up budget for additional faculty, advising, and technical resources will be presented by the dean to the Provost. Most of the courses for the new major are already created. However, additional teaching resources will be needed to create new sections/seats in the introductory and core courses for the major. In years 3-5, additional teaching resources are budgeted to support the social data science related surge in sections/seats in the BSOS departments that grow because of this major. We anticipate this will be GVPT and ECON, but will not know for sure until students enroll and choose their cognate areas.

Discuss the instructional resources (faculty, staff, and teaching assistants) that will be needed to cover new courses or needed additional sections of existing courses to be taught. Indicate the source of resources for covering these costs.

Existing iSchool and BSOS faculty members will teach the courses, along with select additional faculty hires (see budget). All but one of the courses have already been approved, but not all of them are currently offered regularly. Should the campus enrollment grow, then additional tuition revenue is likely. However, we also assume that students who might have chosen other majors (e.g. CMSC, INST, BMGT, ECON, GVPT) may choose the new social data science major instead.

Discuss the administrative and advising resources that will be needed for the program. Indicate the source of resources for covering these costs.

Existing administrative and advising resources will be used. However, one new undergraduate advisor in the I-School and one new undergraduate advisor in the BSOS College will support the social data science major. This is important so that the two colleges can work closely together to ensure that advising is closely aligned and that students are fully supported, even as they spread across two colleges and multiple departments. Please see the budget for details of the administrative and advising resources required.

Use the Maryland Higher Education Commission (MHEC) commission financial tables to describe the program's financial plan for the next five years. See help bubble for financial table template. Use space below for any additional comments on program funding.

Please see Appendix VI.

Implications for the State (Additional Information Required by MHEC and the Board of Regents)

Explain how there is a compelling regional or statewide need for the program. Argument for need may be based on the need for the advancement of knowledge and/or societal needs, including the need for "expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education." Also, explain how need is consistent with the Maryland State Plan for Postsecondary Education **(**https://mhec.state.md.us/About/Documents/2017.2021%20Maryland%20State%20Plan%20for%20Higher%20Education.pdf**).**

The Maryland State Plan identifies three primary goals:

Access: to ensure equitable access to affordable and quality postsecondary education for all Maryland residents;
Success: to promote and implement practices and policies that ensure student success; and
Innovation: to foster innovation in all aspects of Maryland higher education.

The proposed program in Social Data Science is focused on accessibility and success for a range of students. We hope to accomplish these goals by drawing on structures articulated in two of the National Academies recommendations--first, to remove higher math as a prerequisite to the program, thereby bypassing lower math readiness and math anxiety issues, both of which are prominent in underrepresented groups in STEM; and second, to create a flexible program that will meet the needs of a range of students, which we aim to accomplish through our plethora of options in cognate area focus, as well as our flexible benchmark structure. We have also built this proposed program with an eye towards innovation. As will be discussed later, there are no programs like Social Data Science in the state. More importantly, there do not appear to be any programs quite like Social Data Science in the entire nation. Mixing data science education with disciplinary training from one or more social/behavioral sciences appears to exist currently only in institutions in the United Kingdom, and even then, primarily at the graduate level. Oxford, the University of Essex, and the London School of Economics each offer a M.Sc. in Social Data Science, and the University College of London offers a B.Sc. in Social Data Science. Even the B.Sc., however, differs from our proposed program as it requires study of three social science disciplines, two of which must be sociology and economics; as a result, our proposed program in Social Data Science would be the only program in existence that allows a depth of training in data science that is matched by similarly rigorous training in a social or behavioral science discipline.

Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program. Possible sources of information include industry or disciplinary studies on job market, the USBLS Occupational Outlook Handbook **(**https://www.bls.gov/ooh/**), or Maryland state** Occupational and Industry Projections **(**http://www.dllr.state.md.us/lmi/iandoproj/**) over the next five years. Also, provide information on the existing supply of graduates in similar programs in the state (use MHEC's Office of Research and Policy Analysis** webpage **(**http://mhec.maryland.gov/publications/Pages/research/**) for Annual Reports on Enrollment by Program) and discuss how future demand for graduates will exceed the existing supply. As part of this analysis, indicate the anticipated number of students your program will graduate per year at steady state.**

The USBLS Occupational Outlook Handbook shows a projected rate of growth of 33% for individuals working in the field of Mathematics and Statistics, far higher than the average over all industries. In addition, jobs within the category of Computer and Information Technology Occupations (CITO) are projected to grow by 12%, also faster than the average. Within CITO, there is a 16% projected increase in the sub-category of Computer and Information Research Scientists, and USBLS notes that such scientists "are likely to enjoy excellent job prospects, because many companies report difficulties finding these highly skilled workers." Within Business and Financial Occupations, the career of Management Analysts (also known as Business Analysts or Process Consultants) is a potentially apt fit, and projected to increase 14%. USBLS notes that "demand for the services of these workers should grow as organizations continue to seek ways to improve efficiency and control costs." Social science positions--many of which require graduate degrees--are largely holding steady or expecting a small increase (perhaps 5%), but we believe that the data science portion of this social science degree will give our graduates an edge in the job market. In addition to USBLS data, a search of "data science" in LinkedIn.com jobs generated approximately 3,500 returns in the Washington, DC, metropolitan area alone. The same search on jobs.com returned 4,000 open positions in DC and over 40,000 across the nation. These results support the National Academies recommendation to build data science undergraduate programs in order to prepare students for the workforce of the present and near future.

Currently, there are no similar programs in the state (see below), and consequently we expect the fast increase in demand to continue exceeding the existing supply of skilled workers, making this degree program a crucial contributor to industry and society. We anticipate 400 students graduating per year at steady state, beginning three years after implementation of this degree. Please note, however, that our facilities and teaching resources can scale to accommodate larger numbers of students, if they become interested. For evidence of this, please refer to our success in quickly expanding the scope of the B.S. in Information Science, for which we expected 300 students, but which, after a few years, is currently housing more than 1300 students.

Identify similar programs in the state. Discuss any di#erences between the proposed program and existing programs. Explain how your program will not result in an unreasonable duplication of an existing program (you can base this argument on program di#erences or market demand for graduates). The MHEC website can be used to find academic programs operating in the state: http://mhec.maryland.gov/institutions_training/pages/HEPrograms.aspx

There are five undergraduate majors in data science in the state of Maryland, all of which share some similarities with the proposed Social Data Science program but none allowing the breadth of training in an external discipline or an opportunity to explore any social science discipline beyond economics.

Salisbury University offers a B.S. in Data Science. The program's core courses have content overlap with the core courses for Social Data Science, and there is a similarity in structure, in that Salisbury students select a concentration linked to a more traditional discipline. However, there are no opportunities to study social science disciplines in their program: concentrations are available in astrostatistics, bioinformatics, chemometrics, computational data science, geoanalytics, and mathematical data science. Mount Saint Mary's University also offers a B.S. in Data Science, and the program has content overlap with some of the core courses in the proposed Social Data Science program, as well. As with the Salisbury program, there are also structural similarities, in terms of the program's opportunity for specializations, but Mount Saint Mary's only offers specialization opportunities that fall within data science rather than areas linking data science to other disciplines. Specializations include computational science, data engineering, operations research, and analytics for business. There are opportunities to take courses outside of the primary program but not to pursue rigorous academic training in another discipline, and there are next to no courses available in the specializations that come from social science departments. Loyola University of Maryland offers a B.S. in Data Science, and the program also has content overlap between their set of core courses and the proposed core courses for the Social Data Science program, but they do not offer opportunities to work outside of the main involved disciplines of computer science, information systems, and mathematics. Capitol Technology University also offers a B.S. in Data Science, but the program is based primarily in the field of business, with a two-pronged set of core courses, one from computer science and the other in business analytics, with no opportunity to study social science disciplines. Finally, Goucher College offers a B.S. in Integrative Data Analytics, and it is perhaps the closest match to the proposed social data science program. Their program description draws on language similar to that in this proposal--a focus on using "scientific and mathematical principles to find nuanced, complex patterns of physical and human behavior." However, the program allows only two concentrations: data science or economics. And even those students specializing in economics do not receive nearly the level of structured disciplinary instruction as a Social Data Science student choosing economics as their cognate area. Students in the Goucher program take only introductory economics courses and econometrics and will not graduate with nearly the breadth of economic knowledge, skills and abilities as a Social Data Science student with an economics cognate will be able to.

As a side note, all five programs also require higher mathematical competency than the proposed Social Data Science program, thereby making the program proposed herein perhaps the most accessible to the greatest range of students.

Discuss the possible impact on Historically Black Institutions (HBIs) in the state. Will the program affect any existing programs at Maryland HBIs? Will the program impact the uniqueness or identity of a Maryland HBI?

There are currently no programs in data science at a Maryland Historically Black Institution. No impact is anticipated.

Supporting Documents

Attachments

SDS Appendix I.pdf
SDS Appendix V.pdf
SDS Appendix IV.pdf
SDS Appendix III.pdf
SDS Appendix II.pdf
SDS Appendix VI.pdf
SDS Appendix VII.pdf

Key: 761

Social Data Science Major - SDSC (I-School & BSOS College)

SDSC Major Course Requirements

Social Science Cognate Area (pick one)	*African American Studies*	*Anthropology*	*Economics*	*Geographical Sciences & GIS*	*Government & Politics & Intl. Rel.*	*Psychology*	*Sociology*	
Benchmark I Minimum MATH & STAT (6 cr)	STAT100 (3) & MATH115 (3)	STAT100 (3) & MATH115 (3)	STAT100 (3) & MATH120 (3)	STAT100 (3) & MATH120 (3)	STAT100 (3) & MATH115 (3)	STAT100 (3) & MATH120 (3)	STAT100 (3) & MATH115(3)	
Benchmark I (3 cr)	INST126 (3) or GEOG276 (3)							
Benchmark II (6-9 cr)	AASP101 (3)	ANTH210 (3) or 222 (4) or 240 (3)*	ECON200 (3)	GEOG202 (3)	GVPT170 (3)	PSYC100 (3)	SOCY100 (3)	
	AASP210 (3)	INST314 (3)	ECON201 (3)	GEOG306 (3)	GVPT200 (3)	PSYC200 (3)	SOCY201 (3)	
			ECON230 (3)		GVPT201 (3)			
Core Courses (27 cr)	BSOS233 (3)							
	INST326 (3) or BSOS326(3) or GEOG376 (3)							
	INST327 (3)							
	INST366 (3)							Advising hand-off after INST366
	INST414 (3)							
	INST447 (3)							
	INST462 (3)							
	SURV400 (3)							
	SURV430 (3)							
Capstone (3 cr)	INST492 (3)							
Cognate I Courses (3 cr) (Required)	***Required 3 cr*** AASP395 (3)	***Required 3 cr*** ANTH310 or 322 or 340*	***Required 3 cr*** ECON305 or 306	***Required 3 cr*** GEOG373	**Required 3 cr** GVPT320	**Required 3 cr** PSYC300	***Required 3 cr*** SOCY202	
Cognate II Courses (6-9 cr) (Choose from a list)	***choose 9 cr. from:*** AASP301	***choose 9 cr. from 1 of the following 3 groups:***	***choose 6 cr from:*** ECON305 or 306**	***choose 9 cr including 6 cr at 4XX from:*** GEOG330	***choose 6 cr from any:*** GVPT3XX	**choose 9 cr from:** PSYC330	***choose 9 cr:*** SOCY325	
	AASP310	**Group 1 - Health**	ECON311	GEOG331	GVPT4XX	PSYC332	SOCY335	
	AASP313	ANTH411	ECON312	GEOG332		PSYC334	SOCY401	
	AASP314	ANTH412	ECON315	GEOG333		PSYC336	SOCY405	
	AASP400	ANTH413	ECON317	GEOG335		PSYC341	SOCY406	
	AASP402	ANTH415	ECON330	GEOG415		PSYC344	SOCY407	
	AASP411	ANTH416	ECON340	GEOG416		PSYC353	SOCY410	
	AASP441	**Group 2 - Heritage**		GEOG421		PSYC354	SOCY411	
	AASP443	ANTH341		GEOG422		PSYC355	SOCY412	
	AASP499	ANTH440		GEOG432		PSYC356	SOCY413	
		ANTH441		GEOG470		PSYC361	SOCY415	
		ANTH447		GEOG473		PSYC362	SOCY420	
		ANTH448		GEOG475		PSYC416	SOCY430	
		ANTH451		GEOG477		PSYC417	SOCY431	
		ANTH464				PSYC420	SOCY432	
		ANTH496				PSYC424	SOCY441	
		Group 3 - Environment				PSYC425	SOCY442	
		ANTH450				PSYC432	SOCY444	
		ANTH454				PSYC435	SOCY445	
		ANTH456				PSYC436	SOCY457	
		ANTH462				PSYC437	SOCY464	
		ANTH467				PSYC440	SOCY465	
						PSYC450	SOCY467	
						PSYC456	SOCY480	
						PSYC460	SOCY490	
							SOCY491	

*** ANTH Benchmark course will guide a student's choice of Cognate I and Cognate II courses in Health, Heritage, or Environment.**

**** Course may count only as Cognate I or Cognate II. It may not double-count.**

	Social Data Science Major	
	Sample Four Year Plan - Cognate Area in GVPT	
Year 1	Fall	Spring
	MATH115 (3)	STAT100 Elementary Statistics and Probability (FSAR: Analytical Reasoning) (3)
	GVPT170 American Government (DSHS: History/Social Sci) (3)	INST126 Intro to Programming for Information Science (3)
	ENGL101 (FSAW: Academic Writing) (3)	DSHS: (History/Social Science) (3)*
	DSHU (Humanities) (3)*	FSOC (Oral Communication) (3)
	Elective (3)	DVUP: (Understanding Plural Societies)(3)
	UNIV100 (1)	
	Total = 16 cr	**Total = 15 cr**
Year 2	Fall	Spring
	BSOS233 Data Science for Social Sciences (3)	INST326 (3)
	GVPT200 International Political Relations (3)	GVPT201 Scope and Method for Political Science Research (DSSP: Scholaship in Practice)(3)
	DSNL: (Natural Sciences Lab) (4)	BSOS326 Python Programming for the Social Sciences (new)(3)
	FSOC: (Oral Communications)(3)	DVUP or DVCC: (Cultural Competence)(3)
	DSHU:(Humanities) (3)	Elective (3)
	Total = 16 credits	**Total = 15 cr**
Year 3	Fall	Spring
	GVPT320 Advanced Empirical Research (3)	GVPT 3XX or 4XX (3)
	INST327 Database Design and Modeling (3)	INST447 Data Sources and Manipulation (3)
	INST414 Data Science Techniques (3)	INST462 Data Visualization (3)
	DSNS: (Natural Sciences Non-Lab) (3)	DSSP: (Scholarship in Practice, non-major)(3)
	Elective (3)	FSPW: (Professional Writing) (3)
	Total = 15 cr	**Total = 15 cr**
Year 4	Fall	Spring
	GVPT3XX or 4XX (3)	INST492 Integrated Capstone for Social Data Science (3)
	INST366 Privacy, Security and Ethics for Big Data (3)	SURV430 Questionnaire Design (3)
	SURV400 Fundamentals of Survey and Data Science (3)	Elective (3)
	Elective (3)	Elective (3)
	Elective (3)	Elective (3)
	Total = 15 cr	**Total = 15 cr**
	*All students must complete two Distributive Studies courses that will also count for the I-Series requirement. Students may also fulfill Understanding Plural Society and/or Cultural Competence with courses from Distributive Studies.	

Fall 2020 - URM Students in BSOS & I-School (Unduplicated Count of UG Majors)

	UMD Total Undergrad	BSOS Undergrad	I-School Undergrad
American Indian	32	5	2
Black, African American	3700	544	268
Hispanic US	3045	566	100
Native Hawaiian etc.	22	6	0
Total URM UG Students	6799	1121	370
Total UG Students	30,875	4662	1216
% UG students who identify as URM	**22%**	**24%**	**30%**

Data retrieved from reports.umd.edu on 12/23/2020 by KFR.

Appendix IV: Curriculum Maps

Program Learning Outcome Curriculum Map	General SDS Benchmark Courses		SDS Core Courses									Cognate Area
	INST126 Introduction to Programming for Information Science OR GEOG276 Principles of Python Programming for Social and Environmental Sciences	STAT100 Elementary Statistics and Probability	BSOS233 Data Science for Social Sciences	INST326 Object-Oriented Programming OR BSOS326 Python Programming for the Social Sciences OR GEOG376 Programming for Geospatial Analysis	INST366 Privacy, Security, and Ethics for Big Data	INST414 Data Science Techniques	INST447 Data Sources and Manipulation	INST462 Data Visualization	SURV400 Fundamentals of Survey and Data Science	SURV430 Questionnaire Design and Evaluation	INST 492 Capstone Project	
Design, execute, document, and disseminate research that applies tools and methods from data science to address a social science research question	Introduced	Introduced	Introduced	Introduced		Reinforced	Reinforced	Reinforced	Introduced	Introduced	Reinforced	Introduced and Reinforced
Develop expertise in specific contemporary social science theories and data science approaches to tackling research questions related to these theories			Introduced		Introduced	Reinforced	Reinforced	Reinforced	Introduced	Introduced	Reinforced	
Apply findings from social data science research to analyze the policy and design of socio-technical systems			Introduced		Introduced	Introduced	Introduced				Reinforced	
Identify and analyze social, legal, and ethical and equity issues in social data science work and in the profession			Introduced		Reinforced	Introduced	Introduced	Introduced	Introduced	Introduced	Reinforced	

Washington CoLAB Outcomes X Information Science Courses	General Benchmarks		Core Courses								
	INST126	STAT100	BSOS233	INST326 OR BSOS326 OR GEOG376	INST366	INST414	INST447	INST462	SURV400	SURV430	INST 492
Generalist Credential											
Role of Data and Analytics			Introduced	Reinforced	Introduced	Reinforced		Reinforced	Introduced	Introduced	Reinforced
Probability and Descriptive and Inferential Statistics		Introduced	Reinforced			Reinforced			Reinforced	Reinforced	
Data Manipulation	Introduced and Reinforced			Reinforced		Reinforced	Reinforced	Reinforced	Reinforced	Reinforced	
Data Ethics			Introduced	Introduced	Reinforced	Introduced	Reinforced	Introduced	Reinforced	Introduced	Reinforced
Data Security				Introduced	Introduced and Reinforced						
Specialist Credential: Data Analytics											
Data Management and Governance				Reinforced	Reinforced				Introduced	Introduced	
Data Manipulation	Introduced and Reinforced			Reinforced		Reinforced	Reinforced	Reinforced	Introduced	Reinforced	
Probability and Descriptive and Inferential Statistics		Introduced and Reinforced	Introduced						Reinforced		
Data Visualization and Communication								Introduced	Reinforced		
Foundations of Systems Development Life Cycle					Introduced						Reinforced
Data Ethics			Introduced		Reinforced	Introduced	Reinforced	Introduced	Reinforced	Introduced	Reinforced
Specialist Credential: Machine Learning											
Mathematical & Statistical Machine Learning					Introduced	Reinforced					
Machine Learning Models & Algorithms					Introduced	Reinforced					
Data Visualization and Communication								Introduced and Reinforced			
Application of Machine Learning Models & Algorithms					Introduced		Reinforced				
Data Ethics			Introduced		Reinforced	Reinforced	Reinforced	Reinforced			

UNIVERSITY OF MARYLAND

Katherine Worboys Izsak <kworboys@umd.edu>

Fwd: Including STAT100 as benchmark for new INFO/BSOS undergraduate major

Ron Padron <rapadron@umd.edu> Thu, Dec 17, 2020 at 10:31 AM
To: Katherine Worboys Izsak <kworboys@umd.edu>

See below.

Ron Padrón, MS | Interim Director of Undergraduate Operations
{Pronouns: He, His, Him}
College of Information Studies
4130 Campus Drive | College Park, MD 20742
301.405.1040 (P) | ischool.umd.edu

---------- Forwarded message ---------
From: **Doron Levy** <dlevy@umd.edu>
Date: Thu, Dec 17, 2020 at 10:08 AM
Subject: Re: Including STAT100 as benchmark for new INFO/BSOS undergraduate major
To: Ron Padron <rapadron@umd.edu>
Cc: Antoine Mellet <mellet@umd.edu>

Hi Ron,

We support using Stat 100 as a benchmark for the new major.
I am attaching a 2-year (college by college) breakdown of the number of students that have been taking Stat 100. We can support increased enrollments in Stat 100 if necessary.

By the way - if you have a draft of the proposal that you can share with us - that will be interesting. Nothing urgent.

Best regards -
Doron

Doron Levy
Professor and Chair
Department of Mathematics
University of Maryland
College Park, MD 20742
Web | Twitter | LinkedIn | 301-405-5051

> On Dec 17, 2020, at 9:47 AM, Ron Padron <rapadron@umd.edu> wrote:
>
> Good morning all,
>
> I'm reaching out on behalf of the program design committee for the Bachelors of Science in Social Data Science, a shared program between the College of Information Studies and the College of Behavioral and Social Sciences. We would like to list STAT100 as a benchmark requirement for this program. Do you have any concerns with us doing so? Or would this be fine to include in our proposal?
>
> I'm happy to arrange a time to discuss this in more detail if you would like.

(Since you were each listed on the response to a previous inquiry for a different program I am reaching out to you both. Apologies if this should only have gone to one of you.)

Ron

Ron Padrón, MS | Interim Director of Undergraduate Operations
{Pronouns: He, His, Him}
College of Information Studies
4130 Campus Drive | College Park, MD 20742
301.405.1040 (P) | ischool.umd.edu

---

stat100-2years.pdf
111K

	201708 U Id	201801 U Id	201805 U Id	201808 U Id	201901 U Id	201905 U Id
AGNR	15	16	1	9	14	3
ARCH	2	1			1	
ARHU	66	71	6	71	92	3
BMGT	6	1		2	3	2
BSOS	96	66	3	105	75	7
CMNS	34	34	7	30	47	10
EDUC	25	29	4	30	22	
ENGR	6	7		4	5	
EXST	84		8	83		8
GRAD			1			
INFO	62	72	6	103	89	5
JOUR	11	4	1	36	5	1
LTSC	113	134	21	141	114	23
PLCY	10	25	3	23	26	4
SPEC	1				1	
SPHL	115	94	17	80	91	16
UGST	20	20		14	11	1

STAT 100 Students Grouped by College
Fall 2017-Summer 2019

		U Id
STAT100	AGNR	54
	ARCH	4
	ARHU	292
	BMGT	13
	BSOS	336
	CMNS	161
	EDUC	103
	ENGR	21
	EXST	183
	GRAD	1
	INFO	303
	JOUR	58
	LTSC	509
	PLCY	85
	SPEC	2
	SPHL	391
	UGST	61

EXPENDITURES FOR SOCIAL DATA SCIENCE MAJOR FY22-FY26 (Rev. 12/04/2020)

Expenditure Categories	Year 0 - FY22	Year 1 - FY23	Year 2 - FY24	Year 3 - FY25	Year 4 - FY26	
1. TTK Faculty (b+c below)		$410,970	$423,299	$435,998	$449,078	
a. #FTE		2.0	2.0	2.0	2.00	2 TTK Faculty Hires - one in I-School, one in BSOS*
b. Total Salary		$309,000	$318,270	$327,818	$337,653	
c. Total Benefits		$101,970	$105,029	$108,180	$111,425	
1. PTK Faculty (b+c below)	$133,000	$532,000	$547,960	$846,598	$871,996	2 PTK Faculty Hires - one in I-School, one in BSOS**
a. #FTE	1.0	4.0	4.0	6.0	6.0	Additional PTK faculty will be needed to support increased enrollment in upper-level cognate courses in BSOS depts. Assume it will be ECON & GVPT.
b. Total Salary	$100,000	$400,000	$412,000	$636,540	$655,636	
c. Total Benefits	$33,000	$132,000	$135,960	$210,058	$216,360	
1. Graduate Teaching Assistants (b+c	$0	$95,760	$98,633	$203,184	$209,279	
a. #FTE		4.0	4.0	8.0	8.0	TA lines are for core SDS courses
b. Total Salary		$72,000	$74,160	$152,770	$157,353	
c. Total Benefits		$23,760	$24,473	$50,414	$51,926	
2. Admin. Staff (b+c below)	$139,650	$279,300	$287,679	$296,309	$305,199	
a. #FTE	1.5	3.0	3.0	3.0	3.0	UG Co-Directors 1.0 FTE (0.5 FTE x 2), Academic Advisor 1.0 FTE I-School, Academic Advisor 1.0 FTE BSOS
b. Total Salary	$105,000	$210,000	$216,300	$222,789	$229,473	
c. Total Benefits	$34,650	$69,300	$71,379	$73,520	$75,726	
3. Total Support Staff (b+c below)		$99,750	$102,743	$105,825	$109,000	System Admin/Data Manager 1.0 FTE
a. #FTE	0.5	1.0	1.0	1.0	1.0	
b. Total Salary		$75,000	$77,250	$79,568	$81,955	
c. Total Benefits	$0	$24,750	$25,493	$26,257	$27,045	
4. Equipment		$25,000	$25,000	$25,000	$25,000	Fac/Advisor Computers, Furniture, Marketing/Communications (year 1-2); UG student employees (years 3-5)
5. AWS, Software, Licenses & Library	$25,000	$50,000	$50,000	$50,000	$50,000	Estimated IT Infrastructure & Library Costs
6. New or Renovated Space	$0	$0	$100,000	$0	$0	Renovation of office space for major
7. Other Expenses: Operational Expenses		$103,536	$103,536	$207,072	$310,608	Tuition Remission: $25,884 per Graduate Teaching Assistant (average of In-State & Out-of-State rates)
TOTAL (Add 1 - 7)	**$297,650**	**$1,596,316**	**$1,738,849**	**$2,169,986**	**$2,330,159**	

resources - expenditures

These budget estimates are resources and expenditures to the University overall, and not to the program or unit. Do not include revenue-sharing agreements between units, between unit and college, or with the university (e.g., for entrepreneurial programs) as an expenditure.

benefits	benefits	0.33
inflation	inflation	1.03

* BSOS TTK faculty resources may be spread to support existing JPSM faculty who will teach UG courses in SDS major

** BSOS PTK faculty will serve as the course director & primary instructor for BSOS233 & BSOS326.

DATE: 1/28/2021

TO: Katherine Izsak
Director of Academic Programs, College of Information Studies

FROM: On behalf of the University of Maryland Libraries:

Rachel Gammons, Head, Teaching and Learning Services
Tahirah Akbar-Williams, Education and African American Studies Librarian
Jordan Sly, Anthropology, Psychology, Philosophy, Digital Humanities, and SLLC Librarian for French, Italian, and German
Maggie Saponaro, Head of Collection Development
Daniel Mack, Associate Dean, Collection Strategies & Services

RE: Library Collection Assessment: Bachelor of Science in Social Data Science

We are providing this assessment in response to a proposal by Katherine Iszack on behalf of the College of Information Studies (iSchool) and the College of Behavioral and Social Sciences (BSOS) to create a Bachelor of Science in Social Data Science. The departments have requested that we at the University of Maryland Libraries assess our collection and resources in order to determine the level of support to the curriculum and students that the libraries are able to provide with reference to the proposed program.

Serial Publications

The proposed Bachelor of Science in Social Data Science is an undergraduate program focusing on preparing students to effectively, ethically and efficiently create information products, such as datasets, visualizations, and models, about human activity and behavior. In line with the existing Bachelor of Science in Information Sciences and BSOS's Joint Program in Survey Methodology it is expected that the B.S. in Social Data Science will rely heavily on online resources. The University of Maryland Libraries currently subscribe to a large number of scholarly journals in online format that focus on human computer interaction, information science, data science, and data analytics, as well as resources that would support the program's cognate discipline, African-American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, or Sociology.

The Libraries subscribe to most of the top ranked journals that are listed in Information Science and Computer Science categories in the Social Sciences Edition of Journal Citation Reports.* These journals include the following, all of which are available online:

- *Journal of Computer Mediated Communication*
- *International Journal of Information Management*
- *Information Systems Journal*

- *Information Processing & Management*
- *MIS Quarterly: Management Information Systems*
- *Journal of Strategic Information Systems*
- *Information Communication & Society*
- *Computers & Society*

The Libraries subscribe to highly respected journals in the associated disciplines noted in the program description such as African-American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, and Sociology. Below is a selection of these journals all of which are available through the library's online journal and database subscriptions. Please note that this list is not exhaustive but serves to illustrate a sample of the scope of our holdings:

- *Black Scholar*
- *Journal of Black Studies*
- *Journal of Blacks in Higher Education*
- *Review of Black Political Economy*
- *Journal of African American Studies*
- *Du Bois Review: Social Science Research on Race*
- *Souls A Critical Journal of Black Politics, Culture, and Society,*
- *Slavery, Abolition and Social Justice*
- *Black Thought and Culture*
- *Slavery in America and the World: History, Culture & Law*
- *Journal of Gender Studies*
- *Health Care for Women International*
- *Black Women, Gender & Families*
- *Women, Gender, and Families of Color*
- *Journal of Gender Studies*
- *Sexuality Research and Social Policy*
- *Journal of Racial and Ethnic Health Disparities*
- *American Journal of Sociology*
- *Computers, Environment, and Urban Systems*
- *Design Studies*
- *Social Problems*
- *Journal of Peasant Studies*
- *Cultural Anthropology*
- *Journal of Human Evolution*
- *Current Anthropology*
- *Medical Anthropology*
- *Medical Anthropology Quarterly*
- *Annual Review of Anthropology*

- *American Ethnologist*
- *Journal of Archaeological Research*
- *Journal of Archaeological Method*
- *Psychological Bulletin***
- *Annual Review of Psychology*
- *Annual Review of Clinical Psychology*
- *Journal of Child Psychology and Psychiatry*
- *Psychological Review***
- *Psychological Medicine***
- *Depression and Anxiety*
- *Journal of Memory and Language*
- *Psychosomatic Medicine***
- *Psychological Methods***
- *Computers in Human Behavior*
- *Environment and Behavior*

*Note: Journal Citation Reports is a tool for evaluating scholarly journals. It computes these evaluations from the relative number of citations compiled in the Science Citation Index and Social Sciences Citation Index database tools

**Note: select access to back issues via print collection and HathiTrust. Current issues available via ILL

Databases

The Libraries' Database Finder (http://www.lib.umd.edu/dbfinder) resource offers online access to databases that provide indexing and access to scholarly journal articles and other information sources. Several of these databases cover subject areas that would be relevant to this proposed program. Databases that would be useful in the field of Information Science and Data Science are *ACM Digital Library*, *Library and Information Science Source Information*, and *Web of Science Core Collection*. Subject area databases that would be relevant to this curriculum include, *Ethnic NewsWatch, SocIndex with Full Text, PAIS Index, GenderWatch, International Political Science Abstracts, Business Source Complete, LGBTQ+ Source, Women's Studies International, Social Explorer*, *APA PsycInfo, AAA Anthro Source, Anthropological Literature*, and *SimplyAnalytics*. General/multidisciplinary databases such as *Academic Search Ultimate, JSTOR*, and *Project Muse* are also good sources of articles relevant to this topic.

In most cases, these indexes offer full text copies of the relevant journal articles. In those instances in which the journal articles are available only in print format, the Libraries can make copies available to graduate students through the Libraries Interlibrary Loan System (Note: see below.)

Monographs

The Libraries regularly acquire scholarly monographs in Information Management, Data Science, Human Computer Interaction and allied subject disciplines. Monographs not already part of the collection can usually be added upon request.

Even though most library research for this course/program likely will rely upon online journal articles, students may wish to supplement this research with monographs. Fortunately, more and more monographs are available as e-books. Even in instances when the books are only available in print, students will be able to request specific chapters for online delivery through the Interlibrary Loan program (https://www.lib.umd.edu/access/ill-article-request).

A search of the University of Maryland Libraries' WorldCat UMD catalog was conducted, using a variety of relevant subject terms. This investigation yielded sizable lists of citations of books that we own. A search for "data science" yielded nearly 57,000 monographs, 650 of which were e-books. A search for "survey methodology" yielded 3,000 monographs, 1,694 of which were e-books. A further search revealed that the Libraries' membership in the Big Ten Academic Alliance (BTAA) dramatically increases these holdings and citations. A search for "data science" from BTAA holdings yielded 122,000 books and "survey methodology" yielded 7,400 books.

As with our own materials, graduate students can request that chapters be copied from these BTAA books if the books are not available electronically

Interlibrary Loan

Interlibrary Loan services (https://www.lib.umd.edu/access/ill) provide online delivery of bibliographic materials that otherwise would not be available online. As a result, remote users who take online courses may find these services to be helpful. Interlibrary Loan services are available free of charge.The article/chapter request service scans and delivers journal articles and book chapters within three business days of the request--provided that the items are available in print on the UM Libraries' shelves or in microform. In the event that the requested article or chapter is not available on campus, the request will be automatically forwarded to the Interlibrary Loan service (ILL). Interlibrary Loan is a service that enables borrowers to obtain online articles and book chapters from materials not held in the University System of Maryland.

Please note that one limitation of these services that might create some challenges for the online student is that the Libraries are not allowed to make online copies of entire books. The only way that a student can get access to a print copy of an entire book is to physically come to the Libraries and check out that book.

Additional Resources

In addition to serials, monographs and databases available through the University Libraries, students in the proposed program will have access to a wide range of media, datasets, software, and technology. Media in a variety of formats that can be utilized both on-site and via ELMS

course media is available at McKeldin Library. GIS Datasets are available through the GIS Data Repository (https://www.lib.umd.edu/gis/data-and-resources) while statistical consulting and additional research support is available through the Research Commons (http://www.lib.umd.edu/rc) and technology support and services are available through the Terrapin Learning Commons (http://www.lib.umd.edu/tlc).

The subject specialist librarian/s for the discipline/s Jordan Sly, Rachel Gammons, and Tahirah Akbar-Williams also serve as an important resource to programs such as the one proposed. Through departmental partnerships, subject specialists actively develop innovative services and materials that support the University's evolving academic programs and changing research interests. Subject specialists provide one-on-one research assistance online, in-person, or via the phone. They also provide information literacy instruction and can provide answers to questions regarding publishing, copyright and preserving digital works.

Conclusion

With our substantial journals holdings and index databases, as well as additional support services and resources, the University of Maryland Libraries have resources to support teaching and learning inThe University of Maryland Libraries currently subscribe to a large number of scholarly journals in online format that focus on human computer interaction, information science, data science, and data analytics, as well as resources that would support the program’s cognate discipline, African-American Studies, Anthropology, Economics, Government and Politics/International Relations, Geography/Geospatial Information Science, Psychology, or Sociology. These materials are supplemented by a strong monograph collection, many of which are available as e-books. Additionally, the Libraries’ Interlibrary Loan services make materials that otherwise would not be available online, accessible to remote users in online courses. As a result, our assessment is that the University of Maryland Libraries are able to meet the curricular and research needs of the proposed Bachelor of Science in Social Data Science.