**Overview of the Social Science Analytics Specialization**

 The Social Science Analytics Specialization (SSAS) in the Data Analytics major will complement the computational, mathematical, and statistical skills attained from the core curriculum with an understanding of, and proficiency in, original social science research (including experiments, surveys, content analysis, and ethnographic research). The SSAS will provide students with an understanding of the fundamental concepts and issues involved in doing research (e.g., theory development and hypothesis testing, ethics, sampling, various types of validity, and measurement) and the skills necessary to design original research.

 Social science research skills are critical components of “big data” analytics. For example, companies like Facebook and Google regularly conduct experiments for purposes of product testing, improving user experiences, and even basic social science; Google acknowledges running over 20,000 experiments a year (<http://www.nytimes.com/2014/07/03/technology/personaltech/the-bright-side-of-facebooks-social-experiments-on-users.html> ). While new technologies have radically changed public opinion polling, the basic skills associated with survey research (e.g., sampling and measurement) remain elements of big data web panels and social media platforms. Cultural anthropologists and other ethnographic scholars are increasingly in demand to provide “thick” description and explanation to the results that emerge from big data platforms. ( <http://www.businessinsider.com/heres-why-companies-aredesperateto-hireanthropologists-2014-3>). In short, it is expected that SSAS graduates will be attractive to employers in a wide range of industries, including technology and social media companies, marketing and consulting firms, and government agencies.

 More concretely, the SSAS will provide students with two complementary sets of skills. First, they will have the ability to formulate specific hypotheses and research questions, and create analytic investigations designed to answer those questions, making use of existing large, complex data sets. Second, they will be proficient in designing original data collection project. These original research designs might be intended to guide the direction of large complex data collections. Alternately, these original research designs might be smaller projects designed to complement existing data collection efforts to provide deeper insights into when and why particular social patterns emerge. To achieve these outcomes, the SSAS has the following requirements (the details of the requirements are further spelled out below):

1. **One general “overview of research methods” course**. There are four of these courses offered in Communication, Sociology, Psychology, and Political Science, respectively. These “overview” courses have some overlap, including coverage of: (1) fundamental principles of research design, such as the logic of hypothesis testing, sampling, measurement error, internal and external validity, and research ethics; (2) specific research methodologies, such as surveys, experiments, content analyses, and qualitative/ethnographic research; and (3) basic statistics. While these courses naturally have different emphases given different disciplinary research norms, the overlap is substantial enough that only one of the four can count toward the specialization requirement.
2. Three courses from a set of electives that **focus on specific research techniques, as well as visualization and spatial analyses.** Eighteen courses have been identified, offered by nearly the full range of social science disciplines (Anthropology, Communication, Economics, Geography, Political Science, Psychology, Sociology, and Statistics). These courses offer in-depth training in specific research methodologies, such as experiments, survey research, ethnography, network analysis, and GIS. It is possible, even likely, that this elective course list will be expanded, as the social science programs expand their research methods course offerings. There is no distribution requirement; students can take any three of these courses to satisfy this requirement.

There is no distribution requirement because the SSA specialization is intended to be interdisciplinary, in keeping with the nature of the major itself. Students will have the option to sample multiple social science disciplines, or focus on a single discipline (this flexibility is comparable to the Business Specialization in the Data Analytics major).

1. Completion of an **independent research project,** through enrollment in either a departmental 4998 (Undergraduate Research in XXX) or 4999 (Undergraduate Thesis Research). This requirement requires students to demonstrate that they can design and carry out an independent, data-based research project, as well as produce a written report describing the theoretical motivation, research design and empirical results. The project must have a data component, and it can draw on existing data sets or involve original data collection. This project must be approved in advance by the faculty member who will serve as the SSAS representative on the Data Analytics Steering Committee. The faculty member who supervises the research project will be responsible for approving, and submitting a grade for, the final project. The SSAS representative will also collect and review the final projects, not for purposes of evaluation but rather for subsequent program evaluation.

Students will have sufficient exposure to social science research topics to complete an independent research project. Students will received beginning-level exposure to social science theories and methods in prerequisites and GE courses, and this preparation is assumed to be sufficient to prepare students to move into the intermediate level courses. Virtually all of the courses in the specialization include a research component (most of them group-based projects), so students will have had several opportunities to conduct research projects on a wide array of social science topics prior to the independent research project. Thus, they will be in a position to make an informed choice about the topic of the independent research project, which might indeed build upon a project completed in an earlier course.

1. Training in the ethics of human subjects research is incorporated in several of the specialization courses. Given the importance of research ethics in conducting social science research, students must also complete the Collaborative Institutional Training Initiative (CITI) web-based human research course (specifically, the Social and Behavioral Research track), available here <http://orrp.osu.edu/irb/training-requirements/citi/>. Many of the courses (in both the general “overview of research methods” and “specific research techniques” categories) require completion of the CITI training course. If the CITI training is not completed as part of a formal course requirement, it should be completed during the independent research project. Upon completing the training, students should print and retain a copy of the completion report so that fulfillment of this requirement can be verified by the SSAS faculty member on the Data Analytics Steering Committee.
2. Students will also take part in the broader integrative experiential component of the major represented by the **Capstone Data Analytics course** being developed by CSE/STAT. It is anticipated that if the enrollments grow sufficiently in the future, an independent Social Science Capstone course would be developed to replace the CSE/STAT Capstone for SSAS students.

 **Specialization: Social Science Analytics**

Outcomes from the Core Courses

**M.1** Students will demonstrate an understanding of and ability to apply computer science principles relating to data representation, retrieval, programming and analysis.

**M.2** Students will demonstrate an understanding of and ability to apply mathematical and statistical models and concepts to detect patterns in data, as well as draw inferences and conclusions supported by the data.

**M.3** Students will demonstrate critical thinking skills associated with problem identification, problem solving and decision-making, assessing value propositions supported by data, and generating a logical synthesis of information from data.

**M.4** Students will demonstrate the ability to apply knowledge gained from one area to problems and data in another.

**M.5** Students will demonstrate the ability to communicate findings and their implications, and to apply them effectively in organizational settings.

Outcomes from the Technical Courses for the Specialization

**S.1** Students demonstrate an understanding of methodologies used by social scientists in the conduct of research, including ethical issues.

**S.2** Students demonstrate proficiency in critically evaluating social science research.

**S.3** Students demonstrate proficiency in the design and implementation of original social science research.

**Program outcomes** *(B=beginner, I=intermediate, A=advanced)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course** | **M.1** | **M.2** | **M.3** | **M.4** | **M.5** | **S.1** | **S.2** | **S.3** |
| Math 1151 |  | B |  |  |  |  |  |  |
| Math 1152 |  | B |  |  |  |  |  |  |
| Math 2568 |  | I |  |  |  |  |  |  |
| CSE 2221 | B |  |  |  | B |  |  |  |
| CSE 2231 | I |  | B |  | B |  |  |  |
| CSE 2321 | I | B | B |  | B |  |  |  |
| CSE 2421/2*xxx* | B |  | B |  | B |  |  |  |
| CSE 3241 | A |  | I |  | I |  |  |  |
| STAT 3201 |  | B |  |  | B |  |  |  |
| STAT 3202 |  | B | B |  | B |  |  |  |
| ISE 3230 |  | I | I |  | I |  |  |  |
| STAT 3301 | B | I | I | B | I |  |  |  |
| STAT 3302 | B | A | I | B | I |  |  |  |
| STAT 3303 |  | I | A | I | I |  |  |  |
| STAT 4620 | B | A | I | B | I |  |  |  |
| CSE 5242 | A |  | A | B | A |  |  |  |
| CSE 5243 | A | I | A | I | A |  |  |  |
| CSE 5544 or ISE 5*xxx* | CSE: A ISE: I | ISE: I | A | I | A |  |  |  |
| **Course** | **M.1** | **M.2** | **M.3** | **M.4** | **M.5** | **S.1** | **S.2** | **S.3** |
| Comm 3160 |  | B | B |  | I | I | I | I |
| Soc 3487 |  | B | B |  |  | I | I | B |
| Psych 2300 |  | B | B |  |  | I | I |  |
| PolSci 4781 |  | I | B |  |  | I | I |  |
| Anthro 5650 |  |  | I |  | I | A | A | I |
| Comm 3163 | B | B | B |  | I | I | I | I |
| Econ 4050 |  | I | I |  | I | A | I | I |
| Econ 5420 |  | A | A |  |  | I |  |  |
| PolSci 7785 |  | I | A |  | I | A | A | A |
| PolSci 7702 |  | I | A |  | I | I | A | A |
| Psych 4511 |  |  | I |  |  | I | I |  |
| Soc 4650 | I | I | I |  | I | I | I | A |
| Anthro 5651 | I | I | I |  | I | I | I | A |
| Geog 5200 | I |   | I |  | I | I | I |  |
| Geog 5201 | A |  | I |  | I |  |  | I |
| Geog 5210 | I |  | I |  | I | I | I |  |
| Geog 5212 | A | I | I |  |  | I |  | I |
| Geog 5226 | A | I | I |  | I | I | I | I |
| Geog 5222 | A | I | I |  | I | I | I | I |
| Geog 5223 | A | I | I |  |  | I |  |  |
| Geog 5225 | I | I | I |  | I | I |  | I |
| PolSci 3780 | B | I | I |  | I | I | I | I |
| XXXX 4998 |  | A | A |  | A | A | A | A |
| XXXX 4999 |  | A | A |  | A | A | A | A |
| Capstone (CSE/STAT 5xxx) | A | A | A | A | A | A | A | A |

**B.S. Degree—Data Analytics Major The Ohio State University**

**Specialization Requirements College of Arts and Sciences**

**Social Science Analytics**

Total credit hours: 19 hours minimum, to be satisfied as follows:

(1) One course from the “overview of research methods” courses listed below is required; only one of those four courses can count towards the specialization requirement. (3-4 credit hours)

(2) Three courses from the electives listed in the “focused research methods” and “visualization and spatial analyses” section. There is no distribution requirement; students may select any combination of these courses to satisfy this requirement. (9-10 credit hours)

(3) Completion of an independent research project, requiring enrollment in a departmental 4998 (Undergraduate Research in xxx) or 4999 (Undergraduate Thesis Research). (3 credit hours)

(4) Capstone in Data Analytics (CSE5xxx/STAT 5XXX). (4 credit hours)

In addition to completion of these formal course requirements, students are required to complete the CITI Basic Human Research Course training (the Social and Behavioral Research track). The CITI training may be completed as part of a requirement for one of the courses, or it may be completed independently by the student. The CITI Basic Human Research Course is accessed here:

<http://orrp.osu.edu/irb/training-requirements/citi/>. Upon completing the training, students should print and retain a copy of the completion report so that fulfillment of this requirement can be verified.

Electives Title Course # CH Pre-req

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Overview of Research Methods** | Communication Research Methods | Comm3160 | 4 | Stat 1350 or 1450 |
|  | Research Methods in Sociology | Soc3487 | 3 |  |
|  | Introduction to Research Methods | Psych 2300 | 3 | Psych 1100 |
|  | Techniques of Political Analysis | PolSci4781 | 3 |  |
| **Focused Research Methods** | Research Design and Ethnographic Methods | Anthro5650 | 3 | Anthro2202 or permission |
|  | Communication Industry Research Methods | Comm 3163 | 4 | Stat1350 or 1450 |
|  | Experimental Economics | Econ 4050 | 3 | Econ2001 or equiv. |
|  | Econometrics II | Econ 5420 | 3 | Permission |
|  | Experimental Design | PolSci7785 | 3 | Permission of instructor and Grad School |
|  | Survey and Questionnaire Design | PolSci7702 | 3 | Permission of instructor and Grad School |
|  | Psychological Testing | Psych4511 | 3 | Psych2300 |
|  | Seminar in Social Networks | Soc 4650 | 3 |  |
|  | Statistical Foundations of Survey Research | Stat 5510 | 3 | Various stats or permission |
| **Visualization and****Spatial Analyses** | Spatial Analysis forAnthropologists | Anthro5651 | 3 | Geog 5210 or permission |
|  | Cartography and Map Design | Geog 5200 | 3 |  |
|  | GeoVisualization | Geog 5201 | 3 | Geog 5200  |
|  | Fundamentals of GIS | Geog 5210 | 3 |  |
|  | GIS Algorithms and Programming | Geog 5222 | 3 | Geog 5210 or equiv or permission |
|  | Design and Implementation of GIS | Geog 5223 | 3 | Geog 5210 or equiv or permission |
|  | Geographic Applications ofRemote Sensing | Geog5225 | 3 | Geog5100, Stat 2450 or permission |
|  | Spatial Simulation and Modeling in GIS | Geog 5226 |  | Geog 5210 or equiv or permission |
|  | Data Literacy and DataVisualization | PolSci3780 | 3 |  |
| **Required of all students** | Undergraduate Research in XXX (independent study) or Undergraduate Thesis Research | XXXX4998 or XXXX4999 | 3 |  |
| **Required of all students** | Capstone in Data Analytics | CSE5XXX/STAT5XXX | 4 |  |

**B.S. Degree—Data Analytics Major The Ohio State University**

**Advising Sheet College of Arts and Sciences**

**Social Science Analytics Specialization**

**Suggested Curriculum**

This should be used as a **guide** only. Semester offerings are subject to change.

|  |  |  |
| --- | --- | --- |
| **Year** | **Autumn** | **Spring** |
|  | **Course** | **Hrs.** | **Course** | **Hrs.** |
| 1 | ASC 1100.xx | 1 | Math 1152 (Calc II) | 5 |
| Math 1151 (Calc I) | 5 | CSE 2221 (Software I) | 4 |
| GE Phys. Sci. (lab) | 4 | GE Open Option\* | 3 |
| GE Foreign Language 1 | 4 | GE Foreign Language 2 | 4 |
| GE Writing Level 1 | 3 |  |  |
| **Total:** | **17** | **Total:** | **16** |
| 2 | CSE 2231 (Software II) | 4 | CSE 2421 or 2xxx (Systems I or Systems for Data Analytics) | 4 |
| CSE 2321 (Foundations I) | 3 | Math 2568 (Linear Algebra) | 3 |
| Stat 3201 (Prob. and Uncertainty) | 3 | Stat 3202 (Stat. Inference) | 4 |
| GE Social Sciences I \*\* | 3 | GE Writing Level 2 | 3 |
| GE Foreign Language 3 | 4 | GE Social Sciences II \*\* | 3 |
| **Total:** | **17** | **Total:** | **17** |
| 3 | ISE 3230 (Optim. & System. Model.) | 3 | Stat 3302 (Modeling for Discovery II) | 3 |
| CSE 3241 (Databases I) | 3 | CSE 5243 (Data Mining) | 3 |
| Stat 3301 (Modeling for Discovery I) | 3 | GE Biological Sciences (lab) | 4 |
| Social Science Analytics Elective | 3-4 | Social Science Analytics Elective | 3-4 |
|  |  |  |  |
|  Social Science Analytics Elective | 3-4 | CSE 5544 **or** ISE 5xxx (Visualization) | 3 |
| Total: | **15-17** | **Total:** | **16-17** |
| 4 | Stat 4620 (Intr. Stat. Learning) | 2 | Stat 3303 (Statistical Dec. Making) | 3 |
| CSE 5242 or CSE 5xxx (DB II or Adv. DB and Cloud Computing) | 3 | GE Historical Study | 3 |
| Social Science Analytics Elective | 3-4 | Social Science Research Project\*\*\*\* | 3 |
| GE Natural Science | 3 | GE Cult. & Ideas or Hist. Study\*\*\* | 3 |
| GE ArtsGE Literature | 33 | CSE/Stat Capstone | 4 |
| **Total:** | **17-18** | **Total:** | **16** |

\* Stat 2450 is a suggested, but not required, choice for the GE Open Option for students with no previous exposure to statistics.

\*\* Psych 1100 (Introduction to Psychology) is a suggested choice for satisfying a GE Social Sciences requirement; Psych 1100 is required for the Psych 2300 (Introduction to Research Methods) Social Science Analytics elective.

\*\*\* Phil 1332 (Ethics in the Professions) is a suggested, but not required, choice for satisfying the GE Culture and Ideas requirement.

\*\*\*\*Enrollment in a departmental 4998 (Undergraduate Research in xxx) or 4999 (Undergraduate Thesis Research) and completion of an independent research project. It is possible that the research project will require more than one semester to complete.

Geog 5210 (Fundamentals of GIS) is a prerequisite for Geog 5222, Geog 5223, and Geog 5226.

**Total hours to complete the degree program = 131-135**