

COMPUTATIONAL SOCIAL SCIENCE

Program Website: <https://macss.uchicago.edu/programs-of-study/college-minor> (<https://macss.uchicago.edu/programs-of-study/college-minor/>)

MINOR PROGRAM IN COMPUTATIONAL SOCIAL SCIENCE

Computational Social Science is an emergent field at the intersection of the social and computational sciences—leveraging computational advances, such as those in AI and machine learning, as well as the widespread availability of “big data,” to drive the next generation of social research.

The Minor in Computational Social Science enables students in the social sciences to build fundamental computational skills with the purpose of enriching existing approaches to social scientific inquiry. Additionally, for students outside of the social sciences (e.g., in the physical and biological sciences), it provides an opportunity to consolidate their computational, mathematical, and statistical skills, as well as apply these skills to questions about social and cultural life.

Over the course of the program, students will learn how computational approaches complement and expand upon traditional research designs in the social sciences, as well as gain the hands-on computer programming and data analysis skills necessary to implement these computationally enhanced research designs. For instance, students will learn how “big data” and AI technologies enhance traditional observational studies and explore simulation-based research designs, as well as investigate how to run large, computationally enhanced surveys and digital experiments. They will additionally have the opportunity to explore advanced approaches for applying their computational and analytical skills to social science problems in elective courses in Computational Social Science. For example, students may complete machine learning and high-performance computing coursework, with an emphasis on applicability to social scientific research.

PROGRAM REQUIREMENTS

The minor consists of six courses: one course introducing contemporary approaches for performing Computational Social Science research, one data analysis course, two computational methods courses, and two electives in Computational Social Science.

Courses in the minor must be taken for quality grades and may not be double counted with the student’s major(s), other minors, or general education requirements.

Students who wish to declare a minor in Computational Social Science must reach out to the program contact listed below to indicate their intention to complete the minor and have their Consent to Complete a Minor Program (https://humanities-web.s3.us-east-2.amazonaws.com/college-prod/s3fs-public/documents/Consent_Minor_Program.pdf) form signed. Students will need to submit the signed form to their College adviser before the end of the Spring Quarter of their third year.

Students interested in receiving email updates with information about courses, events, and opportunities relevant to the Computational Social Science Minor Program can sign up to join our listhost (https://docs.google.com/forms/d/e/1FAIpQLSfFgR4ni9GknDP-q3zEx9b9Cm_mEcMonfm5O7C1r3PVOfx8Zg/viewform/). Students are also encouraged to reach out to the program contact listed below to meet and discuss course plans, as well as obtain advice relevant to their interests.

SUMMARY OF REQUIREMENTS

MACS 10000	Introduction to Computational Social Science	100
STAT 22000	Statistical Methods and Applications (or approved equivalent coursework in data analysis)*	100
MACS 10111 & MACS 10112	Python Programming with Social Science Applications and Python Data Management with Social Science Applications (or approved equivalent coursework in computational methods)	200
Two Computational Social Science Electives (any two courses with an MACS course number at the 20000-level or below)		200
Total Units		600

* Students who take STAT 22000 or equivalent coursework for their major, another minor, or general education requirement will complete a five-course (500-unit) minor.

APPROVED EQUIVALENT COURSEWORK IN DATA ANALYSIS

If students have not already completed a statistics or data analysis course for their major, another minor, or general education requirement, they must complete such a course for the Computational Social Science minor. Specifically, students should complete STAT 22000 Statistical Methods and Applications or equivalent coursework (at the same or higher level of mathematical requirements).

Examples of approved equivalent coursework include the following. Students should complete the course specific to their major, other minor, or general education requirements.

- Higher-level foundational STAT courses:
 - STAT 23400 Statistical Models and Methods
 - STAT 24400 Statistical Theory and Methods I
- DATA 11900 Introduction to Data Science II
- Other statistics offerings within the Social Sciences Division:
 - CHDV 20101 Applied Statistics in Human Development Research
 - ECON 11010 Introduction to Statistical Methods in Economics
 - ECON 21010 Statistical Methods in Economics
 - PSYC 20250 Introduction to Statistical Concepts and Methods
 - SOCI 20004 Introduction to Statistical Methods and Models
 - SOSC 26009 Introductory Statistical Methods
- Other approved substitutions by petition

APPROVED EQUIVALENT COURSEWORK IN COMPUTATIONAL METHODS

Students must complete two introductory computer programming courses: MACS 10111 Python Programming with Social Science Applications and MACS 10112 Python Data Management with Social Science Applications, or equivalent coursework.

Examples of approved equivalent coursework include:

- CMSC 12100 Computer Science with Applications I and CMSC 12200 Computer Science with Applications II
- CMSC 14100 Introduction to Computer Science I and CMSC 14200 Introduction to Computer Science II
- If students have already completed introductory computer programming courses (e.g., CMSC 14100-14200) as a part of their major, another minor, or general education requirements, they may substitute additional CMSC or MACS courses to meet the two-course Computational Methods minor requirement. For instance, a student who completed CMSC 14100-14200 to meet requirements in their major might take MACS 10113 Large-Scale Computing for the Social Sciences and CMSC 14300 Systems Programming I to meet the requirements (or any other combination of CMSC and MACS courses) of the minor.
- Other approved substitutions by petition

COMPUTATIONAL SOCIAL SCIENCE ELECTIVE OPTIONS

Students must complete at least two Computational Social Science electives as a part of the minor—any two Computational Social Science courses with an MACS course number at the 20000-level and below (see those listed below). Course availability varies by year.

A list of all MACS courses offered each quarter is also available on the program website (<https://macss.uchicago.edu/programs-of-study/courses/>).

COMPUTATIONAL SOCIAL SCIENCE COURSES

MACS 10000. Introduction to Computational Social Science. 100 Units.

Massive digital traces of human behavior and ubiquitous computation have both extended and altered classical social science inquiry. This course surveys successful social science applications of computational approaches to the representation of complex data, information visualization, and model construction and estimation. We will reexamine the scientific method in the social sciences in context of both theory development and testing, exploring how computation and digital data enables new answers to classic investigations, the posing of novel questions, and new ethical challenges and opportunities. Students will review fundamental research designs such as observational studies and experiments, statistical summaries, visualization of data, and how computational opportunities can enhance them. The focus of the course is on exploring the wide range of contemporary approaches to computational social science.

Instructor(s): Ali Sanaei, Henry Dambanemuya, David Peterson Terms Offered: Autumn Winter

Note(s): This course cannot be dropped without instructor consent.

Equivalent Course(s): MACS 30000

MACS 10100. Machine Learning for Computational Social Science. 100 Units.

This is a core-course for the MACSS program and it requires Python programming experience (for non-MACSS students, please email the instructor for consultation). This course will teach fundamental skills of applying statistical machine learning models in computational social science tasks. It will focus on understanding the strengths and weaknesses of modern machine learning algorithms as well as their applications in real-world tasks. Topics will include the key techniques in standard machine learning pipelines: data processing (e.g., data representation, feature selection), classification models (e.g., decision trees, logistic regression, naive bayes), regression models (e.g., linear regression), model evaluation (e.g., cross-validation, confusion matrix, precision,

recall, and f_1 for classification models; RMSE and Pearson correlation for regression models), and error analysis (e.g., data imbalance, bias-variance tradeoff, interpret model performance).

Instructor(s): Zhao Wang, Ali Sanaei Terms Offered: Winter

Prerequisite(s): Familiarity with R or Python at the level of MACS 30111, and statistics at the level of an introduction to inferential statistics course is required; if you are in doubt, reach out to the instructor.

Note(s): Consent required for all Undergraduate and Non MACSS students

Equivalent Course(s): MACS 30100

MACS 10111. Python Programming with Social Science Applications. 100 Units.

This course is the first in a three-quarter sequence that teaches fundamentals of computational thinking to students in the social sciences. Lectures in the class will cover topics such as functions, data structures, as well as classes and objects. Assignments will give students the opportunity to practice these basic computing concepts using the Python programming language and get familiar with computational logic in real-world tasks.

Instructor(s): Jean Clipperton Terms Offered: Autumn

Prerequisite(s): This course is intended for those who placed into it via MACS 30120 "Computing Fundamentals Boot Camp" or for those who are not otherwise prepared to independently and fluently write code using any programming language (e.g., R, Python, C, C++, Java). Note that this is the introductory version of MACS 30121. We will provide several test questions to help students better identify the suitability of this course at the beginning of the quarter.

Equivalent Course(s): MACS 30111

MACS 10112. Python Data Management with Social Science Applications. 100 Units.

This course is the second in a three-quarter sequence that teaches computational thinking and programming skills to students in the social sciences. Specifically, this course equips students with a fundamental toolkit for working with social science data. Students will learn the basics of web-scraping, relational databases, record linkage, data cleaning, modeling, visualization, and data structures. The programming language of the course is Python.

Instructor(s): Sabrina Nardin Terms Offered: Winter

Prerequisite(s): Students must have taken MACS 30111. This course is the introductory version of MACS 30122.

Equivalent Course(s): MACS 30112

MACS 10113. Large-Scale Computing for the Social Sciences. 100 Units.

Computational social scientists increasingly need to grapple with data that is too big and code that is too resource intensive to run on a local machine. Using Python, students in this course will learn how to effectively scale their computational methods beyond their local machines –optimizing and parallelizing their code across clusters of CPUs and GPUs, both on-premises and in the cloud. The focus of the course will be on social scientific applications, such as: accelerating social simulations by several orders of magnitude, processing large amounts of social media data in real-time, and training machine learning models on economic datasets that are too large for an average laptop to handle.

Instructor(s): Jon Clindaniel Terms Offered: Spring, MACS 10111/30111 and MACS 10112/30112, or equivalent

Prerequisite(s): MACS 30111 and MACS 30112, or equivalent

Equivalent Course(s): MACS 30113

MACS 10150. Perspectives on Computational Modeling for Economics. 100 Units.

In this course students will learn several computational methodologies and tools to solve, simulate, and analyze models that are the backbone of current macroeconomic analysis. While learning the relevant computational methods is the main objective, the theoretical economic aspects of the model will be stressed and the students will be required to apply their economic knowledge and skills to interpret and analyze the results. We will examine non-stochastic and stochastic general equilibrium models, both under local and global approximations. The main part of the course will deal with representative agent models, but a significant part will be devoted to introducing students to the solution of heterogeneous agent models as well.

Instructor(s): Sergio Salas Terms Offered: Winter

Prerequisite(s): PQ for undergraduates: Econ 20200/20210 and MATH 19620/Stat 24300/Math 20250 and Stat 23400/Stat 24400/Stat 24410.

Note(s): MACSS students have priority.

Equivalent Course(s): ECMA 31140, MACS 30150

MACS 10200. Computational Research Design. 100 Units.

This course focuses on applying computational methods to conducting social scientific research and the development of a strong research proposal. Students will identify a research question of their own interest that involves a direct reference to social scientific theory, the use of data, and a significant computational component. The students will review existing literature, identify an appropriate data source and conduct exploratory analysis, or develop a method (e.g. survey, experiment) through which they plan on collecting data, and generate a complete and well-motivated research proposal. The course will include modules on theoretical and practical considerations, including topics such as epistemological questions about research design, conducting literature reviews, data visualization and interpretation, reproducible research, writing and rhetoric, as well as presenting work to an audience.

Instructor(s): Jean Clipperton, Henry Dambanemuya Terms Offered: Spring Winter

Prerequisite(s): MACSS students have priority. Others admitted with instructor consent.

Equivalent Course(s): MACS 30200

MACS 20123. Large-Scale Data Mining for Social and Cultural Knowledge Discovery. 100 Units.

Are you prepared to deepen your knowledge of large-scale computational modeling and pioneer new frontiers in social scientific research? This course will introduce fundamental data mining techniques for extracting insights from massive datasets, as well as the practical and theoretical implications of using these approaches to produce new knowledge about the social and cultural world. For instance, students will learn strategies for deciphering cultural logics at scale (e.g. association rule and frequent itemsets mining), revealing patterns in complex social networks (e.g. link analysis and graph neural networks), and discovering large-scale processes that shape our social and cultural world (e.g. recommender systems and causal rule mining). Through in-class discussions, as well as hands-on exercises using Python and large-scale computing frameworks like Spark, students will develop the mastery necessary to conduct large-scale data mining research. By the course's conclusion, students will synthesize their knowledge and skills into an original research project, geared toward publication in a relevant Computational Social Science journal or conference.

Instructor(s): Jon Clindaniel, Zhao Wang Terms Offered: Autumn

Prerequisite(s): Instructor Consent Required. Must complete first-year CSS Computing Sequence (through MACS 10113/30113/30123) and at least one course in Machine Learning (e.g. MACS 10100/30100 or 23002/33002) in order to enroll.

Equivalent Course(s): MACS 40123

MACS 20267. Thinking like a Computational Social Scientist. 100 Units.

The movement of much of our social lives online has created exciting new opportunities for social science research. This course provides a broad survey of computational methods used to make sense of this data. Students will learn how to collect online data and analyze this data using contemporary techniques from natural language processing, supervised/unsupervised machine learning, and generative AI. Students will also cultivate analytical skills through formal paper presentations, oral exams, and an original research project. The course will be taught in Python. This is an intuitive introduction without prerequisites, although previous experience with probability, statistics, and/or programming will be helpful. This course has a shared lecture on Thursdays and a separate graduate and undergraduate sections on Tuesdays(required).

Instructor(s): B. Koch Terms Offered: Winter

Equivalent Course(s): SOCI 20602, DATA 20602, HIST 49307, MACS 30267, SOCI 40267, PSYC 38520, PSYC 28520

MACS 20400. Computation and the Identification of Cultural Patterns. 100 Units.

Culture is increasingly becoming digital, making it more and more necessary for those in both academia and industry to use computational strategies to effectively identify, understand, and (in the case of industry) capitalize on emerging cultural patterns. In this course, students will explore interdisciplinary approaches for defining and mobilizing the concept of "culture" in their computational analyses, drawing on relevant literature from the fields of Anthropology, Psychology and Sociology. Additionally, they will receive hands-on experience applying computational approaches to identify and analyze a wide range of cultural patterns using the Python programming language. For instance, students will learn to identify emerging social movements using social media data, predict the next fashion trends, and even decipher ancient symbols using archaeological databases.

Instructor(s): Jon Clindaniel Terms Offered: Autumn Winter

Prerequisite(s): No previous coding experience required. A Python boot camp will be held at the beginning of the quarter to teach the coding skills necessary to succeed in the course. Open to Advanced Undergraduates with Instructor Permission.

Equivalent Course(s): CHDV 40404, MAPS 40401, PSYC 40460, MACS 40400

MACS 20500. Computing for the Social Sciences. 100 Units.

This is an applied course for social scientists with little-to-no programming experience who wish to harness growing digital and computational resources. The focus is on learning the basics of programming in R and generating reproducible research. Topics include coding concepts (e.g., data structures, control structures, etc.), data visualization, data wrangling, web-scraping, version control software, exploratory data analysis, and more. Students will leave the course with basic programming skills for the social sciences and the ability to adapt and expand these skills as they encounter new questions, methods, and data beyond the course. Requirements: No prior experience with R is required, though it's helpful to have completed a course involving a programming language (e.g., Python, Stata, SPSS, or others) in some capacity. If you're unsure or have had informal exposure to programming, please email the instructor to see if the course is a good fit.

Instructor(s): Jean Clipperton, Sabrina Nardin Terms Offered: Autumn Summer

Equivalent Course(s): PSYC 30510, SOSC 26032, CHDV 30511, MACS 30500, SOCI 20278, SOCI 40176, MAPS 30500

MACS 20550. Agent-Based Modeling. 100 Units.

Social science problems often have so many details and moving parts that it can be difficult for researchers to gain traction without models. In this course, we explore agent-based modeling approaches to understand these social science problems including cooperation and the development of culture. Agent-based models enable us to build an understanding from the bottom up, starting with simple assumptions and analyzing how patterns emerge at a larger scale. Through the term, we'll cover the fundamentals of modeling, including basic principles of model design, data extraction, and canonical examples like Conway's Game of Life, Schelling's segregation model, and Boids/flocking. The course is balanced between social science readings and applications and hands-

on coding. It culminates in a final project consisting of an agent-based model designed by students to apply to a social science phenomenon.

Instructor(s): David Peterson Terms Offered: Spring

Prerequisite(s): Background in Python at the level of MACS 30111 or equivalent. Consent required for all undergrads not meeting prerequisite and all non MACSS students.

Equivalent Course(s): MACS 40550

MACS 20555. Spatial Regression Analysis. 100 Units.

This course covers statistical and econometric methods specifically geared to the problems of spatial dependence and spatial heterogeneity in cross-sectional data. The main objective of the course is to gain insight into the scope of spatial regression methods, to be able to apply them in an empirical setting, and to properly interpret the results of spatial regression analysis. While the focus is on spatial aspects, the types of methods covered have general validity in statistical practice. The course covers the specification of spatial regression models in order to incorporate spatial dependence and spatial heterogeneity, as well as different estimation methods and specification tests to detect the presence of spatial autocorrelation and spatial heterogeneity. Special attention is paid to the application to spatial models of generic statistical paradigms, such as Maximum Likelihood, Generalized Methods of Moments and the Bayesian perspective. An important aspect of the course is the application of open source software tools such as R, GeoDa and PySal to solve empirical problems.

Instructor(s): Luc Anselin Terms Offered: Spring

Equivalent Course(s): MACS 55000, GEOG 40217

MACS 20700. Data Visualization. 100 Units.

Social scientists frequently wish to convey information to a broader audience in a cohesive and interpretable manner. Visualizations are an excellent method to summarize information and report analysis and conclusions in a compelling format. This course introduces the theory and applications of data visualization. Students will learn techniques and methods for developing rich, informative and interactive, web-facing visualizations based on principles from graphic design and perceptual psychology. Students will practice these techniques on many types of social science data, including multivariate, temporal, geospatial, text, hierarchical, and network data. All graphics are designed using R, and students will gain exposure to plotly within R and build a Shiny app.

Instructor(s): Jean Clipperton Terms Offered: Winter

Equivalent Course(s): PLSC 20700, PLSC 40700, MACS 40700

MACS 23002. Introduction to Machine Learning: theory and applications in social sciences. 100 Units.

This course requires Python programming experience. The course will train students to gain the fundamental skills of machine learning. It will cover knowledge and skills of running with computational research projects from a machine learning perspective, including the key techniques used in standard machine learning pipelines: data processing (e.g., data cleaning, feature selection, feature engineering), classification models (e.g., logistic regression, decision trees, naive bayes), regression models (e.g., linear regression, polynomial regression), parameter tuning (e.g., grid-search), model evaluation (e.g., cross-validation, confusion matrix, precision, recall, and f1 for classification models; RMSE and Pearson correlation for regression models), and error analysis (e.g., data imbalance, bias-variance tradeoff). Students will learn simple and efficient machine learning algorithms for predictive data analysis as well as gain hands-on experience by applying machine learning algorithms in social science tasks. The ultimate goal of this course is to prepare students with essential machine learning skills that are in demand both in research and industry.

Instructor(s): Zhao Wang Terms Offered: Winter

Prerequisite(s): Python programming experience required.

Equivalent Course(s): MAPS 33002, MACS 33002, PLSC 43505

MACS 23005. Introduction to Supervised Machine Learning for Social Scientists. 100 Units.

This course will cover the fundamentals of Supervised Machine Learning (SML). Students will be introduced to key prediction techniques like k-nearest neighbors, naive bayes classifier, regression (linear, logistic, non-linear and regularized regression models), decision trees, random forests and deep neural networks. Besides, students will learn about the importance of parameter optimization and also how to evaluate their SML model predictions using different types of cross-validation (Monte Carlo, leave-k-out, block) and with different metrics for classification problems (e.g. precision, recall, confusion matrices) or regression problems (e.g. Root-Mean Squared Error, Pearson or Spearman's correlation). The course ends with a brief and conceptual discussion of bias, fairness and trustworthiness in SML and what is the role of interpretable methods, so that students can know where to go next to learn the state-of-the-art discussions on SML. Note that the main focus of the course will be on having the students learn the critical concepts and develop deep intuitions about the techniques. To achieve that, we will cover some of the crucial mathematical foundations, but students will also have the chance to test and play with many techniques using the R programming language (which is assumed to be known already).

Terms Offered: Summer

MACS 23050. Artificial Intelligence, Innovation, and Growth. 100 Units.

Social and cultural innovation, alongside economic growth, are among the most compelling, critical and challenging phenomena in modern social science. Innovation has always been associated with unleashing transformative growth in art, science, and the economy, and in this class we explore these issues in the context of the contemporary emergence of Artificial Intelligence (AI). AI represents a novel source of innovation in

economy and society, but also a powerful tool for understanding, modeling, and steering innovation in new ways. The primary purpose of this course is to enable students to understand innovation and growth in the age of AI, and with tools from AI alongside theoretical frameworks and methods from economics, sociology, evolution, and complex systems necessary for study them. The course strives to provide students with a background in dynamic analysis, data analysis, and modern AI requisite for studying innovation in the modern age. We will also consider a number of compelling theoretical and empirical challenges, ranging from the paradox of institutionalizing innovation to inequalities that emerging AI capacities could create or remove to advances it could unleash in science and technology to the spread of misinformation to consequences of AI tools and "agents" in all domains of modern life to existential risks associated with AI. We will cover theories and models at an abstract and advanced level.

Instructor(s): Akcigit, U. and Evans, J. Terms Offered: Winter

Prerequisite(s): [MATH 13200 or MATH 15200 or MATH 16200 or MATH 15910 or MATH 20250 or MATH 20300] and [ECON 11010 or STAT 22000 or STAT 23400 or STAT 24400 or SOCI 20004 or SOCI 20602 or SOCI 20596]

Equivalent Course(s): SOCI 30620, DATA 20620, SOCI 20620, MACS 33050, ECON 23050, ECMA 33050

MACS 23517. Pixels, Planet, Power: Visualizing Urban & Environmental Change. 100 Units.

This hands-on methods course trains students how to turn streams of satellite imagery into persuasive, narrative visualizations of urban, environmental, and planetary change. Using Google Earth Engine and other open-source tools, you will learn how to acquire, preprocess, analyze, and map earth-observation data, from spectral indices and machine-learning classification methods to time-series composites and cartographic design. Short lectures frame the technical labs within larger questions of power, representation, and justice, encouraging you to critique the assumptions that shape geospatial workflows even as you master them. Each year, the class grounds these skills in a fresh, high-stakes theme, ensuring that evolving geospatial methods confront the most pressing environmental and urban challenges. No prior coding or mapping experience is required; curiosity and a willingness to experiment are essential. The course fulfills the CEGU methods requirement and may also be eligible to meet methods requirements in other social sciences, sciences, and humanities majors.

Instructor(s): Grga Basic Terms Offered: Winter

Equivalent Course(s): ARCH 23517, MADD 13517, CEGU 23517, CEGU 33517, ARTV 20665, CCSG 22707

MACS 26000. Computational Methods Using Online Social Media Data. 100 Units.

This course will discuss a broad range of computational social science topics that leverage large-scale data from online communication platforms to gain insights into social issues. We will start from collecting and processing data from social media platforms (e.g., Twitter, IMDB, Airbnb, Yelp), and then introduce computational research topics that include but are not limited to: sentiment analysis, deceptive marketing, recommendation system, fake news detection, spam detection, bot detection, demographic inference, public health, political attitude analysis, personality and behavior analysis, and cyberbullying. We will use version control techniques (e.g., git, Github) to keep track of the class projects. The ultimate goal of this course is to provide a broad introduction of computational social science research areas and train students to be familiar with the pipelines of doing computational research.

Instructor(s): Wang, Zhao Terms Offered: Winter

Equivalent Course(s): MAPS 36001, MACS 36000

MACS 27000. Thinking with Deep Learning for Complex Social & Cultural Data Analysis. 100 Units.

A deluge of digital content is generated daily by web-based platforms and sensors that capture digital traces of human communication and connection, and complex states of society, culture, economy, and the world. Emerging deep learning methods enable the integration of these complex data into unified social and cultural "spaces" that enable new answers to classic social and cultural questions, and also pose novel questions. From the perspective of deep learning, everything can be viewed as data—novels, field notes, photographs, lists of transactions, networks of interaction, theories, epistemic styles—and our treatment examines how to configure deep learning architectures and multi-modal data pipelines to improve the capacity of representations, the accuracy of complex predictions, and the relevance of insights to substantial social and cultural questions. This class is for anyone wishing to analyse textual, network, image or arbitrary structured and unstructured data, especially in concert with one another to solve complex social and cultural analysis problems (e.g., characterize a culture; predict next year's ideology).

Instructor(s): James Evans Terms Offered: Winter

Prerequisite(s): The course uses Python and the widely popular PyData ecosystem to demonstrate all motivating examples and includes working code, accompanying exercises, relevant datasets and additional analytics and visualization that facilitate social and cultural interpretation and communication. Familiarity with Python is required.

Equivalent Course(s): DATA 30332, SOCI 30332, MACS 37000

MACS 27005. AI Agents for Social Science & Society. 100 Units.

This course takes the position that AI agents represent a fundamental transformation in both society and social science methodology: from cartoons of social life to another dimension of sociality, and from tools that merely process data to autonomous systems that can formulate hypotheses, conduct literature reviews, design studies, analyze complex multimedia data, engage in theoretical reasoning, simulate human behavior and social dynamics, and reveal their own behaviors that are playing an increasingly important role in the human social world. In this course, students will learn to understand and construct AI agents that serve as research assistants (automating data collection and analysis), research subjects (simulating human responses and social processes

or revealing their own authentic behavior), research advisors (synthesizing literature and proposing theoretical frameworks), research scientists (generating and testing hypotheses), and workers within organizations, institutions, and societies for study, but also productive work and life.

Instructor(s): James Evans Terms Offered: Winter

Equivalent Course(s): DATA 37005, DATA 27005, MACS 37005

