

# Information Science: PhD

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## The Doctoral Program

The doctoral program in Information Management and Systems is a research-oriented program in which the student chooses specific fields of specialization, prepares sufficiently in the literature and the research of those fields to pass a qualifying examination, and completes original research culminating in the written dissertation. The degree of Doctor of Philosophy is conferred in recognition of a candidate's grasp of a broad field of learning and distinguished accomplishment in that field through the contribution of an original piece of research revealing high critical ability and powers of imagination and synthesis.

The I School also offers a master's in Information Management and Systems (<http://guide.berkeley.edu/graduate/degree-programs/information-management-systems/>) (MIMS), a master's in Information and Data Science (<http://guide.berkeley.edu/graduate/degree-programs/information-data-science/>) (MIDS), and a master's in Information and Cybersecurity (<http://guide.berkeley.edu/graduate/degree-programs/information-cybersecurity/>) (MICS).

## Admission to the PhD Program

We welcome students from a diverse set of backgrounds; some will be technically educated, some educated in the humanities and social sciences.

The I School typically accepts 3-7 PhD students each year from more than 100 applications. Applications are reviewed by a committee of faculty.

Applicants are evaluated holistically on a number of factors. A strong academic record is important, but not sufficient. A critical factor is the ability to demonstrate a research record and agenda that fit well with specific I School faculty. In a small, interdisciplinary program, it is important that applicants clearly indicate in their Statement of Purpose which faculty member(s) they are interested in researching with, and why.

To be eligible to apply to the PhD in Information Management and Systems program, applicants must meet the following requirements:

- A bachelor's degree or its recognized equivalent from an accredited institution.
- Superior scholastic record, normally well above a 3.0 GPA.
- Indication of appropriate research goals, described in the Statement of Purpose.
- For applicants whose academic work has been in a language other than English, the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).
- Not required: GRE/GMAT. Starting Fall 2021, we no longer require the GRE or GMAT. We recommend you put your time and effort towards the required application materials.

Further information about I School Ph.D. Admissions (<https://www.ischool.berkeley.edu/programs/phd/admissions/>) can be found on the I School website.

## Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. A complete list of graduate academic departments, degrees offered, and application deadlines can be found on the Graduate Division website (<http://grad.berkeley.edu/programs/list/>).

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application can be found on the Graduate Division website (<http://grad.berkeley.edu/admissions/>).

## Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (<https://grad.berkeley.edu/admissions/steps-to-apply/requirements/>). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (<http://guide.berkeley.edu/graduate/degree-programs/>).

## Where to apply?

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

## Program Design

The School of Information is an interdisciplinary school examining the design, organization, and management of information and information systems. The School of Information draws on the expertise not only of its own faculty but of the full Berkeley campus. We encourage students to take full advantage of being at this world-class University and not feel bound by disciplinary boundaries.

The PhD degree program at the School of Information is a research program. Each student is expected to work with his or her adviser to ensure that the program of study includes:

- A thorough understanding of research methods and research design.
- The ability to review current research critically.
- The ability to understand emerging trends from an interdisciplinary perspective.

## Expected PhD Timeline:

- **Semester 1:** Identify a faculty adviser
- **Semesters 1–4:** Complete breadth courses; complete major and minor requirements
- **Semester 4:** Complete the preliminary research paper
- **Semester 5:** Complete preliminary exam

- **Semester 6–8:** Complete qualifying exam; advance to candidacy
- **Four semesters after qualifying exam:** Complete dissertation and give presentation

Please refer to the School of Information website (<http://www.ischool.berkeley.edu/programs/phd/degree/requirements/>) for more information.

## Breadth Courses

### I. Foundation

INFO 218	Concepts of Information	3
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### II. Engineering and Design

INFO 202	Information Organization and Retrieval	3
INFO 206A	Introduction to Programming and Computation	2
INFO 206B	Introduction to Data Structures and Analytics	2
INFO 213	Introduction to User Experience Design	4
INFO 247	Information Visualization and Presentation	4
INFO 251	Applied Machine Learning	4
INFO 253A	Front-End Web Architecture	3
INFO 253B	Back-End Web Architecture	3
INFO 256	Applied Natural Language Processing	3
INFO 259	Natural Language Processing	4
INFO C262	Theory and Practice of Tangible User Interfaces	4
INFO C265	Interface Aesthetics	3

### III. Social Aspects of Information

INFO 201	Research Design and Applications for Data and Analysis	3
INFO 203	Social Issues of Information	3
INFO 214	User Experience Research	3
INFO 217A	Human-Computer Interaction (HCI) Research	3
INFO 233	Social Psychology and Information Technology	3
INFO 271B	Quantitative Research Methods for Information Systems and Management	3
INFO 272	Qualitative Research Methods for Information Systems and Management	3
INFO 283	Information and Communications Technology for Development	3
INFO 288	Big Data and Development	3

### IV. Information Economics, Law and Policy

INFO 205	Information Law and Policy	3
INFO 232	Course Not Available	3
INFO 234	Information Technology Economics, Strategy, and Policy	3
INFO 239	Technology and Delegation	3
INFO 289	Public Interest Cybersecurity: The Citizen Clinic Practicum	3
INFO 290S	Special Topics in Social Science and Policy	2-4

### Major/Minor Areas

#### Human-Computer Interaction

INFO 213	Introduction to User Experience Design	4
INFO 214	User Experience Research	3
INFO 217A	Human-Computer Interaction (HCI) Research	3
INFO 247	Information Visualization and Presentation	4

INFO C262	Theory and Practice of Tangible User Interfaces	4
INFO C265	Interface Aesthetics	3

Plus outside courses upon approval of your advisor

#### Information Economics and Policy

INFO 232	Course Not Available	3
INFO 234	Information Technology Economics, Strategy, and Policy	3

Plus outside courses upon approval of your advisor

#### Information Law and Policy

INFO 205	Information Law and Policy	3
INFO 239	Technology and Delegation	3
INFO 289	Public Interest Cybersecurity: The Citizen Clinic Practicum	3

Plus outside courses upon approval of your advisor

#### Information Organization and Retrieval

INFO 202	Information Organization and Retrieval	3
INFO 247	Information Visualization and Presentation	4
INFO 251	Applied Machine Learning	4
INFO 256	Applied Natural Language Processing	3
INFO 258	Data Engineering	4
INFO 259	Natural Language Processing	4

Plus outside courses upon approval of your advisor

#### Information Systems Design

INFO 206A	Introduction to Programming and Computation	2
INFO 206B	Introduction to Data Structures and Analytics	2
INFO 251	Applied Machine Learning	4
INFO 253A	Front-End Web Architecture	3
INFO 253B	Back-End Web Architecture	3
INFO 255	Privacy Engineering	3
INFO 258	Data Engineering	4
INFO 256	Applied Natural Language Processing	3
INFO 259	Natural Language Processing	4

Plus outside courses upon approval of your advisor

#### Social Aspects of Information

INFO 201	Research Design and Applications for Data and Analysis	3
INFO 203	Social Issues of Information	3
INFO 214	User Experience Research	3
INFO 218	Concepts of Information	3
INFO 233	Social Psychology and Information Technology	3
INFO 241	Experiments and Causal Inference	3
INFO 271B	Quantitative Research Methods for Information Systems and Management	3
INFO 272	Qualitative Research Methods for Information Systems and Management	3
INFO 288	Big Data and Development	3

Plus outside courses upon approval of your advisor

#### Information and Communication Technologies and Development

INFO 203	Social Issues of Information	3
INFO 213	Introduction to User Experience Design	4
INFO 214	User Experience Research	3
INFO 283	Information and Communications Technology for Development	3

INFO 288 Big Data and Development 3  
 Plus outside courses upon approval of your advisor

Expand all course descriptions [+]Collapse all course descriptions [-]

## INFO 201 Research Design and Applications for Data and Analysis 3 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

Introduces the data sciences landscape, with a particular focus on learning data science techniques to uncover and answer the questions students will encounter in industry. Lectures, readings, discussions, and assignments will teach how to apply disciplined, creative methods to ask better questions, gather data, interpret results, and convey findings to various audiences. The emphasis throughout is on making practical contributions to real decisions that organizations will and should make. Course must be taken for a letter grade to fulfill degree requirements.

Research Design and Applications for Data and Analysis: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Research Design and Applications for Data and Analysis: Read Less [-]

## INFO 202 Information Organization and Retrieval 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course introduces the intellectual foundations of information organization and retrieval: conceptual modeling, semantic representation, vocabulary and metadata design, classification, and standardization, as well as information retrieval practices, technology, and applications, including computational processes for analyzing information in both textual and non-textual formats.

Information Organization and Retrieval: Read More [+]

### Rules & Requirements

**Prerequisites:** Students should have a working knowledge of the Python programming language

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Information Organization and Retrieval: Read Less [-]

## INFO 203 Social Issues of Information 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course is designed to be an introduction to the topics and issues associated with information and information technology and its role in society. Throughout the semester we will consider both the consequence and impact of technologies on social groups and on social interaction and how society defines and shapes the technologies that are produced. Students will be exposed to a broad range of applied and practical problems, theoretical issues, as well as methods used in social scientific analysis. The four sections of the course are: 1) theories of technology in society, 2) information technology in workplaces 3) automation vs. humans, and 4) networked sociability.

Social Issues of Information: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Social Issues of Information: Read Less [-]

## INFO 205 Information Law and Policy 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course uses examples from various commercial domains—retail, health, credit, entertainment, social media, and biosensing/quantified self—to explore legal and ethical issues including freedom of expression, privacy, research ethics, consumer protection, information and cybersecurity, and copyright. The class emphasizes how existing legal and policy frameworks constrain, inform, and enable the architecture, interfaces, data practices, and consumer facing policies and documentation of such offerings; and, fosters reflection on the ethical impact of information and communication technologies and the role of information professionals in legal and ethical work.

Information Law and Policy: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor required for nonmajors

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Mulligan

Information Law and Policy: Read Less [-]

## INFO 206A Introduction to Programming and Computation 2 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course introduces the basics of computer programming that are essential for those interested in computer science, data science, and information management. Students will write their own interactive programs (in Python) to analyze data, process text, draw graphics, manipulate images, and simulate physical systems. Problem decomposition, program efficiency, and good programming style are emphasized throughout the course.

Introduction to Programming and Computation: Read More [+]

### Hours & Format

**Fall and/or spring:** 7.5 weeks - 4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Farid

Introduction to Programming and Computation: Read Less [-]

## INFO 206B Introduction to Data Structures and Analytics 2 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

The ability to represent, manipulate, and analyze structured data sets is foundational to the modern practice of data science. This course introduces students to the fundamentals of data structures and data analysis (in Python). Best practices for writing code are emphasized throughout the course. This course forms the second half of a sequence that begins with INFO 106. It may also be taken as a stand-alone course by any student that has sufficient Python experience.

Introduction to Data Structures and Analytics: Read More [+]

### Rules & Requirements

**Prerequisites:** INFO 206A or equivalent, or permission of instructor

**Credit Restrictions:** Course must be completed for a letter grade to fulfill degree requirements.

### Hours & Format

**Fall and/or spring:** 7.5 weeks - 4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Farid

**Formerly known as:** Information 206

Introduction to Data Structures and Analytics: Read Less [-]

## INFO 213 Introduction to User Experience Design 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course will provide an introduction to the field of Human-Computer Interaction (HCI). Students will learn to apply design thinking to User Experience (UX) design, prototyping, & evaluation. The course will also cover special topic areas within HCI.

Introduction to User Experience Design: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Introduction to User Experience Design: Read Less [-]

## INFO 214 User Experience Research 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course addresses concepts and methods of user experience research, from understanding and identifying needs, to evaluating concepts and designs, to assessing the usability of products and solutions. We emphasize methods of collecting and interpreting qualitative data about user activities, working both individually and in teams, and translating them into design decisions. Students gain hands-on practice with observation, interview, survey, focus groups, and expert review. Team activities and group work are required during class and for most assignments. Additional topics include research in enterprise, consulting, and startup organizations, lean/agile techniques, mobile research approaches, and strategies for communicating findings.

User Experience Research: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

User Experience Research: Read Less [-]

## INFO 215 Product Design Studio 3 Units

Terms offered: Fall 2024, Fall 2023

This course will give participants hands-on digital product design experience oriented around current industry practice. The course will be project-based with an emphasis on iteration, practice, and critique. During the course, participants will work on a series of design projects through a full design process, including developing appropriate design deliverables, gathering feedback, and iterating on designs.

Product Design Studio: Read More [+]

### Objectives & Outcomes

**Course Objectives:** The course objective is to provide students interested in web and mobile Product Design with skills, practice, and experience that will prepare them for careers in product design and design-related roles.

### Rules & Requirements

**Prerequisites:** DES INV 15 or COMPSCI 160 or INFO 213 AND INFO 214; or permission of the instructor. Students can take INFO 214 and INFO 215 concurrently, but students may not drop INFO 214 and remain in INFO 215

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Formerly known as:** Information Systems and Management 215

Product Design Studio: Read Less [-]

## INFO 217A Human-Computer Interaction (HCI) Research 3 Units

Terms offered: Spring 2024, Fall 2021, Fall 2020

This course is a graduate-level introduction to HCI research. Students will learn to conduct

original HCI research by reading and discussing research papers while collaborating on a semester-long research project. Each week the class will focus on a theme of HCI research and review foundational and cutting-edge research relevant to that theme.

The class will focus on the following areas of HCI research: ubiquitous computing, social computing, critical theory, and human-AI interaction. In addition to these research topics the class will introduce common

qualitative and quantitative methodologies in HCI research.

Human-Computer Interaction (HCI) Research: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Salehi

Human-Computer Interaction (HCI) Research: Read Less [-]

## INFO 218 Concepts of Information 3 Units

Terms offered: Spring 2024, Spring 2022, Spring 2020

As it's generally used, "information" is a collection of notions, rather than a single coherent concept. In this course, we'll examine conceptions of information based in information theory, philosophy, social science, economics, and history. Issues include: How compatible are these conceptions; can we talk about "information" in the abstract? What work do these various notions play in discussions of literacy, intellectual property, advertising, and the political process? And where does this leave "information studies" and "the information society"?

Concepts of Information: Read More [+]

### Rules & Requirements

**Prerequisites:** Graduate standing

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructors:** Duguid, Nunberg

Concepts of Information: Read Less [-]

## INFO 225 Leadership and Management 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2021

This course focuses on the practice of leadership, collaboration, and people management in contemporary, distributed, information and technology-rich organizations. Not just for potential people managers, this course is derived from the premise that a foundation in leadership, management, and collaboration is essential for individuals in all roles, at any stage of their career. To build this foundation we will take a hybrid approach, engaging literature from disciplines such as social psychology, management, and organizational behavior, as well as leveraging case studies and practical exercises. The course will place a special emphasis on understanding and reacting to social dynamics in workplace hierarchies and teams.

Leadership and Management: [Read More](#) [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Leadership and Management: [Read Less](#) [-]

## INFO 231 Decisions and Algorithms 3 Units

Terms offered: Fall 2024, Spring 2013, Spring 2011

This class is for graduate students interested in getting an advanced understanding of judgments and decisions made with predictive algorithms. The course will survey the vast literature on the psychology of how people arrive at judgments and make decisions with the help of statistical information, focused mostly on experimental lab evidence from cognitive and social psychology. Then study the burgeoning evidence on how people use statistical algorithms in practice, exploring field evidence from a range of settings from criminal justice and healthcare to housing and labor markets. Special attention is paid to psychological principles that impact the effectiveness and fairness of algorithms deployed at scale.

Decisions and Algorithms: [Read More](#) [+]

### Objectives & Outcomes

**Course Objectives:** Help students understand systematic human errors and explore potential algorithmic solutions.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Decisions and Algorithms: [Read Less](#) [-]

## INFO 233 Social Psychology and Information Technology 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

Discusses application of social psychological theory and research to information technologies and systems; we focus on sociological social psychology, which largely focuses on group processes, networks, and interpersonal relationships. Information technologies considered include software systems used on the internet such as social networks, email, and social games, as well as specific hardware technologies such as mobile devices, computers, wearables, and virtual/augmented reality devices. We examine human communication practices, through the lens of different social psychology theories, including: symbolic interaction, identity theories, social exchange theory, status construction theory, and social networks and social structure theory.

Social Psychology and Information Technology: [Read More](#) [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Cheshire

Social Psychology and Information Technology: [Read Less](#) [-]

## INFO 234 Information Technology Economics, Strategy, and Policy 3 Units

Terms offered: Spring 2024, Spring 2022, Spring 2021

This course applies economic tools and principles, including game theory, industrial organization, information economics, and behavioral economics, to analyze business strategies and public policy issues surrounding information technologies and IT industries. Topics include: economics of information goods, services, and platforms; economics of information and asymmetric information; economics of artificial intelligence, cybersecurity, data privacy, and peer production; strategic pricing; strategic complements and substitutes; competition and antitrust; Internet industry structure and regulation; network cascades, network formation, and network structure.

Information Technology Economics, Strategy, and Policy: [Read More](#) [+]

### Objectives & Outcomes

#### Course Objectives:

INFO234 is a graduate level course in the school's topical area of Information Economics and Policy, and can be taken by the masters and doctoral students to satisfy their respective degree requirements.

#### Student Learning Outcomes:

Students will learn to identify, describe, and analyze business strategies and public policy issues of particular relevance to the information industry. Students will learn and apply economic tools and principles to analyze phenomena such as platform competition, social epidemics, and peer production, and current policy issues such as network neutrality and information privacy. Through integrated assignments and project work, the students will apply the theoretical concepts and analytic tools learned in lectures and readings to develop and evaluate a business model, product, or service of their choosing, e.g., a start-up idea they are pursuing.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Chuang

Information Technology Economics, Strategy, and Policy: [Read Less](#) [-]

## INFO 239 Technology and Delegation 3 Units

Terms offered: Fall 2021, Fall 2019, Fall 2018

The introduction of technology increasingly delegates responsibility to technical actors, often reducing traditional forms of transparency and challenging traditional methods for accountability. This course explores the interaction between technical design and values including: privacy, accessibility, fairness, and freedom of expression. We will draw on literature from design, science and technology studies, computer science, law, and ethics, as well as primary sources in policy, standards and source code. We will investigate approaches to identifying the value implications of technical designs and use methods and tools for intentionally building in values at the outset.

Technology and Delegation: [Read More](#) [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Mulligan

Technology and Delegation: [Read Less](#) [-]

## INFO 241 Experiments and Causal Inference 3 Units

Terms offered: Fall 2024, Spring 2024, Fall 2022

This course introduces students to experimentation in data science. Particular attention is paid to the formation of causal questions, and the design and analysis of experiments to provide answers to these questions. This topic has increased considerably in importance since 1995, as researchers have learned to think creatively about how to generate data in more scientific ways, and developments in information technology has facilitated the development of better data gathering.

Experiments and Causal Inference: [Read More](#) [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Experiments and Causal Inference: [Read Less](#) [-]

## INFO 247 Information Visualization and Presentation 4 Units

Terms offered: Spring 2023, Spring 2022, Spring 2021

The design and presentation of digital information. Use of graphics, animation, sound, visualization software, and hypermedia in presenting information to the user. Methods of presenting complex information to enhance comprehension and analysis. Incorporation of visualization techniques into human-computer interfaces. Course must be completed for a letter grade to fulfill degree requirements.

Information Visualization and Presentation: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** INFO 206B or knowledge of programming and data structures with consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of laboratory per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Hearst

Information Visualization and Presentation: [Read Less](#) [-]

## INFO 251 Applied Machine Learning 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

Provides a theoretical and practical introduction to modern techniques in applied machine learning. Covers key concepts in supervised and unsupervised machine learning, including the design of machine learning experiments, algorithms for prediction and inference, optimization, and evaluation. Students will learn functional, procedural, and statistical programming techniques for working with real-world data.

Applied Machine Learning: [Read More](#) [+]

### Objectives & Outcomes

#### Student Learning Outcomes: •

Effectively design, execute, and critique experimental and non-experimental methods from statistics, machine learning, and econometrics.

- Implement basic algorithms on structured and unstructured data, and evaluate the performance of these algorithms on a variety of real-world datasets.
- Understand the difference between causal and non-causal relationships, and which situations and methods are appropriate for both forms of analysis.
- Understand the principles, advantages, and disadvantages of different algorithms for supervised and unsupervised machine learning.

### Rules & Requirements

**Prerequisites:** INFO 206B, or equivalent course in Python programming; INFO 271B, or equivalent graduate-level course in statistics or econometrics; or permission of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Blumenstock

Applied Machine Learning: [Read Less](#) [-]



## INFO 253A Front-End Web Architecture 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course is a survey of technologies that power the user interfaces of web applications on a variety of devices today, including desktop, mobile, and tablet devices. This course will delve into some of the core Front-End languages and frameworks (HTML/CSS/JS/React/Redux), as well as the underlying technologies enable web applications (HTTP, URI, JSON).

The goal of this course is to provide an overview of the technical issues surrounding user interfaces powered by the web today, and to provide a solid and comprehensive perspective of the Web's constantly evolving landscape.

Front-End Web Architecture: Read More [+]

### Rules & Requirements

**Prerequisites:** Introductory programming

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of laboratory per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Formerly known as:** Information 253

Front-End Web Architecture: Read Less [-]

## INFO 253B Back-End Web Architecture 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course is a survey of web technologies that are used to build back-end systems that enable rich web applications. Utilizing technologies such as Python, Flask, Docker, RDBMS/NoSQL databases, and Spark, this class aims to cover the foundational concepts that drive the web today. This class focuses on building APIs using micro-services that power everything from content management systems to data engineering pipelines that provide insights by processing large amounts of data.

The goal of this course is to provide an overview of the technical issues surrounding back-end systems today, and to provide a solid and comprehensive perspective of the web's constantly evolving landscape.

Back-End Web Architecture: Read More [+]

### Rules & Requirements

**Prerequisites:** Introductory programming

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of laboratory per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Back-End Web Architecture: Read Less [-]

## INFO 255 Privacy Engineering 3 Units

Terms offered: Spring 2024, Spring 2023

The course overviews a broad number of paradigms of privacy from a technical point of view. The course is designed to assist system engineers and information systems professionals in getting familiar with the subject of privacy engineering and train them in implementing those mechanisms. In addition, the course is designed to coach those professionals to critically think about the strengths and weaknesses of the different privacy paradigms. These skills are important for cybersecurity professionals and enable them to effectively incorporate privacy-awareness in the design phase of their products.

Privacy Engineering: Read More [+]

### Objectives & Outcomes

**Course Objectives:** Critique the strengths and weaknesses of the different privacy paradigms

Describe the different technical paradigms of privacy that are applicable for systems engineering

Implement such privacy paradigms, and embed them in information systems during the design process and the implementation phase

Stay updated about the state of the art in the field of privacy engineering

### Rules & Requirements

**Credit Restrictions:** Students will receive no credit for INFO 255 after completing INFO 255. A deficient grade in INFO 255 may be removed by taking INFO 255.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Privacy Engineering: Read Less [-]

## INFO 256 Applied Natural Language Processing 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2021

This course examines the use of natural language processing as a set of methods for exploring and reasoning about text as data, focusing especially on the applied side of NLP — using existing NLP methods and libraries in Python in new and creative ways. Topics include part-of-speech tagging, shallow parsing, text classification, information extraction, incorporation of lexicons and ontologies into text analysis, and question answering. Students will apply and extend existing software tools to text-processing problems.

Applied Natural Language Processing: Read More [+]

### Rules & Requirements

**Prerequisites:** INFO 206A and INFO 206B or proficient programming in Python (programs of at least 200 lines of code). Proficient with basic statistics and probabilities

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Bamman

Applied Natural Language Processing: Read Less [-]

## INFO 258 Data Engineering 4 Units

Terms offered: Spring 2024, Fall 2022

This course will cover the principles and practices of managing data at scale, with a focus on use cases in data analysis and machine learning. We will cover the entire life cycle of data management and science, ranging from data preparation to exploration, visualization and analysis, to machine learning and collaboration, with a focus on ensuring reliable, scalable operationalization.

ensuring reliable, scalable operationalization.

Data Engineering: Read More [+]

### Rules & Requirements

**Prerequisites:** INFO 206B or equivalent college-level course in computer science in Python with a C- or better AND COMPSCI C100/DATA C100/STAT C100 or COMPSCI 189 or INFO 251 or DATA 144 or equivalent college-level course in data science with a C- or better

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructors:** Hellerstein, Parameswaran, Jain

Data Engineering: Read Less [-]

## INFO 259 Natural Language Processing 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course introduces students to natural language processing and exposes them to the variety of methods available for reasoning about text in computational systems. NLP is deeply interdisciplinary, drawing on both linguistics and computer science, and helps drive much contemporary work in text analysis (as used in computational social science, the digital humanities, and computational journalism). We will focus on major algorithms used in NLP for various applications (part-of-speech tagging, parsing, coreference resolution, machine translation) and on the linguistic phenomena those algorithms attempt to model. Students will implement algorithms and create linguistically annotated data on which those algorithms depend.

Natural Language Processing: Read More [+]

### Rules & Requirements

**Prerequisites:** Familiarity with data structures, algorithms, linear algebra, and probability

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Bamman

Natural Language Processing: Read Less [-]

## INFO C262 Theory and Practice of Tangible User Interfaces 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course explores the theory and practice of Tangible User Interfaces, a new approach to Human Computer Interaction that focuses on the physical interaction with computational media. The topics covered in the course include theoretical framework, design examples, enabling technologies, and evaluation of Tangible User Interfaces. Students will design and develop experimental Tangible User Interfaces using physical computing prototyping tools and write a final project report.

Theory and Practice of Tangible User Interfaces: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of laboratory per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Ryokai

**Also listed as:** NWMEDIA C262

Theory and Practice of Tangible User Interfaces: Read Less [-]

## INFO C265 Interface Aesthetics 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This course will cover new interface metaphors beyond desktops (e.g., for mobile devices, computationally enhanced environments, tangible user interfaces) but will also cover visual design basics (e.g., color, layout, typography, iconography) so that we have systematic and critical understanding of aesthetically engaging interfaces. Students will get a hands-on learning experience on these topics through course projects, design critiques, and discussions, in addition to lectures and readings. Interface Aesthetics: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Ryokai

**Also listed as:** NWMEDIA C265

Interface Aesthetics: Read Less [-]

## INFO 271B Quantitative Research Methods for Information Systems and Management 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Introduction to many different types of quantitative research methods, with an emphasis on linking quantitative statistical techniques to real-world research methods. Introductory and intermediate topics include: defining research problems, theory testing, casual inference, probability, and univariate statistics. Research design and methodology topics include: primary/secondary survey data analysis, experimental designs, and coding qualitative data for quantitative analysis.

Quantitative Research Methods for Information Systems and Management: Read More [+]

### Rules & Requirements

**Prerequisites:** Introductory statistics recommended

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Cheshire

Quantitative Research Methods for Information Systems and Management: Read Less [-]

## INFO 272 Qualitative Research Methods for Information Systems and Management 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Theory and practice of naturalistic inquiry. Grounded theory.

Ethnographic methods including interviews, focus groups, naturalistic observation. Case studies. Analysis of qualitative data. Issues of validity and generalizability in qualitative research.

Qualitative Research Methods for Information Systems and Management: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Burrell

Qualitative Research Methods for Information Systems and Management: Read Less [-]

## INFO 283 Information and Communications Technology for Development 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

This seminar reviews current literature and debates regarding Information and Communication Technologies and Development (ICTD). This is an interdisciplinary and practice-oriented field that draws on insights from economics, sociology, engineering, computer science, management, public health, etc.

Information and Communications Technology for Development: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of seminar per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Saxenian

**Formerly known as:** Information C283

Information and Communications Technology for Development: Read Less [-]

## INFO 288 Big Data and Development 3 Units

Terms offered: Spring 2024, Spring 2021, Spring 2019

As new sources of digital data proliferate in developing economies, there is the exciting possibility that such data could be used to benefit the world's poor. Through a careful reading of recent research and through hands-on analysis of large-scale datasets, this course introduces students to the opportunities and challenges for data-intensive approaches to international development. Students should be prepared to dissect, discuss, and replicate academic publications from several fields including development economics, machine learning, information science, and computational social science. Students will also conduct original statistical and computational analysis of real-world data.

Big Data and Development: Read More [+]

### Rules & Requirements

**Prerequisites:** Students are expected to have prior graduate training in machine learning, econometrics, or a related field

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Blumenstock

Big Data and Development: Read Less [-]

## INFO 289 Public Interest Cybersecurity: The Citizen Clinic Practicum 3 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

This course provides students with real-world experience assisting politically vulnerable organizations and persons around the world to develop and implement sound cybersecurity practices. In the classroom, students study basic theories and practices of digital security, intricacies of protecting largely under-resourced organizations, and tools needed to manage risk in complex political, sociological, legal, and ethical contexts. In the clinic, students work in teams supervised by Clinic staff to provide direct cybersecurity assistance to civil society organizations. We emphasize pragmatic, workable solutions that take into account the unique needs of each partner organization.

Public Interest Cybersecurity: The Citizen Clinic Practicum: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit with instructor consent.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Public Interest Cybersecurity: The Citizen Clinic Practicum: Read Less [-]

## INFO 290 Special Topics in Information 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

Specific topics, hours, and credit may vary from section to section, year to year.

Special Topics in Information: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

#### Fall and/or spring:

8 weeks - 2-8 hours of lecture per week

15 weeks - 1-4 hours of lecture per week

**Summer:** 10 weeks - 1.5-6 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Special Topics in Information: Read Less [-]

## INFO 290M Special Topics in Management 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

Specific topics, hours, and credit may vary from section to section and year to year.

Special Topics in Management: Read More [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

#### Fall and/or spring:

8 weeks - 2-8 hours of lecture per week

15 weeks - 1-4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Special Topics in Management: Read Less [-]

## INFO 290S Special Topics in Social Science and Policy 2 - 4 Units

Terms offered: Fall 2024, Fall 2023, Spring 2023

Specific topics, hours, and credit may vary from section to section and year to year.

Special Topics in Social Science and Policy: [Read More](#) [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

#### Fall and/or spring:

8 weeks - 4-8 hours of lecture per week

15 weeks - 2-4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Special Topics in Social Science and Policy: [Read Less](#) [-]

## INFO 290T Special Topics in Technology 2 - 4 Units

Terms offered: Spring 2024, Fall 2023, Spring 2023

Specific topics, hours, and credit may vary from section to section and year to year.

Special Topics in Technology: [Read More](#) [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

#### Fall and/or spring:

8 weeks - 4-8 hours of lecture per week

15 weeks - 2-4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Special Topics in Technology: [Read Less](#) [-]

## INFO 291 Special Topics in Information 1 - 4 Units

Terms offered: Prior to 2007

Specific topics, hours, and credit may vary from section to section, year to year.

Special Topics in Information: [Read More](#) [+]

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit when topic changes.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of lecture per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructor:** Hoofnagle

Special Topics in Information: [Read Less](#) [-]

## INFO 293 Information Management Practicum 0.5 Units

Terms offered: Fall 2016, Summer 2016 10 Week Session, Spring 2016

This course is designed to help School of Information graduate students maximize their internship, practicum, or independent research experiences.

Information Management Practicum: [Read More](#) [+]

### Objectives & Outcomes

**Course Objectives:** Experience the practical application of your academic knowledge to real-world professional contexts;  
Gain insight into an organization and how one might make a valuable contribution;  
Reflect on the information the experience has provided, to see if it fits within one's personal value set and work/life manifestos.  
Try out various professional activities to see when you are in 'flow';

**Student Learning Outcomes:** Assess the organizational culture of a company, governmental body, or non-governmental organization  
Connect academic knowledge about information management to real-world professional contexts  
Evaluate the effectiveness of a variety of information science techniques when deployed in organizational situations  
Integrate the student's own individual professional goals with the organization's needs relevant to the internship or practicum  
Reflect critically on the internship or practicum experience

### Rules & Requirements

**Prerequisites:** Consent of a Head Graduate Adviser for the School of Information

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of internship per week

**Summer:** 10 weeks - 1.5 hours of internship per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Information Management Practicum: [Read Less](#) [-]

## INFO 294 Doctoral Research and Theory Workshop 2 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022

An intensive weekly discussion of current and ongoing research by Ph.D. students with a research interest in issues of information (social, legal, technical, theoretical, etc.). Our goal is to focus on critiquing research problems, theories, and methodologies from multiple perspectives so that we can produce high-quality, publishable work in the interdisciplinary area of information research. Circulated material may include dissertation chapters, qualifying papers, article drafts, and/or new project ideas. We want to have critical and productive discussion, but above all else we want to make our work better: more interesting, more accessible, more rigorous, more theoretically grounded, and more like the stuff we enjoy reading.

Doctoral Research and Theory Workshop: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** PhD students only

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of workshop per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

**Instructor:** Cheshire

Doctoral Research and Theory Workshop: [Read Less](#) [-]

## INFO 295 Doctoral Colloquium 1 Unit

Terms offered: Fall 2024, Fall 2023, Spring 2023

Colloquia, discussion and readings designed to introduce students to the range of interests of the school.

Doctoral Colloquium: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** Ph.D. standing in the School of Information

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of colloquium per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Doctoral Colloquium: [Read Less](#) [-]

## INFO 296A Seminar 2 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

Topics in information management and systems and related fields.

Specific topics vary from year to year.

Seminar: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit when topic changes.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2-4 hours of seminar per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Seminar: Read Less [-]

## INFO 298 Directed Group Study 1 - 4 Units

Terms offered: Fall 2019, Spring 2016, Fall 2015

Group projects on special topics in information management and systems.

Directed Group Study: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Credit Restrictions:** Students will receive no credit for INFO 298 after completing INFOSYS 298.

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

**Summer:** 8 weeks - 1.5-7.5 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Directed Group Study: Read Less [-]

## INFO 298A Directed Group Work on Final Project 1 - 4 Units

Terms offered: Spring 2022, Spring 2016, Spring 2015

The final project is designed to integrate the skills and concepts learned during the Information School Master's program and helps prepare students to compete in the job market. It provides experience in formulating and carrying out a sustained, coherent, and significant course of work resulting in a tangible work product; in project management, in presenting work in both written and oral form; and, when appropriate, in working in a multidisciplinary team. Projects may take the form of research papers or professionally-oriented applied work.

Directed Group Work on Final Project: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor. Course must be taken for a letter grade to fulfill degree requirements

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-4 hours of directed group study per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Directed Group Work on Final Project: Read Less [-]

## INFO 299 Individual Study 1 - 12 Units

Terms offered: Fall 2023, Summer 2016 8 Week Session, Spring 2016  
Individual study of topics in information management and systems under faculty supervision.

Individual Study: Read More [+]

### Rules & Requirements

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit when topic changes. Students may enroll in multiple sections of this course within the same semester.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-12 hours of independent study per week

**Summer:** 8 weeks - 2-22.5 hours of independent study per week

### Additional Details

**Subject/Course Level:** Information/Graduate

**Grading:** Letter grade.

Individual Study: Read Less [-]

## **INFO 375 Teaching Assistance Practicum 2 Units**

Terms offered: Spring 2024, Fall 2021, Fall 2020

Discussion, reading, preparation, and practical experience under faculty supervision in the teaching of specific topics within information management and systems. Does not count toward a degree.

Teaching Assistance Practicum: Read More [+]

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture per week

### **Additional Details**

**Subject/Course Level:** Information/Professional course for teachers or prospective teachers

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructor:** Duguid

Teaching Assistance Practicum: Read Less [-]

## **INFO 602 Individual Study for Doctoral Students 1 - 5 Units**

Terms offered: Spring 2016, Fall 2015, Spring 2015

Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. degree.

Individual Study for Doctoral Students: Read More [+]

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 1-5 hours of independent study per week

### **Additional Details**

**Subject/Course Level:** Information/Graduate examination preparation

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Students: Read Less [-]