These are courses we know about. There may be others that count, as well. So feel free to contact professors and the gender studies advisor with inquiries.

Required Courses:

**76-294**  
Interpretive Practices: Introduction to Critical Reading  
*Home Department:* English  
*Instructor:* Professor Richard Purcell  
*Meetings:* TR 1:30-2:50 p.m.  
*Units:* 9  
*Prerequisites:* 76-101 Interpretive Practices or 76-102 Advanced First-Year Writing

This course will introduce you to foundational theories and methods that form the practice of interpreting literary, poetic, cinematic, and other artistic modes of expression. We will start with an introduction to poetics through the works of Aristotle then move our way up through specific terms and theories of language, image and narrative as a system of communication and imaginative expression from Ferdinand Saussure to Roland Barthes and Hortense Spillers. I have organized our course around specific art works that I have paired with an interpretive reading practice and/or term. We will read, watch or listen to the works of: T.S. Eliot, Beyoncé, Sergei Eisenstein, Kara Walker, Mary Shelley and Percival Everett to name a few.

Core Courses:

**76-388**  
Topics in Digital Humanities: Coding for Humanists  
*Home Department:* English  
*Instructor:* Professor Suguru Ishizaki  
*Meetings:* TR 3:00-4:20 p.m.  
*Units:* 9  
*Prerequisites:* none
This introductory course provides humanities students with the foundational knowledge and skills to develop computer-aided research tools for text analysis. Through a series of hands-on coding exercises, students will explore computation as a means to engage in new questions and expand their thinking about textual artifacts. This course is designed for students with no (or very little) coding experience. During the early part of the semester, students will learn basic programming using Python through examples and problem sets that are relevant to text analysis. Then, students will be introduced to a limited set of commonly used Python packages for text analysis, such as natural language processing, statistical analysis, visualization, web scraping, and social media text mining. Students are expected to complete a small final project that examines how evidence-based data-driven insights derived from text analysis would support humanistic research in their area of interest, including (but not limited to) genre studies, rhetorical criticism, authorship attribution, discourse analysis, cultural analysis, social network analysis, spatial/temporal text analysis, and writing assessment.

76-429    Digital Humanities: Politics and Early Modern Drama
Home Department:  English
Instructor:   Professor Stephen Wittek
Meetings:   MW 3:00-4:20 p.m.
Units:    9
Prerequisites:   none
This course will explore a range of questions related to the manifestation of political thinking on the early modern English stage, a key medium for the dissemination and cultivation of information and ideas. Our central curriculum will include plays by William Shakespeare, Thomas Middleton, Christopher Marlowe, and others alongside a selection of critical essays and related literature from the period. To complement this collective investigation, students will also complete a hands-on, entry-level assignment that introduces digital methodologies for visualizing and analyzing early modern texts. No previous experience with the digital humanities is necessary to participate. Technological neophytes, seasoned programmers, and persons at all skill levels in-between are all very welcome to participate.

Elective Courses for Humanities Majors (English, History, Modern Languages, Philosophy):

05-391    Designing Human-Centered Software
Home Department:  Human-Computer Interaction (HCI)
Instructor:   Professor Christopher Harrison
Meetings:   TR 12:00-1:20 p.m.
Units:    12
Prerequisites:   15-104, 15-110, or 15-112
Why are things so hard to use these days? Why doesn’t this thing I just bought work? Why is this web site so hard to use? These are frustrations that we have all faced from systems not designed with people in mind. The question this course will focus on is: how can we design human-centered systems that people find useful and usable? This course is an introduction to designing, prototyping, and evaluating user interfaces. If you take only one course in Human-Computer Interaction, this is the course for you. This class is open to all undergrads and grad students, with either technical or non-technical backgrounds. We will cover theory as well as practical application of ideas from Human-Computer Interaction. Course work includes lectures, class discussion, homework, class presentations, and group project.

05-434/11-344    Designing Human-Centered Software
Machine Learning is concerned with computer programs that enable the behavior of a computer to be learned from examples or experience rather than dictated through rules written by hand. It has practical value in many application areas of computer science such as on-line communities and digital libraries. This class is meant to teach the practical side of machine learning for applications, such as mining newsgroup data or building adaptive user interfaces. The emphasis will be on learning the process of applying machine learning effectively to a variety of problems rather than emphasizing an understanding of the theory behind what makes machine learning work. This course does not assume any prior exposure to machine learning theory or practice. In the first 2/3 of the course, we will cover a wide range of learning algorithms that can be applied to a variety of problems. In particular, we will cover topics such as decision trees, rule based classification, support vector machines, Bayesian networks, and clustering. In the final third of the class, we will go into more depth on one application area, namely the application of machine learning to problems involving text processing, such as information retrieval or text categorization. 05-834 is the HCI graduate section. If you are an LTI student, please sign up for the LTI graduate course number (11-663) ONLY to count properly towards your degree requirements. 05-434 is the HCI undergraduate section. If you are an LTI student, please sign up for the LTI undergraduate course number (11-344) ONLY to count properly towards your degree requirements.

**11-441 Machine Learning for Text Mining**

**Home Department:** Language Technologies Institute  
**Instructor:** Professor Yiming Yang  
**Meetings:** TR 12:00-1:20 p.m.  
**Units:** 9  
**Prerequisites:** none

This course provides a comprehensive introduction to the theory and implementation of algorithms for organizing and searching large text collections. The first half of the course studies text search engines for enterprise and Web environments; the open-source Indri search engine is used as a working example. The second half studies text mining techniques such as clustering, categorization, and information extraction. Programming assignments give hands-on experience with document ranking algorithms, categorizing documents into browsing hierarchies, and related topics.

**15-104 Introduction to Computing for Creative Practice**

**Home Department:** Computer Science  
**Instructor:** Professor Roger Dannenberg  
**Meetings:** MWF 9:30-10:20 a.m. (lecture)  
**Recitations (choose just one):** T 9:00-10:20, 10:30-11:50, 1:30-2:50, 3:00-4:20, 6:30-7:50  
**Units:** 10  
**Prerequisites:** none

[IDEAte portal course] An introduction to fundamental computing principles and programming techniques for creative cultural practices, with special consideration to applications in music, design and the visual arts. Intended for students with little to no prior programming experience, the course develops skills and understanding of text-based programming in a procedural style, including idioms of sequencing, selection,
iteration, and recursion. Topics include data organization (arrays, files, trees), interfaces and abstraction (modular software design, using sensor data and software libraries), basic algorithms (searching and sorting), and computational principles (randomness, concurrency, complexity). Intended for students participating in IDeATe courses or minors who have not taken 15-112.

15-110    Principles of Computing
Home Department: Computer Science
Instructors: various
Meetings: Multiple options – Please consult the Schedule of Classes for full details.
Units: 10
Prerequisites: none
A course in fundamental computing principles for students with minimal or no computing background. Programming constructs: sequencing, selection, iteration, and recursion. Data organization: arrays and lists. Use of abstraction in computing: data representation, computer organization, computer networks, functional decomposition, and application programming interfaces. Use of computational principles in problem-solving: divide and conquer, randomness, and concurrency. Classification of computational problems based on complexity, non-computable functions, and using heuristics to find reasonable solutions to complex problems. Social, ethical and legal issues associated with the development of new computational artifacts will also be discussed.

16-223    IDeATe Portal: Creative Kinetic Systems
Home Department: Robotics
Instructors: Professor Garth Zeglin
Meetings: MW 9:30-11:20 a.m.
Units: 10
Prerequisites: none
The art and science of machines which evoke human delight through physical movement is founded on a balance of form and computation. This introductory physical computing course addresses the practical design and fabrication of robots, interactive gadgets, and kinetic sculptures. The emphasis is on creating experiences for human audiences through the physical behavior of devices which embody computation with mechanism, sensing, and actuation. Specific topics include basic electronics, elementary mechanical design, embedded programming, and parametric CAD. A key objective is gaining an intuitive understanding of how information and energy move between the physical, electronic, and computational domains to create a compelling behavior. The final projects are tested in the field on children and adults. This interdisciplinary course is an IDeATe Portal Course open to students from all colleges. For students choosing to follow an IDeATe program it is an entry into either Physical Computing or Intelligent Environments. The structure of the class revolves around collaborative exercises and projects which introduce core physical computing and system engineering techniques in a human-centric context. Students apply system and design thinking across multiple domains, work together to make and test several devices, and participate in wide-ranging critique which considers both technical and artistic success.

18-090    Twisted Signals: Multimedia Processing for the Arts
Home Department: Electrical & Computer Engineering
Instructors: Professor Jesse Stiles
Meetings: MW 9:30-11:20 a.m.
Units: 10
Prerequisites: none

[IDEAITE portal course] - This course presents an overview on manipulating and synthesizing sound, video, and control signals. Signals are the raw materials used in many forms of electronic art and design - electronic music, interactive art, video art, kinetic sculpture, and more. In these fields, signals are used to represent information about sound, images, sensors, and movement. By transforming and manipulating these types of signals, we are able to create powerful new tools for digital art, multimedia applications, music, responsive environments, video and sound installation, smart products, and beyond. In this course we will study Signal Processing from a practical point-of-view, developing tools that can be easily integrated into art-making using the graphical programming environment Max (a.k.a. Max/MSP/Jitter). We will present a survey of Signal Processing techniques used in the sonic and visual arts, and will discuss the mathematical theories underlying these techniques. Students will be encouraged to combine, modify, and extend working examples of software to create original digital artworks. Please note that there will be usage/materials fees associated with this course.

19-403  Policies of Wireless Systems
Home Department: Engineering and Public Policy
Instructors: Professor Jon Peha
Meetings: TR 12:00-1:20 p.m.
Units: 12
Prerequisites: none

This course will address public policy issues related to wireless systems, and to the Internet. It begins by investigating policies related to a wide variety of emerging wireless systems and technologies, including wifi computer networks, broadband to the home, broadcast radio and television, and satellite communications. This can include the government role in facilitating the creation of infrastructure, in advancing competition among broadcasters and communications service providers, in managing spectrum, and in protecting privacy and security. The course will then address Internet policy issues, which can include Internet governance and the domain name system, taxation, privacy and security, and intellectual property. Because these are inherently interdisciplinary issues, the course will include detailed discussions of technology, economics, and law, with no prerequisites in any of these areas. Note: ECE students must take this course under #18-650 only.

36-202  Methods for Statistical Data Science
Home Department: Statistics and Data Science
Instructors: TBA
Meetings: MWF 11:30 a.m.-12:20 p.m. (Lecture)
Recitation (choose just one):
   F 10:30-11:20, 11:30-12:20, 1:30-2:20
Units: 9
Prerequisites: 36-200 or 36-201 or 36-247 or 36-220 or 70-207 or 36-207

This course builds on the principles and methods of statistical reasoning developed in 36-200 (or its equivalents). The course covers simple and multiple regression, analysis of variance methods and logistic regression. Other topics may include non-parametric methods and probability models, as time permits. The objectives of this course is to develop the skills of applying the basic principles and methods that underlie statistical practice and empirical research. Learning the Data Analysis Pipeline is strongly emphasized through structured coding and data analysis projects. In addition to three lectures a week, students attend a computer lab twice a week for "hands-on" practice of the material covered in lecture; students will learn the basics of R Markdown and related analytics tools. Not open to students who have received credit for: 36-208/70-208, 36-
309. Students who have completed or are enrolled in 36-401 prior to completing 36-202, are not able to take/receive credit for 36-202.

36-315    Statistical Graphics and Visualization
Home Department: Statistics and Data Science
Instructors: TBA
Meetings: MW 12:30-1:20 p.m. (Lecture), F 12:30-1:20 p.m. (Recitation)
Units: 9
Prerequisites: 36-202 or 36-208 or 36-226 or 88-250 or 36-225 or 36-625 or 70-208 or 36-303 or 36-309

Graphical displays of quantitative information take on many forms as they help us understand both data and models. This course will serve to introduce the student to the most common forms of graphical displays and their uses and misuses. Students will learn both how to create these displays and how to understand them. As time permits the course will consider some more advanced graphical methods such as computer-generated animations. Each student will be required to engage in a project using graphical methods to understand data collected from a real scientific or engineering experiment. In addition to two weekly lectures there will be lab sessions where the students learn to use software to aid in the production of appropriate graphical displays.

36-350    Statistical Computing
Home Department: Statistics and Data Science
Instructor: TBA
Meetings: MWF 11:30 a.m.-12:20 p.m.
Units: 9
Prerequisites: (36-208 or 36-202 or 36-315 or 36-303 or 70-208 or 36-218 or 36-225 or 36-217)

Statistical Computing: An introduction to computing targeted at statistics majors with minimal programming knowledge. The main topics are core ideas of programming (functions, objects, data structures, flow control, input and output, debugging, logical design and abstraction), illustrated through key statistical topics (exploratory data analysis, basic optimization, linear models, graphics, and simulation). The class will be taught in the R language. No previous programming experience required.

48-095    Spatial Concepts for Non-Architects I
Home Department: Architecture
Instructor: Professor Nina Marie Barbuto
Meetings: TR 1:30-4:20 p.m.
Units: 10
Prerequisites: none

This course serves as an introduction to the spatial concepts of architecture for students from other disciplines. The course is focused entirely on project design work (this is not an historical survey, technical or lecture course). This course is very hands-on. Projects will explore the design and experience of spatial environments through a series of creative investigations. The semester will be broken in to 3 parts: Intro/Exploration and a long term project. In Intro/Exploration, students will have many hands on opportunities to start to build a common language to describe spacial investigations as well as creating them. This will consist of short projects, with each design investigation progressively building upon the previous exploration; these early projects will consist of both individual and group work. They will focus on Making. The second half of the semester will
consist of one long term project to be created individually, incorporating students' personal theories of architecture based on an overarching question. Studio work will be supported by group discussion based upon critical review of student work, readings, slide presentations, videos and films. There will also be a few field trips. Students are encouraged to explore their own areas of interest with respect to their work in class. Self-motivation, class attendance and an open mind is mandatory, however, no prior architectural, engineering or artistic experience is required. Students are expected to perform work both inside and outside of class. Students should be prepared to purchase various supplies throughout the course.

51-229  Digital Photographic Imaging
Home Department: Design
Instructor: Professor Dylan Vitone
Meetings: F 1:30-4:20 p.m.
Units: 9
Prerequisites: none
The objective of this course is to provide students with a practical, technical and theoretical foundation in digital imaging. The primary software for this course is Adobe Photoshop, with which students will explore construction, combination, manipulation, input, and output of image as a means of narrative creation. Through project critique and other discussion, we will also consider the aesthetic and political implications of the emergence of this and other new electronic imaging technologies.

53-451  Research Issues in Game Development
Home Department: Entertainment Technology Pittsburgh
Instructor: Professor Thomas Corbett
Meetings: MWF 10:30-11:50 a.m.
Units: 12
Prerequisites: none
This course covers evolving trends in technology and how they can apply to game design. Recent advancements in virtual reality, augmented reality, cloud computing, 4K video streaming, and alternative input devices are changing the way that we create, deliver, and experience games. Students will form collaborative teams to explore these platforms and address design challenges by creating games for them and testing their designs.

60-142/62-142  Digital Photography I
Home Department: Art
Instructor: Professor Dylan Vitone
Meetings: MW 1:30-4:20 p.m.
Units: 10
Prerequisites: none
This course explores digital photography and digital printing methods. By semester's end students will have knowledge of contemporary trends in photography, construction (and deconstruction) of photographic meaning, aesthetic choices, and the use of color. Students will learn how digital cameras work, proper digital workflow, RAW file handling, color management and Adobe Photoshop. Through the combination of the practical and theoretical, students will better define their individual voices as photographers. No prerequisites.

62-150  IDeATe Portal: Introduction to Media Synthesis and Analysis
Home Department: CFA Interdisciplinary
Instructors: multiple
Technologists, artists, and designers are engaging in new, interdisciplinary modes to consume, create, and reuse media. To do this, they thoughtfully collaborate and critically reflect on media creation, distribution, participation, interaction, and how media affects the audience. In this course, students will challenge themselves to work in these new modal contexts by thinking critically in a genre of exploration. They will formulate the intent of their creative work, articulate relationships to art/design practice and theory, and respond insightfully to creative, media-rich outcomes. The class will introduce core concepts through foundational texts, in-class exercises, collaborative projects, and group critique. Through hands-on media exploration, students will ground concepts such as embodiment, emergence, composition, participatory interfaces, and mediated experiences. Section A will be an Introduction to Textile Media. Section B, will be an Introduction to Mediascapes: 2D to 3D Spatial Environments. Section C will be an Introduction to Digital Storytelling + Archives. For more detail on these sections, please visit https://courses.ideate.cmu.edu/62-150/f2018/.

Elective Courses for Non-Humanities Majors:

76-314 Data Stories  
Home Department: English  
Instructors: Professor Christopher Warren  
Meetings: TR 10:30-11:50 a.m.  
Units: 9  
Prerequisites: 76-101 Interpretation and Argument OR 76-120 Advanced First-Year Writing

Every dataset has a story. In the age of big data, it is vital to understand the unlikely casts of algorithms, data miners, researchers, data janitors, pirates, data brokers, financiers, etc. whose activities shape culture. This course will feature a range of "farm to table" data stories, some going back hundreds of years, and introduce students to resources and strategies for contextual research. It will explore cases such as the London cholera epidemic, Google Books, Netflix, the Oxford English Dictionary, the Strava map, and the Queen Nefertiti scan alongside several pieces of art and fiction that capture aspects of data stories typically obscured elsewhere. Research methods introduced will include book history, media archeology, history of information, infrastructure studies, ethnography, and digital forensics. Students will read scholarly articles, novels, journalism, and popular non-fiction, and they will be responsible for a class presentation, a short paper, and a longer research paper.

76-373 Argument  
Home Department: English  
Instructors: Professor Doug Coulson  
Meetings: MW 12:00-1:20 p.m.  
Units: 9  
Prerequisites: none

This course is an introduction to the practice of argument. It is designed to help you produce and support a persuasive written argument and to develop the ability to discuss the production and evaluation of arguments with professional peers. The course begins with an overview of major theories of and approaches to argument, particularly the tension between those who view argument as (1) a logical text or product to be tested for the validity of the relationships asserted between its premises and conclusions, (2) a procedural form used to
govern exchanges between participants in a dialogue or debate, and (3) a rhetorical process of inference, negotiation, and controversy between people in any situation. The course then considers a variety of topics regarding the production, analysis, and evaluation of both visual and verbal arguments, frequently applying the principles we study by rehearsing arguments on both sides of various cases and controversies in class. In addition to a series of written reading responses, you will write two short arguments in an argument field of your choosing before extending one of your first two papers into a longer argument for your final paper.

76-444    History of Books and Reading
Home Department:    English
Instructors:    Professor Jon Klancher
Meetings:    TR 1:30-2:50 p.m.
Units:    9
Prerequisites:    76-101 Interpretation and Argument or 76-102 Advanced First-Year Writing

Rather than putting an end to the book, digital media have had the oddly exhilarating effect of making us look at all kinds of print, past and present, through newly focused lenses. This course will introduce you to the history of books and reading, a cross-fertilizing field of study that is having an impact on many disciplines, from the history of science to literary history, cultural studies, and the arts. Scholarship in this still-emerging field will include work by Roger Chartier, Michel Foucault, Elizabeth Eisenstein, Pierre Bourdieu, Michel de Certeau, and the current scholars who appear in one of our key books, "Interacting with Print: A Multigraph." We'll also read primary texts by Joseph Addison, Jane Austen, Samuel Coleridge, and Wilkie Collins to see how differing modes of print and reading became highly contested cultural and political matters in the eighteenth and nineteenth centuries. Other topics include the division between new reading publics and their ways of reading books; important changes in book production, typography, printing methods (hand-press to steam press). Such knowledge of the history of print has become especially crucial in an era of emerging "new media" and the field of digital humanities in the university.

Two papers will be required—one shorter paper (5-7 pp.) and a longer research paper on the uses of books and print by producers and readers. Though the course meets in Baker Hall, you will have hands-on experience with early books and other forms of print as we also meet periodically in the Rare Book Room at Hunt Library.

76-476    Rhetoric of Science
Home Department:    English
Instructors:    Professor James Wynn
Meetings:    TR 3:00-4:20 p.m.
Units:    9
Prerequisites:    76-101 Interpretation and Argument or 76-102 Advanced First-Year Writing

This course explores questions about scientific argument and communication that are of interest to scientists, rhetoric of science scholars, and professional/technical writing practitioners. These include questions like: How are scientific arguments structured? How is scientific information and argument transformed when it moves from research papers to publications for non-specialist audiences? How does the social, historical, and cultural context of science shape the way it is communicated and/or argued? What contributions do visuals make to scientific argument and communication? To investigate these questions, we will be examining a wide variety of real-world communications in and about science as well as texts in rhetoric, history, and philosophy of science.

79-200    Introduction to Historical Research & Writing
Home Department:    History
Instructors:    Professor Katherine Lynch
This course introduces students to methods and materials that historians use to study the past, and how they present and debate findings. We study what historians consider "best practices" for doing research in primary and secondary sources. We discuss how to ask questions or pose problems about the past that will enable students to develop a research topic, find appropriate primary and secondary sources, take notes from those sources, and write a paper that answers the original question using skills we have studied. We will use the topic of World War I as the theme for the semester. The first part of the class will consist of readings from primary sources such as eyewitness accounts, memoirs, poetry, and film to understand the meanings that participants gave to the experience of war. We also read secondary accounts of the war in which historians recount the war and assess the longer-term meanings it. In addition to our discussions of these assigned readings, students will develop, carry out, and report to the class on their research topics, so that, by the end of the semester, the group will have built an understanding of the war in its many dimensions. Work includes reading and discussing course texts, completing short assignments, sharing writing-in-progress, oral reports to classmates, and a final research paper of 10-15 pages.

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80-180    Nature of Language  
Home Department:   Philosophy  
Instructors:   Professor Christina Bjorndahl  
Meetings:   Multiple options – Please consult the Schedule of Classes for details.  
Units:    9  
Prerequisites:   none
Language is used to talk about the world or to describe it, but how do we go about describing language itself? Linguistics is the name given to the science of language, whose task it is to give such a description. The discipline of linguistics has developed novel tools for describing and analyzing language over the last two hundred years and in this course we learn what these tools are and practice applying them. Sub-areas of linguistics which we study include phonetics (the study of speech sounds), phonology (the study of sound systems), morphology (the study of parts of words), and syntax (the study of combinations of words). Beyond this, we look at changes in language over time, and we consider the puzzle of linguistic meaning. The methods of linguistics are useful in the study of particular languages and in the study of language generally, so this course is useful for students of foreign languages as well as those interested in going on to study language acquisition, psycholinguistics, sociolinguistics, philosophy of language, and computer modeling of language.

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80-282    Phonetics and Phonology I  
Home Department:   Philosophy  
Instructors:   Professor Thomas Werner  
Meetings:   MW 12:00-1:20 p.m.  
Units:    9  
Prerequisites:   80-180
This course aims to provide students with practical tools for the study of speech sounds. The acoustic properties of sounds are examined using spectrograms and other devices, with emphasis on vowels and sonorant consonants. Following this, basic phonological notions are covered, tracing their development in the twentieth century up through optimality theory. In optimality theory, contrast and allophonic variation are explained in terms of an input-output device which selects the most harmonic candidate still faithful to phonemes in the input. The course should be relevant not only to linguistics students, but to students of
language generally, with applications to sociolinguistics, child language development, speech recognition technologies, and the study of foreign languages.