Bowdoin College
Digital and Computational Studies

Course Offerings
Spring 2021

DCS 1020 How to Read a Million Books (FYWS)
Professor Crystal Hall
Course Description:
Confronts the challenges of having too many things to read and limited attention spans to persuade someone that a written interpretation is valid. Explores different methods of reading (i.e. close, surface, text mining, thematic) at different scales, from 1 book to millions of data points from Bowdoin's library collections. Activities evaluate both the process and rationale for different reading and writing methods. Assumes no knowledge of programming. This course has only online components.

DCS 1100
Professors Crystal Hall and Fernando Nascimento
Course Description:
Examines the impact of digital artifacts, networked interaction, and computational analysis on the ways in which we establish new knowledge, engage in creative and social practices, and understand the self. Studies how the combination of large-scale digital data and computational modeling methods shape our agency as decision-makers. Emphasis on how the Liberal Arts shape and are shaped by these processes. Coursework includes quantitative analysis, machine learning, text and network analysis, critical readings in the field, and short, exploratory projects. Assumes no knowledge of programming or any software that will be used. Some activities encourage group work, and we will provide opportunities for students to work in-person if a small group of students in residence can be formed. This course is online with in-person components.

DCS 2310/PHYS 2310 Big Data in Astrophysics and Cosmology
Professor Jeffrey Hyde
Course Description:
Astronomy has been transformed in recent years by the open availability of large data sets. This course uses several astronomical “case studies” to introduce methods and computational tools for analysis of data, after which students will design, complete and present an astronomical data analysis project of their own. Students will examine the abilities and limitations of these methods, and their impact on the types of questions we can answer and who has access to research. Possible topics include but are not limited to: using galaxy surveys to find large-scale structure in the universe, finding and characterizing exoplanets or binary star systems from light curves, or using supernova data to estimate cosmological parameters. Computation is an important part of the course, but programming experience is not required. This course has only online components.

DCS 2335/ENVS 2004 Understanding Place: GIS and Remote Sensing
Professor Eileen Johnson
Course Description:
Geographical information systems (GIS) organize and store spatial information for geographical presentation and analysis. They allow rapid development of high-quality maps and enable powerful and sophisticated investigation of spatial patterns and interrelationships. Introduces concepts of cartography, database management, remote sensing, and spatial analysis. Examines GIS and remote sensing applications for natural resource management, environmental health, and monitoring and preparing for the impacts of climate change from the Arctic to local-level systems. Emphasizes both natural and social science applications through a variety of applied exercises and problems culminating in a semester project that addresses a specific environmental application. Students have the option of completing a community-based project. This course is online with in-person components.

DCS 2450 Technology and the Common Good
Professor Fernando Nascimento
Course Description:
As the pace of technological change continues to accelerate, it raises questions about the impacts, positive and negative, on society. Will technology make our lives more comfortable and pleasant or will it destroy human society and lead us to a catastrophic ending? The answers largely depend on our ability to consider new technology advancements in light of desires to live good lives within just institutions. Students engage with topics of current relevance such as artificial intelligence, gene editing, virtual reality, robotics, and the internet of things. Discusses the underlying technological aspects of each and the possible implications for society. Students apply philosophical and ethical concepts and frameworks to consider how technology can become a positive force for the common good and debate possible ways to evaluate and avoid undesirable effects of current and future technologies. No prior programming experience required. This course has only online components.

DCS 2645 Filmmaking and Born-Digital Storytelling
Professor Erin Johnson
Course Description:
Considers filmmaking in a networked world, as well as the cultural implications of new technologies. Students will create innovative, internet-based films that engage in the changing digital landscape of ubiquitous computing. Students will learn the basics of film production, including digital camera operation, sound recording, lighting, nonlinear editing, basic compositing, and green screen—tools needed to create compelling films, interactive videos, VR and AR experiences, and innovative transmedia projects. Additionally, students will study the history and proliferation of cinema engaged with digital technologies and the internet. This course has only online components.

DCS 3350 Contagion
Professor Mohammad Irfan
Course Description:
Project-based advanced networks course. Investigates how the historic perspective of contagion has inspired its expansive contemporary view, ranging from interventions in epidemics to diffusion in social networks to network effects on behavioral aspects like smoking, obesity, and happiness. Studies various network models and their properties. Programming projects involve implementation of network models and applying these models to large-scale, real-world networks with millions of agents, with a particular focus on critically assessing the models and algorithms using computational thinking. Projects also involve creating computer simulations to study models of residential segregation by race. Takes a critical view of the implications of various predictive algorithms, including techniques for disease prediction. This course has only online components.

DCS 3999 Capstone Implementation
Professor Erin Johnson
Course Description:
Guided independent implementation of the DCS senior coordinate major project. Concentrates on contextualization of methods and results, articulation of critical analysis, evaluation of possible project expansion or next steps, and presentation of the final outcome(s). Assigned readings will focus on interdisciplinary research models; weekly activities will engage with the scholarly communities represented by the project; and project components will have an opportunity for peer review throughout the semester. This course has only online components.