

# Bowdoin College Digital and Computational Studies

## Course Offerings Fall 2022



### DCS courses without prerequisites – open to First Year students

#### **DCS 1020 How to Read a Million Books (First Year Writing Seminar)**

**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.

**No prerequisites.**

#### **DCS 1025/HIST 1025 Digital Games and History (First Year Writing Seminar)**

**Professor Patrick Rael**

**Course Description:**

This first-year seminar explores how digital games represent the past. We begin by focusing on the emergence of digital culture in recent decades, seeking to understand the role electronic simulations play in our lives. We move on to exploring the representation of history in commercial video games, from Sid Meier's Civilization series, to Assassin's Creed IV: Black Flag. Why are video games such a popular way of depicting past events? What constraints does the digital game format impose on these representations? How are these constraints conditioned by the nature of these games as commercial products sold in a global marketplace? Finally, how should we approach some games' representation of difficult histories – those that may involve war, colonialism, and racism? Along the way, we will learn how to access campus information sources, use intellectual property responsibly, and write essays for the college level. A weekly evening lab has been reserved for occasional film screenings.

**No prerequisites.**

#### **DCS 1100**

**Professor 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.

**No prerequisites.**

## **DCS 1209/ECON 1099 Using "Big Data" to Investigate and Suggest Solutions to Economic and Social Problems**

**Professor Erik Nelson**

### **Course Description:**

Students will use "big data" to understand and address some of the most important social and economic problems of our time. The course will give students an introduction to cutting edge research and policy applications in economics in a non-technical manner that does not require prior coursework in economics or statistics, making it suitable both for students exploring economics for the first time, as well as for more advanced students who are interested in the class's topics. Social and economic problems that we will cover include equality of opportunity, education, racial disparities, criminal justice, labor market participation, entrepreneurship, health care and public health, the opioid crisis, climate change, and environmental justice. In the context of these topics, the course will also provide an introduction to basic methods in data science, including regression, causal inference, and machine learning. Students will use software packages R, Stata, Arc GIS, and Excel.

**No prerequisites.**

## **DCS 1650/PHIL 1336 Ethics for a Digital World**

**Professor Aliosha Barranco Lopez**

### **Course Description:**

Digital technologies make our lives easier in many ways—e.g., we can communicate with others around the world, we can order devices to play music, we can get instant directions to go basically anywhere! But is there any ethical cost to enjoying the benefits that come from these types of technologies? This course investigates a variety of ethical issues arising from and connected with digital technology. Topics covered might include: privacy and big data; algorithmic bias; surveillance capitalism; social media and mental manipulation; fake news; internet shaming; and the moral status of superintelligence.

**No prerequisites.**

## **DCS 2335/ENVS 2004/URBS 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.

**No prerequisites.**

## **DCS courses with prerequisites**

### **DCS 1300/CSCI 1103 Programming with Data**

**Professor Stephen Majercik**

#### **Course Description:**

Intended for students with some programming experience, but not enough to move directly into Data Structures. An accelerated introduction to the art of problem solving using the computer and the Python programming language. Weekly labs and programming assignments focus on "big data" and its impact on the world.

**Prerequisite:** CSCI 1055 or DCS 1100 or DCS 1200 or Placement in above CSCI 1101.

## **DCS 1500 Understanding and Deploying Computational Methods**

**Professor Eric Chown**

### **Course Description:**

Computational tools, including programming, are increasingly important across the Liberal Arts. Such tools, however, cannot be effectively created or used without a fundamental understanding of computation. This course provides a foundation for the use of these tools in conjunction with the critical framework of DCS. A major goal of the course is to teach introductory programming, but with a focus on how programming can be used to complement and even to implement methodologies including text analysis, network analysis, GIS and visualization. Students will use these methods in the service of critically engaging with data. E.g. where computer science focuses mainly on problem solving, this course is fundamentally about exploration and often problem discovery. No prior programming knowledge is required.

**Prerequisite:** DCS 1100.

## **DCS 2272/SOC 2272 Digital Media and Society**

**Professor Shruti Devgan**

### **Course Description:**

Explores how digital media construct societies and cultures, and in turn how social institutions, interactions and identities get reflected in/through digital media. Draws from multiple socio-cultural contexts to take a global and transnational approach to understand sociological themes such as self, social interaction and community; social control and surveillance; constructions of gender, sexuality, race, social class, and religion; generations; transnational migration; emotional/affective labor; and social movements and change. Challenges binary dystopian and utopian representations of digital media to cultivate a more nuanced understanding.

**Prerequisite:** SOC 1101

## **DCS 2460 Smart Phones, Mobile Selves**

**Professor Fernando Nascimento**

### **Course Description:**

Mobile Devices are increasingly present in our lives. More and more "smart," they transform how we communicate, access information, experience our physical spaces, create and maintain friendships, monitor our health, and have fun. In this course, we will critically consider the consequences of these technological artifacts for how we define our personal identities, our interpersonal relationships, and the organization of our societies. In order to deepen our discussions, within the experiential context of DCS, we will learn how the software of mobile devices is structured, how they communicate with each other, with local sensors and other wearable devices. We will also study the physical and social architectures that connect our mobile experiences, including how they are likely to change in the coming years and their possible implications. This course does not require any prior knowledge in computer science or mobile communications.

**Prerequisites:** DCS 1100 or DCS 1200

## **DCS 3400 Cognitive Architecture**

**Professor Eric Chown**

### **Course Description:**

Advances in computer science, psychology, and neuroscience have shown that humans process information in ways that are very different from those used by computers. Explores the architecture and mechanisms that the human brain uses to process information. In many cases, these mechanisms are contrasted with their counterparts in traditional computer design. A central focus is to discern when the human cognitive architecture works well, when it performs poorly, and why. Conceptually oriented, drawing ideas from computer science, psychology, and neuroscience. No programming experience necessary.

**Prerequisites:** CSCI 2101 or BIOL 2135 or PSYC 2040 or PSYC 2740

## **DCS 3900 Capstone Implementation and Design**

**Professor Crystal Hall**

### **Course Description:**

Provides a culminating experience allowing students to connect DCS to their other chosen discipline. Guided development and implementation of data creation, methodology evaluation, contextualization of topic and results in scholarly conversations, and translation of results and implications across digital media. Students can combine the course units into a single, unifying research project or propose alternative assignments that demonstrate DCS analytical skills and connections across core DCS topics. Assigned readings will address themes in interdisciplinary research, weekly activities will focus on developing best practices, and all work will have opportunities for peer review throughout the semester. This course is intended for students who will be seniors in the fall. ***Only students whose class standing will be senior in the fall will have registrations processed for this course.***

**Prerequisites:** DCS 1100 and DCS 2450.