

NJIT@JerseyCity - Summer 2020 Courses

IS 650 Data Visualization and Interpretation (Aritra Dasgupta)

“We’re not just fighting an epidemic; we’re fighting an infodemic” - The WHO has observed that we are currently facing unprecedented challenges due to data-driven misinformation about the ongoing pandemic which can have severe consequences. The key contributors to this “infodemic” are often poorly designed visual charts, which can disinform or misinform, and do so, at scale. The need to learn the basics of visualization design and interpretation, both as a data consumer and a data practitioner, is more relevant and consequential *now* than ever before. Visualization techniques, when designed effectively, have emerged as a game-changer in data science, business Intelligence, and journalism domains for communicating data-driven insights. In this course you will learn the theory and application of visual design and how to reason about what makes a visualization good or bad. You will learn how to employ principles imbibed from computer science, human perception, cognition and information design to make your charts error-free, effective, and actionable. You will learn why visualization is needed in the data science pipeline, how it can be used to solve real-world problems, and how to distinguish between “good”, “bad”, or “misleading” visualizations. You will gain hands-on experience in building interactive visual interfaces and dashboards using Python, Tableau and Javascript.

CS 610 Data Structures and Algorithms (Ioannis Koutis)

From data organization and retrieval, to social networks and mapping solutions, algorithms have revolutionized software, which in turn has changed the economy and our lives. This course introduces you to a core set of ideas and techniques that underly a multitude of existing algorithms, and are commonly used as 'building blocks' in the design of new algorithms. You will also gain exposure to issues of computational efficiency that are of paramount importance in the development of software products and time-critical applications. The course is centered around a hands-on project that helps you acquire practical experience with algorithms for network analysis. Emphasis is also given on boosting your computational problem-solving skills via algorithmic problems that appear in programming interviews by top companies in the tech and finance sectors.

CS 634 Data Mining (Pantelis Monogioudis)

The process of extracting signals from massive amounts of noisy data is a multi-step endeavor that involves, data analysis, visualization, learning algorithms, model analysis and verification. In this course you will learn not only what methods to use at each one of these stages but also, how to design and architect end-to-end pipelines that deliver on your technical and, ultimately, business objectives. Using real-world use cases from Zillow, Uber and other technology companies, you will use Python and cutting-edge open source machine learning libraries and tools to mine massive, publicly available repositories of structured (tabular) as well as unstructured (e.g. natural language) data. The skills acquired in this course are essential for aspiring data analysts or scientists across all data-driven industries.

IS 601 Web Systems Development (Ryan Tolboom)

This course trains in the development of web-based systems using Python and the Django web framework. You will learn to program with Python and Javascript, currently two of the three [most in-demand programming languages](#), and learn to develop a web based system through an intensive, hands-on project that requires application of real-world problem-solving skills. You will also learn to utilize the Django web framework, one of the [ten most popular web frameworks](#) and currently in use by [Instagram and Pinterest](#). Model-View-Template design, the Django templating language, and object relational mapping for database access will be covered in this course. At the conclusion of the course, you should be able to create a bespoke web interface for a standard internal business application.

Math 661 Applied Statistics (Andrew Pole)

Extracting information from data is the application of statistical description, analysis, and inference. Businesses, industry, academia, governments face these questions every day, looking for opportunities and seeking solutions for emergent problems: How much bandwidth can that streaming compression technology free up? Will we gain customers if we improve the audio quality? How should we examine performance data from four different designs of a prosthetic limb? What is the reliability of different component manufacturing processes? How do we allocate funding to maximize relief impact? In this course you will learn basic and advanced mathematical and statistical tools and techniques for extracting information from your data, big or small, and to make quantitatively justified statements about general populations of concern (customers, patients, supply chain choke points, ...). You will also use real-world data from many settings in the current leading data analytic environments R and Python to learn how to address these business, research, and social needs.

CS 644 Introduction to Big Data (David Bader)

[Data science](#) is a rapidly emerging discipline at the intersection of machine learning, algorithms, and statistics. Solving real-world problems in domains such as [financial services](#), [cybersecurity](#), and [health informatics](#) requires the generation, storage, management, and analytics, on massive data sets. This course will take you on a journey of developing high performance data analytics for massive data sets using accelerated computer architectures, state-of-the-art software frameworks, and real-world case studies. In-depth topics will focus on mathematical modeling, scalable algorithms, and high-performance computing, for fast and practical solutions. Together we will explore real-world data modeling and prediction from the [Data Science Design Manual](#) and learn [How 45 Successful Companies Used Big Data Analytics to Deliver Extraordinary Results](#).