

NJIT@JerseyCity - Summer 2021 Courses

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.

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 631 - Database Management System Design (Canan Eren)

The objective of the course is to introduce modern database systems. The course focuses on the following issues: conceptual data modes, the Entity-Relationship model, the Relational Model, formal and commercial Database Languages, the Relational Algebra, Database Design, Storage (File Organizations, External Hashing, Indexing), Query Processing and Optimization, Formal Database Design (Normalization) and Transaction Processing.

The students will learn how to design and implement a database application through a small project. They will get hands-on experience with commercial database management systems (DBMS) by writing application programs that involve the commercial DBMS query language SQL.

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](#).

CS 675 - Intro to Machine Learning (Ioannis Koutis)

Machine Learning develops computer programs that can improve their performance by tapping into existing data and taking feedback from the environment. Systems based on ML have already exceeded human performance in several tasks, including image medical image classification and games like Chess and Go. ML has also made leaps in even more complicated tasks, like Natural Language Processing or self-driving vehicles, and it has even produced art that imitates the style of human artists! This course offers an intense introduction to the fundamental ML concepts and algorithms that constitute the core of these spectacular developments. It takes you on a tour from the basic mathematical notions and algorithms to some of the recent developments, e.g. Deep Networks or Recurrent Networks. You will gain exposure to cutting-edge ML development tools such as Scikit-learn and TensorFlow via hands-on assignments and projects that instill a working and immediately applicable knowledge of ML methods and will prepare you for more advanced ML courses.