Data Analytics (DATA) Courses

DATA5050 Data Management
This course introduces students to data management by exploring the history of databases, database concepts and structures, the data project cycle, and data best practices. Students learn basic SQL skills to gain an understanding of what is possible with data and build on foundational database concepts. Throughout the course, focus is also placed on data ethics and its role in current business issues. Students demonstrate what is possible with data by completing a project utilizing learned data skills. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5100 Statistical Analysis
This course explores how statistics can be used as a powerful tool for data analysis. Students learn several statistical approaches while using programming language centered around statistics to work with real data. Students gain an understanding of the descriptive and inferential statistics and how they are key concepts in the quantitative analysis of data. Students demonstrate understanding of topics through practical use case scenarios.
Prerequisite(s): ISA5085. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5150 Data Mining
This course in data mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. Data mining is currently regarded as the key element of a more general process called knowledge discovery, which deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. This course covers all of these issues and illustrates the whole process by examples. Special emphasis is given to the machine learning methods as they provide the real knowledge discovery tools. Important related technologies, such as data warehousing and online analytical processing (OLAP), are also discussed. Students use recent data mining software.
Prerequisite(s): ISA5085 (OL)
Offered at Online, Providence
3 Semester Credits

DATA5200 Data Visualization
This course provides students with the tools and techniques to tell a story visually with data. Many analysts find great insights in the data but struggle to successfully deliver their message. The goal of this course is to provide a foundation to bridge that gap. Students learn visual perception and cognition concepts through the creation of powerful visualizations using tools like Tableau and Power BI. This is a project-based course, where students work with data from exploration to the creation of a dashboard that clearly delivers its intended message. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5300 Big Data Analytics
This course introduces students to the world of Big Data, a world in which websites, mobile phone applications, credit cards and many more everyday tools we use extensively collect a tremendous amount of information. Students learn about the history, current challenges, trends and applications of these massive datasets. They explore the specialized algorithms for Big Data analysis, mining and learning algorithms that have been developed specifically to deal with large datasets. Students learn about techniques used for managing Big Data such as cloud computing, map-reduce parallel computing, distributed file systems, No SQL databases, stream computing engines and other related technologies. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5350 Text & Web Mining Analytics
This course covers important topics in text mining, including basic natural language processing techniques, document representation, text categorization and clustering, document summarization, sentiment analysis, social network and social media analysis, probabilistic topic models, and text visualization. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5400 Predictive Modeling
This course focuses on how to use statistical models to analyze data. Data in the real world involves elements of systematic patterns as well as uncertainty. The uncertainty may arise from missing information, measurement error or incomplete sampling of the population. Statistical modeling methodologies provide a set of tools for understanding data by incorporating assumptions and prior knowledge. These models are useful for supporting decision-making in many areas of computer science, including machine learning, data mining, natural language processing, computer vision and image analysis. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5500 Time Series Analysis
This graduate-level course provides an introduction to time series data and models in the time and frequency domains. Students learn the basic theory of stationary processes, linear filters, spectral analysis, ARIMA models, forecasting and smoothing, models for trends and seasonal patterns, and autoregression and time series regression models. Hierarchically introduced methods start with terminology and exploratory graphics, moving to descriptive statistics, and ending with modeling, forecasting procedures and practical applications. Emphasis is on the practical application of time series models. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5550 Optimization Simulation
This course provides an introduction to machine learning, data mining and statistical pattern recognition. Topics include: 1) supervised learning (i.e., parametric/non-parametric algorithms, support vector machines, kernels, neural networks), 2) unsupervised learning (i.e., clustering, dimensionality reduction, recommender systems, deep learning), and 3) best practices in machine learning (i.e., bias/variance theory, innovation process in machine learning). The course draws from numerous case studies and applications, so students learn how to apply learning algorithms to a broad spectrum of use cases. (OL)
Offered at Online, Providence
3 Semester Credits

DATA5700 Data Analytics Capstone
This capstone project course challenges students to apply theoretical knowledge acquired from their previous courses and apply that knowledge to a project involving actual data in a realistic setting. During the project, students engage in the entire process of solving a real-world data science project, from collecting and processing actual data to applying suitable and appropriate analytic methods to the problem. Both the problem statements for the project assignments and the datasets originate from real-world domains similar to those that students might typically encounter within industry, government, nongovernmental organizations (NGOs) or academic research.
Prerequisite(s): Completion of 27 credits in program. (OL)
Offered at Online, Providence
3 Semester Credits