Lehigh University MS in Business Analytics
Data Science Concentration
2022-23

BUAN 446 Python Applications for Business (3) (summer) (required core)
This class is designed to introduce students to the processes involved in acquiring, cleaning, arranging, analyzing, and visualizing business data using the Python programming language. It will be fast-paced, but assumes only a basic familiarity with coding, and requires no specific expertise in Python to start. We will start with the basics of Python, leveraging the Git version control system, the Spyder IDE, and the Anaconda package manager to get students up and running meaningful code as quickly as possible.

BUAN 448 Predictive Analysis in Business (3) (fall) (required core)
The course covers theories and practices in predictive analytics in business. Students will have hands-on experience on analyzing business data for business intelligence and improved business decision making. Includes: key theories, concepts, and models of predictive analytics; and data mining tools to formulate and solve business problems. The course uses data analytics software and real data. Topics include prediction, forecasting, classification, clustering, data-visualization and data reduction techniques. Not available to students who have credit for BIS 348 or BIS 456.

BUAN 452 Business Analytics and Modelling (3) (spring) (required core)
This course covers advanced analytic methods for understanding and solving business problems. The emphasis is on understanding and applying a wide range of modern techniques to specific decision-making situations. Using the programming language R, the course covers advanced topics such as machine learning, text mining, and social network analysis. Upon completion, students will have valuable practical analytical skills to handle large datasets and make business decisions. Credits will not be given for both BIS 352 and BIS 452.
Prerequisites: BUEC or ECO 045

BUAN 457 Artificial Intelligence for Business (3) (fall) (required core)
This course covers fundamental concepts of artificial intelligence (AI) and how it is applied to solve business problems, to increase business value, transform businesses and to gain competitive advantage. A brief technical overview will be covered. Common machine learning (ML) algorithms will be covered and students will have hands-on experience with AI tools/frameworks. Example use cases of these ML algorithms in various business functional areas will be examined. Finally, ethical challenges in the AI context will be explored. The goal of the course is to use an AI perspective to analyze business problems and challenges.

DSCI 310 Introduction to Data Science (3) (summer) (required core)
The computational analysis of data to extract knowledge and insight. Exploration and manipulation of data. Introduction to data collection and cleaning, reproducibility, code and data management, statistical inference, modeling, ethics, and visualization. Not available to undergraduate students.

Course Prerequisites:
CSE 004 or CSE 007 or CSE 012 or BIS 335

DSCI 321 Algorithms and Software Foundations for Data Science (3) (fall)
Foundational computer science topics and software development in Python for data science. Concepts from discrete structures, algorithm design, programming concepts, and data structures, object-oriented programming, exception handling, tools and environments, and scaling for big data
Course Prerequisites:
(CSE 004 or CSE 007 or CSE 012 or BIS 335) and (MATH 021 or MATH 031 or MATH 076)

DSCI 411 Data Management for Big Data (3) (spring)
Modern distributed systems for big data. Systems and technology such as SQL, NoSQL, Hadoop, Spark. Data collection, cleaning, structuring and transforming data, data provenance.
Course Prerequisites:
DSCI 310 and DSCI 321

DSCI 431 Introduction to Statistical Modeling (3) (fall)
Statistical analysis of data and linear models. Exploratory data analysis, graphical data analysis, estimation and hypothesis testing, Bayesian methods, simulation and resampling, linear, multivariate, and generalized linear models, model selection and performance evaluation.
Course Prerequisites:
DSCI 310 and DSCI 311

DSCI 441 Statistical and Machine Learning (3) (spring)
Common machine learning methods, algorithmic analysis of models for scalability and implementation, data transformations(including dimension reduction, smoothing, aggregation), supervised and unsupervised learning, and ensemble methods.
Course Prerequisites:
DSCI 310 and DSCI 321 and DSCI 431