DATA SCIENCE AND ANALYTICS (DSA)

DSA 201 FOUNDATIONS OF DATA-ORIENTED COMPUTING WITH PYTHON
4, 4/0
Prerequisites: Instructor permission. Introduction to data oriented programming and algorithmic problem solving using Python. Python data structures. Data visualization. Introduction to object oriented programming. Applications to data processing, image manipulation and other. The class is hands-on and project oriented. Offered occasionally.

DSA 301 DATA SCIENCE AND ANALYTICS WITH SPREADSHEETS, DBS AND PYTHON
4, 4/0
Prerequisites: MAT 241 or instructor permission. Introduction to tools and techniques needed to collect, clean, analyze and present data that can be used in any academic discipline. Data scraping from the internet. Visualization of data using appropriate software, spreadsheets, databases, Python. Offered occasionally.

DSA 501 DATA ORIENTED COMPUTING AND ANALYTICS
3, 3/0
Prerequisite: Instructor permission. Practical hands-on introduction to Data Science and Data Analytics tools and acquiring, storing, manipulating, and exploring data - both big and small. Examples from bioinformatics (e.g., genomics), health care informatics, urban and regional planning, astronomy and data journalism. Extensive writing of formal reports. Offered every spring.

DSA 512 INTRODUCTION TO DATA SCIENCE AND ANALYTICS
3, 3/0
Prerequisites: Graduate standing. Introduction to Data Science and Analytics; modern analytical techniques; application to academia, industry and business needs. Fundamental concepts and terms; methods, tools, and techniques; identification of “big data” problems; data sources; analytical approaches; algorithm implementations; interpretation and reporting of results. Offered annually in the Fall semester.

DSA 587 TOPICS IN DATA SCIENCE AND ANALYTICS
1-6, 1/0
In-depth examination of rapidly and significantly changing disciplinary issues, topics, or practices. Offered occasionally

DSA 590 INDEPENDENT STUDY
3, 3/0
Independent investigation into a specific area of Data Science and Analytics; topic selected by the student in consultation with a faculty member. Offered occasionally

DSA 600 MACHINE LEARNING FOR DATA SCIENCE
3, 3/0
Prerequisites: CIS 512 or DSA 512 or equivalent. Introduction to Machine Learning Techniques for Data Science; mathematical methods; algorithms; application to academia, industry and business problems. Fundamental concepts and terms; methods, tools, and techniques. Supervised and unsupervised learning; identification of learning problems; data sources; analytical approaches; algorithm implementation; interpretation and reporting. Offered annually in the Fall semester.

DSA 601 MACHINE LEARNING MODELS IN PYTHON
3, 3/0
Prerequisites: MAT 126, MAT 311, CIS 512, or Instructor Permission. Applied introduction to building predictive, machine-learning models for real-world problems; learning Python computing environment, basic data analysis, management; data visualization and reporting using machine learning methods, including k-nearest neighbor, linear models, naïve Bayesian models, decision trees, random forests, and neural networks. Sample data sets from across industry professions. Offered occasionally.

DSA 610 DATABASES AND THE DATA SCIENCE INFORMATION LIFE CYCLE
3, 3/0
Prerequisites: Graduate standing. Introduction to an understanding of data flow for strategic, data-driven decision making, including data storage, data organization, data gathering and preparation, exploratory data analysis, and meaningful visualizations and communication. Emphasis on hands-on practice. Offered occasionally

DSA 616 ELEMENTS OF MATHEMATICS, PROGRAMMING AND COMPUTER SCIENCE FOR DATA SCIENCE
3, 3/0
Prerequisite: Instructor permission. Introductory topics in calculus, optimization, linear algebra and discrete mathematics useful for data scientists. Networking concepts relevant to data analytics approached from a mathematical point of view. Mathematical programming to implement a variety of numerical methods. Offered every fall semester.

DSA 621 DATA SCIENCE TOOLS IN ENERGY ENGINEERING
3, 3/0
Prerequisite: Instructor permission. Tools and techniques needed to collect, clean, analyze and present data specific to the field of Energy Engineering in large datasets; statistical models to describe data; visualization of data; spreadsheets; databases; data analysis software. Offered occasionally.

DSA 646 INTRODUCTION TO STATISTICS FOR DATA SCIENCE
3, 3/0
Prerequisite: Instructor permission. Descriptive statistics, probability concepts, discrete and continuous probability distributions, sampling distributions, interval estimation and hypothesis testing of one and two population means, proportions and variances, non-parametric tests, simple linear regression and correlation, one-way analysis of variance. Offered every fall semester.
Equivalent Course: MAT 646

DSA 650 DATA STRATEGY AND GOVERNANCE
3, 0/3
Prerequisite: Instructor permission. Elements, methods and tools of an organization’s data strategy and its governance. Components of a data strategy for each phase in the data lifecycle, tools for executing the strategy, and aligning the data strategy with the emerging needs of the organization. Policies, procedures, standards, and training for establishing authority over the ownership and use of data assets and its security. Offered every fall semester.

DSA 652 APPLIED TIME SERIES ANALYSIS IN BANKING RISK MANAGEMENT
1, 1/0
Prerequisites: Undergraduate courses in MAT 126, MAT 311 and CIS 151 or instructor permission. Introduction to key concepts and applications of time series analysis for bank risk management data-driven decision-making. Analysis, decomposition, segmentation, model selection and estimation, statistical and hypothesis testing, and forecasting and sensitivity testing. Use of actual datasets for applied analysis; revenue forecasting future scenarios; interactive classroom instruction in SAS programming environment. Offered occasionally.

DSA 687 ADVANCED TOPICS IN DATA SCIENCE AND ANALYTICS
1-3, 1/0
Current advanced topics in Data Science and Analytics. Offered occasionally.

DSA 688 EXPERIENTIAL LEARNING IN DATA SCIENCE AND ANALYTICS
3, 0/0
Prerequisites: Graduate standing, instructor permission, 3.0 minimum GPA. Internship and team project (aka Professional Labs). In the internship, students participate in activities within an industry setting to solve real world data science problems and to learn how to be part of the real-world work environment. In the Professional Lab, students become part of a problem-solving team to learn how to solve real-world data science problem and learn typical roles in a data science team. Offered every semester.

DSA 690 MASTER'S PROJECT
3, 0/0
Master's Project.

DSA 721 THESIS/PROJECT CONTINUATION
0, 0/0

DSA 722 THESIS/PROJECT EXTENDED
0, 0/0