DAMG 6105. Data Science Engineering with Python. (4 Hours)
Studies the Python programming language with data science as the application domain. Offers students an opportunity to learn how to perform complex numerical calculations, fixed data types, space efficiency, and vector manipulations. Covers tools and techniques for manipulating tables, spreadsheets, and group and pivot tables involving extremely large data sets. Covers large multidimensional arrays and matrices and the high-level mathematical functions to operate on these arrays. Studies how to use Python to manipulate the classic math and science algorithms. Analyzes helper functions such as linear and nonlinear regression, integration, Fourier transformations, numerical optimization, etc. Includes higher-level classes for manipulating and visualizing data. Applies tools and techniques to classical data science using cases such as time series forecasting, social network analysis, text analytics, and big data processing.

Prerequisite(s): DAMG 6105 with a minimum grade of B; DAMG 6210 with a minimum grade of B

DAMG 6210. Data Management and Database Design. (4 Hours)
Studies design of information systems from a data perspective for engineering and business applications; data modeling, including entity-relationship (E-R) and object approaches; user-centric information requirements and data sharing; fundamental concepts of database management systems (DBMS) and their applications; alternative data models, with emphasis on relational design; SQL; data normalization; data-driven application design for personal computer, server-based, enterprise-wide, and Internet databases; and distributed data applications.

Prerequisite(s): INFO 7390 with a minimum grade of B; DAMG 6210 with a minimum grade of B

DAMG 7275. Advanced Database Management Systems. (4 Hours)
Introduces the skill set required to become a serious database applications developer. Offers an overview of the Oracle9i object-relational database system for those who have mastered the fundamental principles of database design and are competent with basic SQL. Gives students the opportunity to develop a strong understanding of the PL/SQL programming language, which is used to create triggers, user-generated functions, stored procedures, and packages for programming Oracle objects. Emphasizes advanced SQL features and Oracle-specific SQL enhancements. Covers optimization and tuning issues. Covers corresponding material for Transact-SQL (used for Microsoft SQL Server and Sybase database systems) as time and resources permit.

Prerequisite(s): DAMG 6210 with a minimum grade of B

DAMG 7290. Data Warehousing and Business Intelligence. (4 Hours)
Examines the technical and management aspects of building a data warehouse. Explores the architecture, infrastructure, processes, data quality, database design, and data analysis involved in building the data warehouse for business analysis. Management issues include business goals, tool selection, project management, personnel skills, training, and user requirements. Topics include dimensional data modeling, extraction/transformation/load processes, data quality problems, datamarts, operational data stores (ODS), staging databases, and online analytic processing (OLAP).

Prerequisite(s): DAMG 6210 with a minimum grade of B or DAMG 7275 with a minimum grade of B or INFO 6205 with a minimum grade of B
DAMG 7370. Designing Advanced Data Architectures for Business Intelligence. (4 Hours)
Focuses on designing advanced data architectures supporting structured, unstructured, and semistructured data sources; hybrid integration and data engineering; and analytical uses by casual information consumers, power users, and data scientists. Technologies include databases (relational, columnar, in-memory, and NoSQL); hybrid data, application, and cloud integration; data preparation; data virtualization; descriptive, diagnostic, predictive, and prescriptive analytics; and on-premise and on-cloud deployments. Topics include data structures, data models, data integration workflow and data engineering, data integration, data preparation, and data virtualization.

Prerequisite(s): DAMG 6210 with a minimum grade of B

DAMG 7374. Special Topics in Data Architecture and Management. (1-4 Hours)
Offers topics of current interest in data architecture and management. May be repeated without limit.

DAMG 7978. Independent Study. (1-4 Hours)
Offers individual work performed under individual faculty supervision. May be repeated without limit.