

COMPUTER APPLICATIONS (CAP)

CAP 3786 - Introduction to Data Mgmt (3 Credits)

The course introduces students to methods for extraction, loading, and transformation of data from large data sets and also fundamental relational database concepts. Topics include data preparation/cleaning, conceptual and logical design, query design and reporting.

Prerequisite(s): CGS 1100

CAP 3793 - Advanced Data Management (3 Credits)

The course introduces students to advanced techniques for data extraction, loading, and transformation. Topics include data warehousing, NoSQL databases, Hadoop/MapReduce. Emerging topics related to data management also covered, for example Blockchain.

Prerequisite(s): CAP 3786

Attribute(s): COBC - College of Bus. Course, COBE - College of Bus. Elect.

CAP 4324 - Predictive Analysis (3 Credits)

The course explores techniques and methodologies to make predictions and forecasts using data-driven approaches. Students will learn how to leverage historical data to build predictive models and make informed decisions. This course covers various aspects of predictive analysis, including data preprocessing, feature selection, model building, evaluation, and interpretation of results.

Prerequisite(s): COP 3530

CAP 4662 - Introduction to Robotics (3 Credits)

This course introduces the basics of modeling, design, and planning of robot systems. It consists of a survey of relevant topics from geometry, kinematics, statics, dynamics, and computer vision. Topics include robotic manipulators, kinematics, dynamics, trajectory generation, programming and design.

Prerequisite(s): COP 3003

CAP 4730 - Computer Graphics (3 Credits)

Foundation for work in computer graphics includes mathematical preliminaries, coordinate systems, transformations, perspective, graphical primitives, curve and surface modeling, representation of solids, hidden surfaces, shadows, ray tracing, the sampling process, aliasing, shading, illumination, texture generation, rendering, vision, color, computer displays, and virtual reality systems. Commercial graphic software systems are explored.

Prerequisite(s): COP 3003

CAP 4744 - Data Visualization (3 Credits)

The course introduces students to techniques for data visualization. Topics include visualization for univariate, bivariate, multivariate data, time series data and text data, using tools such as Excel, Tableau, Excel Power BI, and RapidMiner.

Prerequisite(s): QMB 3302

Attribute(s): COBC - College of Bus. Course, COBE - College of Bus. Elect.

CAP 4763 - Predictive Analytics (3 Credits)

The course introduces students to various techniques used in predictive analytics. Topics include Classification, Clustering, Association Rules Mining, Regression Analysis, Text Analytics, and Real-Time Analytics.

Prerequisite(s): CGS 3126

Attribute(s): COBC - College of Bus. Course, COBE - College of Bus. Elect.

CAP 4767 - Exploratory Data Analysis (3 Credits)

This course covers the main topics necessary to train a Data Analyst, that is, descriptive statistics, data visualization, and dashboard design. Overview and applications of Exploratory Data Analysis (EDA), data description and preparation, descriptive analysis, data visualization, data storytelling, and dashboard design.

Prerequisite(s): IDC 3140 and STA 3038

CAP 4770 - Knowledge Disc. & Data Mining (3 Credits)

This course covers principles, concepts, and methods in the fields of data mining and knowledge discovery. Algorithm development, current tools, and real-world applications are explored. Topics include: data visualization, exploration, cluttering, classification, association rule mining, and anomaly detection, among others.

Prerequisite(s): COP 3003

CAP 4830 - Simulation & Modeling (3 Credits)

Covers continuous and discrete event system simulation, with emphasis on general systems thinking, mathematical and computational methods in simulation, and the application of modeling techniques to selected problems in the sciences and other disciplines. Current commercial simulation environments are explored. ~Prerequisite: COP 3003 with a minimum grade of C.

Prerequisite(s): COP 3003

CAP 4941 - Internship in Analytics (3 Credits)

Joint faculty/industry directed remote and/or on-site course experience in data analytics (department approval required) (S/U only).

Prerequisite(s): CAP 3786

CAP 5151 - Secure Internet of Things (3 Credits)

This course will examine the security and ethical issues of smart devices part of the Internet of Things (IoT). It will examine IoT technology and market specific topics, case studies of IoT security vulnerabilities and attacks, and mitigation controls.

CAP 5415 - Computer Vision (3 Credits)

A comprehensive introduction to the analysis of images and video, focusing on the recognition, reconstruction, and modeling of objects in the three-dimensional world. Includes image formation principles, camera imaging geometry, feature detection and matching, stereo vision, motion estimation, tracking, image classification, and scene understanding.

CAP 5766 - Adv. Exploratory Data Analysis (3 Credits)

Students will learn to apply statistical methods and data visualization techniques to extract meaningful insights from structured and unstructured data. Topics include advanced statistical analysis techniques, multivariate data analysis, time-series analysis, text analysis, complex network analysis, dimensionality reduction and feature engineering methods, advanced data visualization techniques, and outlier detection.

CAP 5834 - Disc-event simulation & control (3 Credits)

Introduction to discrete-event systems, mathematical & statistical modeling, role of random numbers and variables, verification & validation, and control and optimization applications.