

Information Systems & Analytics (ISA)

ISA 125. Introduction to Business Statistics. (3)

This course provides an introduction to data, probability, sampling and its importance to analytical decision-making in business. Upon successful completion of this course, students will have the foundational skills necessary to summarize data, describe relationships among variables, and conduct one-sample and two-sample statistical inference. Note: Credit for graduation will not be given for more than one of STA 125, ISA 125, STA 261, STA 301, or STA 368.

Prerequisites: MTH 102 or MTH 121 or MTH 125, MTH 122, MTH 141 or MTH 151; ACT Math Score of 22 or higher; SAT Math Score of 540 or higher; or Miami International Math Placement Test score of 8 or higher; or successful completion of MTH 025; or permission of department chair.

Cross-listed with STA 125.

ISA 177. Independent Studies. (0-6; maximum 10)

ISA 211. Information Technology and Data Driven Decision Making in Business. (3)

Introduction to the concepts of information systems and analytics used to support organizations for the non-business major. Focus is on the critical information technology and systems impacting the operations of organizations in the digital world. Additionally, how organizations use business analytics to make data-driven decisions will be covered.

ISA 225. Principles of Business Analytics. (3)

Provides a continuation of the study of data and its importance to analytical decision-making in business. Topics include: probability and classification, data visualization, two or more population inference, predictive modeling with simple and multiple regression analysis, business forecasting, data-mining. Emphasis on computer implementation, analysis of real data, and communication of results. Prerequisite: (MTH 141 or MTH 151) and ISA/STA 125.

ISA 235. Information Technology and the Intelligent Enterprise. (3)

Focuses on the strategic role of information technology and systems. Topics include: Challenges faced by managers in firms, understanding key technologies and how they help meet these challenges, and the processes, policies and procedures needed to manage technical and digital assets.

Prerequisite: CSE 148.

ISA 241. Database for Analytics. (1.5)

This course is designed to help students develop knowledge and skills related to collection, manipulation, and management of structured data in databases along with skills to access and data. The course deals with the logical and physical design of databases, entity relationship modeling, and structured language query (SQL).

ISA 242. Programming for Analytics. (1.5)

This course is designed to help students develop programming skills to access and process data. The course equips students with programming skills and tools to build and maintain business applications. Emphasis is on the use of structured techniques and using application libraries for data retrieval, logic development, and information presentation.

ISA 245. Database Systems and Data Warehousing. (3)

Provides an understanding of the importance of database systems in organizations. The course focuses on database concepts, design methodologies, database management systems, structured query language, implementation of database systems, and data warehousing.

Prerequisite: ISA 235.

ISA 250. Basic Math for Analytics. (3)

Provides students with practical and applied foundational mathematics needed as background for success in data-driven decision making. Topics include sets, functions in single and multiple variables including logarithms, exponentials, and trigonometric; matrix algebra operations; introductory calculus concepts; and basic optimization principles necessary for data analysis. Introduction to applied software driven techniques is included in the course.

Prerequisites: MTH 102 or MTH 121 or three years of college preparatory mathematics or permission of department chair.

Co-requisites: STA 261, ISA 225, or STA 301.

Cross-listed with STA.

ISA 277. Independent Studies. (0-6; maximum 10)

ISA 281. Concepts in Business Programming. (3)

The course focuses on structuring, designing and developing data driven business applications. Emphasis is on the use of structured, object-oriented techniques, and using application libraries for data retrieval, logic development, and information presentation.

ISA 291. Applied Regression Analysis in Business. (3)

Multiple regression as related to analysis of business problems. Includes useful regression models, statistical inference (intervals and hypothesis tests) in regression, model building, regression assumptions, remedies for violations of assumptions, applications in experimental design, and time series analysis.

Prerequisite: ISA 225 with a grade of C or better or ISA 205.

ISA 301. Business Data Communications and Security. (3)

Introduces theory, concepts and applications of data communications technologies in a today's business environment. It includes and introduction to personal, local and wide area network architectures as well as wired, wireless, and mobile technology standards employed in those architectures. The course also introduces the business issues related to network and data security and covers methodologies and technologies commonly employed to protect corporate data assets. Finally, the course explores emerging standards and other related management considerations such as cloud computing.

Prerequisite: ISA 235.

ISA 303. Enterprise Systems. (3)

An introduction to enterprise systems such as enterprise resource planning (ERP), Supply Chain and customer relationship management (CRM) systems. Both managerial and technological considerations in the implementation and use of these systems within businesses will be explored in depth.

Prerequisite: ISA 235.

ISA 305. Information Technology Governance, Risk Management, Security and Audit. (3)

The foundations of information technology risk management, security and assurance including the principles of which managerial strategy can be formulated and technical solutions can be selected.

Prerequisites: ISA 235 or equivalent; or permission of instructor.

Cross-listed with ACC 305.

ISA 321. Optimization in Business Analytics. (3)

Students will construct and analyze prescriptive models that guide and improve business operations. Emphasis is put on optimization models that capture complex real-life settings as defined by business performance measures, limited resources and/or other requirements, and various decision types. Selected topics include linear, integer, and nonlinear programming, and network analytics. Among others, examples rooted in production management, supply chain, human labor allocation, finance and social network analysis will be covered. Prerequisite: ISA 225.

ISA 333. Nonparametric Statistics. (3)

Applied study of statistical techniques useful in estimating parameters of a population whose underlying distribution is unknown. Chi-square, runs, and association tests covered. CAS-QL. (For majors in the department, this course counts only toward the B.S. in Data Science and Statistics.) Co-requisite: ISA 291 or STA 363. Cross-listed with STA.

ISA 335. Blockchain and Business Applications. (3)

This course provides an introduction to Blockchain, the revolutionary technology behind Bitcoin. The first part of the course is designed to provide an understanding of all the traditional components of blockchains, including cryptographic techniques required to make transactions safe, consensus mechanisms, and incentive schemes. In the second part of the course, students are exposed to applications of Blockchain in a variety of domains, including modern tools for the development and modeling of blockchains.

ISA 340. Internship. (0-20)

Available to Farmer School of Business (FSB) majors and minors. Available for 0 credit hour during spring, summer and fall terms. Available for 1 credit hour during summer terms only. For one hour of credit, student must secure a sponsoring FSB faculty member within his/her major or minor to supervise the internship and accompanying required internship reflection paper. ISA 340 is not available during winter term. Students are to work through their respective academic departments to enroll in the course. Credit/no credit only. Note: FSB students may earn a maximum 2 credit hours toward graduation for ACC/BLS/BUS/ECO/ESP/FIN/ISA/MGT/MKT 340. Prerequisite: 55 earned hours and permission of department.

ISA 365. Statistical Monitoring and Design of Experiments. (3)

Introduction to statistical methods for monitoring process data and data streams. Introduction to experimental design with applications in business analytics. Prerequisite: ISA 205 or ISA 225 or STA 301 or STA 363 or equivalent. Cross-listed with STA 365.

ISA 377. Independent Studies. (0-6; maximum 10)**ISA 387. Designing Business Systems. (3)**

Introduces contemporary approaches for planning, evaluating, and acquiring business software applications such as development, outsourcing, and purchase. Provides an understanding of the business and development environment, the application life cycle, methods, techniques, and tools used today. Co-requisite: ISA 245 or CSE 385.

ISA 401/ISA 501. Business Intelligence and Data Visualization. (3)

An introduction to the use of business intelligence and data visualization in organizations, with emphasis on how information is gathered, stored, analyzed, and used. Topics covered include business intelligence, data warehousing, data visualization, and data mining. Prerequisite: ISA 245 or CSE 385.

ISA 403. Building Web and Mobile Business Applications. (3)

A second course in the design and development of business applications for mobile and the web. It follows the data driven business programming prerequisite ISA 281 and focuses on delivering scalable web and web based mobile applications by using client and server side technologies. Prerequisites: ISA 281 and ISA 245 or CSE 385.

ISA 405. Information Security. (3)

Introduces the broad foundational topics of information security such as threats, vulnerabilities, encryption, controls, privacy issues. An in-depth coverage of organizational security concepts such as governance, policy, risk management frameworks, business continuity planning, security compliance, ethics etc. Concepts are covered using both case studies and cyber security tools. Finally the course will explore emerging standards and managerial issues in security. Prerequisites: ISA 301 or permission of instructor.

ISA 406. IT Project Management. (3)

Information technology project management theories, techniques, and software tools are taught. Focus is on the problems and methods of conduction projects with special attention to modern information technology and software implementation projects. Prerequisites: ISA 387 or CSE 201.

ISA 412/ISA 512. Data Warehousing and Business Intelligence. (3)

The first part of this course deals with the design of data warehouses for business intelligence purposes. In particular, students learn about different design practices and architectures of data warehouses, how to design multidimensional databases, and how to create data integration workflows (ETL processes) to populate and update data warehouses. After learning how to design and populate data warehouses, students learn in the second part of the course how to perform descriptive analytics using different querying languages and tools, and how to create business reports and dashboards based on data from data warehouses. Prerequisite: Math concepts covered in ISA/STA 250.

ISA 414/ISA 514. Managing Big Data. (3)

The course covers both theories and technologies needed to successfully extract insights from unstructured data and large-scale datasets. Upon successful completion of the course, students will be able to articulate the importance of data analytics and big data management inside organizations. Moreover, they will be able to develop big data solutions to support business decisions and new business strategies. Prerequisite: ISA 245 or CSE 385 and one of (ISA 281, ISA 401/ISA 501, ISA 491/ISA 591, STA 402/STA 502, STA 404/STA 504); or permission of instructor.

ISA 419. Data Driven Security. (3)

Traditionally, information technology (IT) security entailed using a few tools, solutions and best practices that focused on attack prevention and protecting a company's sensitive information and network assets. However, these solutions are no longer sufficient. Businesses are transitioning to a new era, where cybersecurity is enhanced and almost requires data-driven analytical solutions. The primary goals of data-driven security are to: a) discover malicious patterns from the data-lakes of logs produced by security software, b) develop automated tools that can assist in the surveillance of security-related data. This course covers various analytic applications in information/cybersecurity including: user behavior analysis, network and host intrusion detection, web security, phishing detection, and emerging issues in Industrial Internet of Things (IIoT) security. The course is very applied and involves a large amount of programming to examine real datasets.

Prerequisites: BUS 104, ISA 225 and ISA 235.

ISA 424. Data Infrastructure for the Enterprise. (3)

This course provides a broad overview of the data infrastructure needs of business for data based decision making. It discusses emerging and established technologies for storing data such as data warehouses, data lakes, nosql database systems, and cloud computing systems. The course also introduces the students to managerial issues organizations face with data.

Prerequisite: ISA 245.

ISA 444/ISA 544. Business Forecasting. (3)

Applied techniques useful in analyzing and forecasting business time series. Emphasis on Box/Jenkins methodology. Time series regression with autocorrelated errors, exponential smoothing, and classical decomposition are also discussed.

Prerequisite: ECO 311, ISA 291 or STA 463/STA 563.

ISA 477. Independent Studies. (0-6)**ISA 480. Topics in Business Analytics. (1-3; maximum 3)**

Issues oriented seminar focused upon significant emerging topics in the business analytics field.

Prerequisite: determined by professor.

ISA 481. Topics in Information Systems. (3-4; maximum 3)

Issues oriented seminar focused upon significant emerging topics in the decision sciences field.

Prerequisite: determined by professor.

ISA 491/ISA 591. Introduction to Data Mining in Business. (3)

Analysis of large data sets related to business is the focus. Topics such as cluster analysis, market basket analysis, tree diagrams, logistic regression, neural nets, model evaluation and application will be presented and implemented using current data mining software.

Prerequisite: ECO 311, ISA 291, or STA 463/STA 563.

ISA 495. Managing the Intelligent Enterprise. (3)

Includes research, reading, writing, and discussion. Independent research on a topic and company from a management information systems perspective. Respond to issues or problems raised in cases in an analytic and creative manner. Present topic report and research to class. SC.

Prerequisite: Farmer School of Business core courses, senior standing.

ISA 496. Business Analytics Practicum. (3)

Provide analytics consulting to various business clients to work through and solve analytical, data driven problems. Course will utilize skills gained from previous analytics courses including data mining, vizualization, modeling and data skills.

Prerequisite: ISA 401/ISA 501 or ISA 491/ISA 591.

ISA 616. Communicating with Data. (3)

Bridges the study of technical and computational tools to the audiences who need the results of this work. This course will span the entire process of developing a data analytic product from consultation with a client to implementing a solution to presenting the solution to the client. This course will address the fundamentals of effectively communicating with and about quantitative analyses. Topics include using data visualization to describe data; document descriptive, predictive, and prescriptive analytical methods for reproducibility; write professional white papers and technical reports; and ethical considerations related to writing and communication with data.

Cross-listed with STA.

ISA 621. Enabling Technology Topics I. (3)

Examines existing and emerging information technology (IT) within the organization. The foci of the course are the role IT plays in business processes, the underlying theoretical basis for innovation through IT, methodologies for successful IT innovation, and infrastructure technologies commonly employed and why.

ISA 628. Information Technology and Analytic's Role in the Enterprise. (1.5)

Examines existing and emerging information technology (IT) for reinventing processes, managing and disseminating data, and consuming that data to improve decision making within the organization. The foci of the course are the role IT plays in business processes, the underlying theoretical basis for innovation through IT, infrastructure technologies commonly employed and technologies for leveraging data.

ISA 629. Leveraging IT and Data Across the Business. (1.5)

This course introduces common technologies and techniques for data manipulation and consumption in various business processes common to most organizations. The course is integrated with and taught in conjunction with the three other domain specific courses in the Certificate in Business Management taught in the first semester of the Master's in Management. Students will learn current tools and apply common techniques to solve discipline specific problems. The course reinforces both the use of data and technology for decision making and the domain specific knowledge covered in the other courses.

Prerequisite or Co-requisite: ISA 628.

ISA 630. Machine Learning Applications in Business. (3)

In this course students will learn supervised and unsupervised modeling techniques using artificial intelligence and machine learning. Methods will include ensemble modeling, customized ensembles and deep learning. The course will focus on the impact and implications of these advanced techniques in business.

Prerequisite: ISA 591.

ISA 632. Big Data Analytics and Modern AI. (3)

This course will further develop students' big data and AI skills for advanced data analytics tasks. We will introduce advanced operations and functions in in-memory cluster computing and non-relational storage solutions, and investigate how to integrate various data sources into a data lake. We will also discuss how data governance can help to improve the management and quality of big data. Moreover, we will examine advanced analytics functions enabled by in-memory cluster computing, such as distributed machine learning, real-time analytics on streaming data, and large-scale social network analysis. Following that, we will cover data-driven modern AI technologies, such as natural language processing, speech recognition, image processing and dialog generation. Those topics will be taught in an applied way, without focusing too much on the theory.

Prerequisites: ISA 514.

ISA 633. Prescriptive Analytics in Business. (3)

This course will cover different strategies to optimize decision-making in practice. The course is divided into three main modules. Students will be first introduced to statistically designed experiments and their use to find optimal courses of action in different business settings. In the second module, students will utilize mathematical models to take an abstract business problem and represent it using mathematical equations/relationships. The third module introduces students to discrete-event simulations and how it can be used to evaluate a number of what-if-analyses. Using the knowledge from this class, the students will model real-world business problems in the domains of: supply chain management, human resource management, finance, accounting, economics and/or marketing.

ISA 634. Analytics Solution Deployment and Lifecycle Management. (3)

This course will introduce students to current and emerging methods and technologies for deploying and managing analytical solutions in practice. The emphasis will be on how organizations embed analytical solutions into corporate technology systems and infrastructures to make the solutions consumable. This will include performing business validation of the model, developing an execution plan for deployment, monitoring, and maintenance of the solution. The course will include deploying analytics solutions to a small number of users as well as scaling solutions throughout the enterprise. We will examine methodologies for tracking model quality and changes over time.

ISA 641. Data Discovery Through Business Analytics for Managers. (2)

This course introduces the current, basic tools and methods of data driven decision making. Included in the course will be introduction to programming using open source software. Students will learn to apply basic programming concepts to summarize and visualize data as well as cursory data discovery.

ISA 645. Business Analytics for the Executive. (3)

Business decisions have always been rooted in data. However, over the past decade more and more data has become available to marketers. This course details the analysis measures and methods used by leading organizations to make more precise business decisions in the 21st century.

Cross-listed with BUS 645.

ISA 650. Business Analytics Practicum. (3; maximum 6)

The graduate level Business Analytics Practicum is an immersive, project-based, experiential course intended to draw on skills and knowledge gained in courses throughout the MS in Business Analytics program. Students will be immersed in a semester long data driven problem solving project that requires the selection and application of appropriate skills, tools and methodologies covered in the MSBA program to address the problem at hand and appropriately communicate findings to multiple audiences. Prerequisites: Completion of the 12 hours of coursework in the Graduate Certificate in Analytics.

ISA 677. Independent Studies. (0-6; maximum 10)**ISA 681. Studies-Management Information Systems. (1-3)**