

# Department of Information Technology and Decision Sciences

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The Department of Information Technology and Decision Sciences is the largest academic department in the Strome College of Business. It is comprised of two separate, yet interrelated, academic disciplines - Business Analytics and Information Technology. The department offers programs at the bachelor, master, and PhD levels.

The department offers common body of knowledge courses in information technology, operations management, decision analysis, business statistics, data analysis, and management science to all of Strome's undergraduate students, as well as electives in various aspects of the disciplines.

Students from both the undergraduate and graduate programs land jobs at companies such as Oracle, Microsoft, Booz Allen Hamilton, BP (British Petroleum), Norfolk Southern, A.P. Møller, Northrop Grumman, CMA CGM, ZIM, Walmart, Dollar Tree and the federal government.

Our faculty's research has been funded by the National Science Foundation, the U.S. Federal Highway Administration and the U.S. Department of Transportation. The department's maritime research was ranked eighth in the world at 2015 by ISI Web of Science.

## Programs

### Certificate Programs

- Business Analytics and Big Data Certificate (<http://catalog.odu.edu/graduate/business/information-technology-decision-sciences/business-analytics-big-data-certificate/>)

## Master of Science - Computer Science - Information Communication Technology

The Department of Information Technology and Decision Sciences offers this degree program jointly with the Department of Computer Science; please see the entry under the Department of Computer Science for degree requirements.

## Courses

### Business Analytics (BNAL)

#### BNAL 503 Data Visualization and Exploration (3 Credit Hours)

This course introduces students to concepts and processes, technologies, and methodologies that are commonly used in data visualization that an organization may use to enhance its descriptive, predictive, and prescriptive methods for making fact-based decisions.

**Prerequisites:** A grade of C or better in BNAL 306 or an equivalent course or instructor's permission

#### BNAL 507 Prescriptive Analytics of Management Science (3 Credit Hours)

Students are introduced to prescriptive analytics through formulation and solution of mathematical models, with a particular focus on optimization models. The business use of the models, as well as their limitations, is emphasized. Topics include linear, integer, non-linear programming, network models, genetic algorithms, decision analysis, and project management models.

**Prerequisites:** A grade of C or better in BNAL 306 or an equivalent course or permission of the instructor

#### BNAL 515 Advanced Business Analytics/Big Data Applications (3 Credit Hours)

This course addresses advanced business analytics techniques and the application of such techniques to large data sets. Some alternative business analytics strategies are introduced. Descriptive, predictive, and prescriptive models are included. Topics covered in this course include data visualization and exploration, cluster analysis, and developing and calibrating predictive models for big data. Applications of multivariate, logistic, and probit regression to business analytics are discussed. Software packages such as SAS/JMP/SPSS may be used.

**Prerequisites:** A grade of C or better in BNAL 306 or BNAL 606 or an equivalent course or instructor's permission

#### BNAL 530 Probability and Statistics (3 Credit Hours)

This course provides a foundational understanding of probability and statistics in a business context. Students learn to analyze data, make informed decisions, and solve business problems using statistical techniques. Topics include sampling distributions, confidence intervals, hypothesis testing, simple and multiple regressions, and time series forecasting. Emphasis is placed on the application of the tools to business problems.

**Prerequisites:** Admission to the MBA program OR approval by the MBA program office

#### BNAL 532 Predictive Analytics for Business (3 Credit Hours)

Predictive analytics techniques for business. Applications include both shorter term forecasting for sales and operations management as well as forecasting for long term planning. Emphasis is on statistical methods to obtain and evaluate forecasts. Statistical models are implemented using standard software such as MINITAB, EXCEL, R, and/or Python.

**Prerequisites:** BNAL 306 or an equivalent course or permission of the instructor

#### BNAL 576 Simulation Modeling and Analysis for Business Systems (3 Credit Hours)

Simulation modeling is an integral part of the analytics revolution, enabling the creation of models that can represent the variability that exists in many real business systems. This course covers the theory and application of simulation modeling, with an emphasis on how simulation provides predictive and prescriptive analytics to support business decision-making. Topics include simulation fundamentals, the project life-cycle, model development, input and output analysis, verification and validation, and the presentation of a simulation study. We utilize a major commercial simulation software package for assignments and class projects.

#### BNAL 630 Intelligent Systems & Business Analytics (3 Credit Hours)

This course explores the intersection of intelligent systems and business analytics. Students gain insights into leveraging artificial intelligence and data analysis techniques to drive informed decision-making and solve complex business problems. Topics include descriptive analytics, predictive analytics, prescriptive analytics, AI, machine learning, and real-world case studies in various industries.

**Prerequisites:** BNAL 530 OR MBA 600 and BNAL 606

#### BNAL 667 Cooperative Education (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment.

#### BNAL 668 Internship in Business Analytics (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment.

#### BNAL 695 Selected Topics in Business Analytics (3 Credit Hours)

Advanced topics in business analytics offered periodically.

**Prerequisites:** Permission of the department chair and graduate program director

#### BNAL 697 Independent Study (3 Credit Hours)

Affords students the opportunity to undertake independent study under the direction of a faculty member.

**Prerequisites:** Permission of the instructor

**BNAL 711 Multivariate Statistical Methods for Business (3 Credit Hours)**

An applied study of statistical methods including analysis of variance, cross-sectional multiple regression, time series regression, panel data methods, discriminant analysis, and generalized linear models. Data analyzed using a computerized statistical package. Emphasizes development of the student's ability to use statistics for independent research.

**Prerequisites:** BNAL 606 or equivalent

**BNAL 712 Advanced Statistical Models in Business Research (3 Credit Hours)**

Advanced statistical models that are commonly encountered in business research. Topics include confirmatory factor analysis as well as structural equation modeling. Emphasis is on model development as well as use of statistical software in analyzing realistic business-oriented data sets.

**Prerequisites:** BNAL 711

**BNAL 715 Multilevel Modeling in Business Research (1 Credit Hour)**

This course introduces the fundamentals of multilevel modeling. Alternative methods of analysis are discussed and critiqued. Use of specialized multilevel modeling software is demonstrated. Topics include a detailed discussion of the issues associated with variable centering. Applications to business research investigations are emphasized.

**Prerequisites:** BNAL 711 or permission of the instructor

**BNAL 721 Simulation Modeling for Business and Supply Chain Systems (3 Credit Hours)**

This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business, supply chain, and logistics decision making.

**Prerequisites:** BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722, or BNAL 822, or instructor's permission

**BNAL 722 Agent-Based Simulation and Modeling (3 Credit Hours)**

This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will explore the roots and literature of agent-based modeling and related fields. Students will also learn to develop agent-based simulation models using a major commercial simulation package.

**Prerequisites:** MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821

**BNAL 796 Selected Topics in Business Analytics (1-3 Credit Hours)**

The advanced study of selected topics not offered on a regular basis.

**BNAL 821 Simulation Modeling for Business and Supply Chain Systems (3 Credit Hours)**

This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business, supply chain, and logistics decision making.

**Prerequisites:** BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722 or BNAL 822, or permission of the instructor or department

**BNAL 822 Agent-Based Simulation and Modeling (3 Credit Hours)**

This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will explore the roots and literature of agent-based modeling and related fields. Students will also learn to develop agent-based simulation models using a major commercial simulation package.

**Prerequisites:** MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821

**Information Technology (IT)****IT 564 Essentials of Project Management (3 Credit Hours)**

This course focuses on project management concepts and methodologies. Topics include project management framework, knowledge areas, and techniques.

**Prerequisites:** Enrolled in a graduate program or a graduate certificate program, or waiver approved by the instructor

**IT 595 Topics (1-3 Credit Hours)****IT 630 Intelligent Systems & Business Analytics (3 Credit Hours)**

This course explores the intersection of intelligent systems and business analytics. Students gain insights into leveraging artificial intelligence and data analysis techniques to drive informed decision-making and solve complex business problems. Topics include descriptive analytics, predictive analytics, prescriptive analytics, AI, machine learning, and real-world case studies in various industries.

**Prerequisites:** Admission to the MBA program OR approval by the MBA program office/instructor

**IT 634 Cloud Computing and Security (3 Credit Hours)**

An introduction to key concepts and techniques of cloud computing and security. Topics include: cloud computing systems, virtualization and container technologies, cloud architecture and service platform design, cloud programming models, big data analytics, cloud performance and security.

**IT 650 Database Management Systems (3 Credit Hours)**

Introduction to database management systems. The topics addressed include system architecture, data models, database analysis, design and implementation, query processing, business transaction processing, and database security.

**Prerequisites:** IT 620 or equivalent; or permission of the department

**IT 651 Business Intelligence (3 Credit Hours)**

Introduction to business intelligence and its three components: data warehouse, data mining, and OLAP. Examines traditional techniques as well as emerging technologies.

**Prerequisites:** IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

**IT 652 Information and Communications Technology for Big Data (3 Credit Hours)**

Introduction to emerging ICT techniques for big data analytics and big data science. Topics cover WSN, cloud computing and IoT.

**Prerequisites:** IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

**IT 660 Digitalizing Enterprises (3 Credit Hours)**

Information and Communication Technologies (ICT) is a critical enabler of the digital enterprise. This class introduces cutting-edge ICT, including enterprise systems, IoT, CPS as the foundation for digitalizing enterprises for the seamless integration of enterprises and supply chain. Topics includes intra- and inter-organizational integration, supply chain collaboration and integration, and digitalization technologies.

**Prerequisites:** IT 650 or permission of the instructor or department or admission to a graduate program at ODU

**IT 664 Project Management (3 Credit Hours)**

This course provides knowledge of project management including tools and techniques to manage scope, time, cost, quality, risk, team, communications, security and procurement. Special issues in the context of information- and technology-based projects are emphasized.

**IT 667 Cooperative Education (1-3 Credit Hours)**

Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment.

**Prerequisites:** IT 620 or equivalent

**IT 668 Information Systems Internship (1-3 Credit Hours)**

Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Available for pass/fail grading only.

**Prerequisites:** IT 620 or equivalent

**IT 672 Enterprise Architectures (3 Credit Hours)**

Introduction to enterprise architectures for business organizations as well as related information architectures. Examines traditional techniques as well as emerging techniques including industrial information integration engineering.

**Prerequisites:** IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

**IT 680 Computing Aspects of Medical Informatics (3 Credit Hours)**

Overview of computing aspects of medical informatics. Computational methods in scientific computing of medical informatics are covered. The basic thrust is to demonstrate the usefulness and power of computational methods in solving real-life problems in perspectives of medical informatics.

**IT 695 Selected Topics in Information (1-3 Credit Hours)**

3 credits.

**Prerequisites:** permission of the department chair and the graduate program director

**IT 697 Independent Study in Information Systems (1-3 Credit Hours)**

Affords students the opportunity to undertake independent study under the direction of a faculty member.

**Prerequisites:** IT 650 or permission of the department

**IT 698 Master's Project in Information (3 Credit Hours)**

3 credits.

**Prerequisites:** IT 650 and permission of the department

**IT 699 Master's Thesis in Information Systems (1-6 Credit Hours)**

1-6 credits.

**Prerequisites:** IT 650 and permission of the department

**IT 795 Selected Topics in Management Information Systems (1-3 Credit Hours)**

3 credits.

**Prerequisites:** permission of the department chair and the graduate program director

**IT 800 Theoretical Foundation in Information Technology Research (3 Credit Hours)**

A survey of research methodology in supply chain and operations management, data science, and information technology including empirical, behavioral, computational, and interdisciplinary methods and techniques in different types of problem domains.

**IT 850 Enterprise Architecture and Computing Algorithms (3 Credit Hours)**

This course examines the latest advances in enterprise architecture and computing. Topics include enterprise architecture design and modeling, service-oriented architecture (SOA), and integration of enterprise information and applications.

**Prerequisites:** IT 800

**IT 890 Seminar in Business Process and Enterprise Systems (3 Credit Hours)**

This course discusses how firms achieve business excellence through business process management (BPM), business process improvement (BPI), and business process reengineering (BPR) supported by IT. Topics include business process and workflow modeling, analysis, integration, monitoring and management.

**Prerequisites:** IT 800

**IT 891 Seminar in Business Intelligence (3 Credit Hours)**

The objective of this course is to provide an overview of managerial and technical issues associated with business intelligence. Topics covered include the state-of-the art data warehousing, data mining and OLAP technologies.

**Prerequisites:** IT 800

**IT 892 Seminar in Knowledge Management (3 Credit Hours)**

The course examines the latest advances in knowledge management (KM) including identifying, capturing, sharing and evaluating an enterprise's knowledge assets. The course reviews and discusses existing technologies in KM and new emerging KM technologies and practices.

**Prerequisites:** IT 800

**IT 893 Supply Chain in E-Business Environment (3 Credit Hours)**

This course examines how supply chain management and information technology integrate to support global e-commerce opportunities. Topics include the theories and practices of material flow management, omnichannel distribution and retailing, maritime, logistics, procurement, and inventory management.

**Prerequisites:** IT 800

**IT 895 Selected Topics in Management Information Systems (1-3 Credit Hours)**

3 credits.

**Prerequisites:** permission of the department chair and the graduate program director

**IT 899 Dissertation (1-12 Credit Hours)**

Ph.D. level research and writing of dissertation.

**Prerequisites:** IT 893; departmental approval required

**IT 998 Master's Graduate Credit (1 Credit Hour)**

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.