OPERATIONS AND DECISION TECHNOLOGIES

The Operations and Decision Technologies (ODT) department is the home to innovative programs in supply chain and operations management, business analytics, decision sciences and operations research, and information systems management. Our supply chain and operations management curriculum focuses on the operation of the entire supply chain, from suppliers to manufacturers to the customer and everything in between. Our business analytics, decision sciences and operations research curriculum focuses on extensive use of data, statistical and quantitative analysis, explanatory and predictive modeling, and fact-based management to drive decision making. Finally, our information systems curriculum blends business and technology curriculum to innovatively apply IT to better lead enterprises in this digital age.

This brochure presents curriculum highlights as well our engagement in different programs within supply chain and operations management, business analytics, decision sciences and operations research, and information systems management. It includes research themes that are pursued by our faculty. Finally, we present ODT alumni spotlight.
Supply Chain and Operations Management

For a firm to deliver its promise to customers, it must be able to utilize its resources to achieve a profitable balance between supply and demand. To reach this goal, supply chain management aligns the firm’s manufacturing and service resources with suppliers, internal partners in finance, accounting, marketing and information systems, distribution channels, and customers.

Our undergraduate and graduate majors provide students with knowledge and skills for all facets of supply chain and operations management: supply chain strategy and analytics, sourcing, operations, and logistics. The curriculum supports several synergistic dual majors.

SUPPLY CHAIN STRATEGY AND ANALYTICS
• Strategic fit between supply chain and internal partners
• Forecasting
• Sales and operations planning
• Inventory planning
• Supply chain contracts
• Role of pricing in supply chains
• Information technology in supply chains
• Digital supply chain

SOURCING
• The decision to make vs. buy
• Total cost of ownership
• Supplier selection
• Supply risk management

OPERATIONS
• Process design
• Capacity and bottlenecks
• Lean operations
• Sustainable operations
• Project management

LOGISTICS
• Network design
• Global supply chains
• Transportation in a supply chain
• Distribution networks
Business Analytics, Decision Sciences, and Operations Research

Quantitative methods such as business analytics, decision sciences and operations research are about using data to make better business decisions. For years, companies have collected data about their practices and consumers. Now thanks to inexpensive computing, more and more companies are putting their data to work—using techniques such as predictive analytics, optimization, econometric techniques, and simulation—to make fact-based decisions that improve productivity, increase profits, and create a competitive advantage.

Our undergraduate co-major, the MBA major/minor and online programs provide knowledge and skills for all facets of business analytics: employing analytics for business transformation, data analytics, decision and causal modeling, data understanding and preparation, and statistical inference and visualization. The curriculum supports several synergistic dual majors.

**EMPLOYING ANALYTICS FOR BUSINESS TRANSFORMATION**
- Applying analytic lens to business problems
- Align, plan and govern analytics deployment
- Evolving business models for the digital enterprise

**DATA ANALYTICS**
- Predictive analytics, data mining and machine learning
- Text and social media network analytics
- Web analytics
- Big data analytics
- Sensor data analytics

**DECISION AND CAUSAL MODELING**
- Analytical decision modeling – optimization
- Stochastic decision modeling – Monte Carlo simulation, discrete event simulation
- Time-series analysis and forecasting
- Data-driven experimentation

**DATA UNDERSTANDING AND PREPARATION**
- Data quality assessment
- Data preparation for analytics

**STATISTICAL INFERENCE AND VISUALIZATION**
- Exploring and visualizing data
- Descriptive statistics and statistical inference

**UNDERGRADUATE CO-MAJOR IN BUSINESS ANALYTICS**
The business analytics co-major provides undergraduate students the opportunity to complement their primary major with advanced business analytics skills, allowing them to better integrate data-driven insights into their analyses and decision-making. This co-major can be paired with any other Kelley School of Business undergraduate major.

- URL: [https://tinyurl.com/odtugba](https://tinyurl.com/odtugba)

**MBA MAJOR AND MINOR IN BUSINESS ANALYTICS**
In the MBA program, a major or minor in business analytics focuses on data-driven insights that can help enhance customer relationships, improve productivity, and better manage costs and risks in an organization.

- URL: [http://tinyurl.com/odtmbaba](http://tinyurl.com/odtmbaba)

**ONLINE MS IN BUSINESS ANALYTICS**
An online MS in business analytics equips students with a multitude of analytic techniques that can help generate insights for decision making: inferential statistics and visualization, data analytics, simulation, optimization and econometrics, big data analytics, and data-driven experimentation. It also delves into managerial issues related to aligning, planning and deploying analytics initiatives.

- URL: [http://tinyurl.com/odtkdbua](http://tinyurl.com/odtkdbua)

**CERTIFICATE PROGRAM IN BUSINESS ANALYTICS**
A 12 credit-hour certificate in business analytics provides an introduction to detecting trends, predicting the most-likely scenarios and making optimal decisions about everything from daily operations to high-level strategies.

- URL: [http://tinyurl.com/odtcerba](http://tinyurl.com/odtcerba)

**PHD IN DECISION SCIENCES**
The doctoral program in decision sciences prepares students for an academic career in the study of mathematical and analytical methods used in decision making.

- URL: [http://tinyurl.com/odtdsphd](http://tinyurl.com/odtdsphd)

**INSTITUTE FOR BUSINESS ANALYTICS**
The Institute for Business Analytics, a Kelley School of Business initiative, brings together students, faculty and corporate partners in various analytics-related initiatives: specialized forums, analytics leadership award, predictive analytics and data viz challenge, corporate guest talks, showcasing students, faculty and corporate partners in the OnAnalytics magazine, and Kelley’s Business Analytics Day.

- URL: [http://kelley.iu.edu/iba](http://kelley.iu.edu/iba)

**STUDENT CLUB**
- Business Analytics Club at Kelley
  ([https://tinyurl.com/kaclub](https://tinyurl.com/kaclub))
Information Systems

Information systems are important for day-to-day operations as well as strategic management of businesses. Information systems management involves analysis, design, implementation and operation of computer-based information systems, which is becoming increasingly important to leading enterprises in innovative ways.

Our undergraduate major/co-major and graduate programs – with a blended business-technology curriculum – focus on multiple facets of information systems management: IT strategy and management, enterprise process management, enterprise data management, IT infrastructure management and application development. The curriculum supports several synergistic dual majors.

IT STRATEGY AND MANAGEMENT
- IT strategy
- IT consulting
- Integration of systems and business
- Digital innovation
- Business digital platforms

ENTERPRISE PROCESS MANAGEMENT
- Systems analysis and design
- Business process management
- Enterprise system management
- Design thinking
- Project management

ENTERPRISE DATA MANAGEMENT AND ANALYTICS
- Design and storage of enterprise data systems
- Data access using database querying languages
- Data integration, master data management, and data quality management
- Enterprise reporting and analytics
- Business intelligence systems
- Big data technologies

IT INFRASTRUCTURE MANAGEMENT
- Information systems security
- IT risk management
- IT architecture
- Cloud computing

APPLICATION DEVELOPMENT
- Business application development
- Mobile application development
- Managing systems development

UNDERGRADUATE MAJOR IN INFORMATION SYSTEMS
The information systems (IS) major focuses on information technology (IT) and process issues for operating and managing large, distributed global businesses: integrating business with systems, designing processes as well as the associated data, managing the IT infrastructure, and developing business applications.

- URL: http://tinyurl.com/odtug

UNDERGRADUATE CO-MAJOR IN TECHNOLOGY MANAGEMENT
The technology management co-major enhances understanding of information systems and the roles they play in areas such as customer relationship management, accounting, and financial systems. It complements skill sets in diverse fields such as finance, accounting, marketing or management.

- URL: http://tinyurl.com/odtug

UNDERGRADUATE TECHNOLOGY CONSULTING WORKSHOP
The workshop prepares undergraduate students to find and secure internships and full-time jobs in technology consulting and in corporate areas that require creative problem solutions with the use of information technology.

- URL: http://tinyurl.com/odttcw

MS IN INFORMATION SYSTEMS
Combining technical, business and managerial expertise, an MS in information systems equips students in effective use of information technology to address business problems. Its innovative curriculum includes three concentrations: enterprise systems, business intelligence and analytics, and enterprise risk management.

- URL: http://tinyurl.com/odtmsis

ONLINE MS IN INFORMATION TECHNOLOGY MANAGEMENT
The online MS in information technology management focuses on advancing the careers of information technology professionals who seek to enhance their ability to employ information technology for solving business problems.

- URL: https://tinyurl.com/mstechmgmt

PHD IN INFORMATION SYSTEMS
The doctoral program in information systems prepares academic scholars who concentrate on how business technologies are designed, developed, and used to enable and empower individuals, teams, processes, organizations, and the society.

- URL: http://tinyurl.com/odtisphd

INSTITUTE FOR THE DIGITAL ENTERPRISE
Kelley’s Institute for the Digital Enterprise (IDE) serves the interests of students, faculty and corporate partners by providing thought leadership, research opportunities, and linkages to ideas and information in technologies that enable the digital enterprise.

STUDENT CLUBS
- Technology Management Club (http://kelley.iu.edu/tmc/)
- MSIS Association (http://kelley.iu.edu/MSISA/)
- Women in Business Technology (https://tinyurl.com/winbustech)
ODT RESEARCH THEMES

SUPPLY CHAIN AND OPERATIONS MANAGEMENT

SUPPLY CHAIN MANAGEMENT
- Strategic sourcing
- Production and inventory management
- Product recalls
- Supply risk management

SERVICE & RETAIL OPERATIONS
- Omni-channel management
- Service quality and design
- Pricing and revenue management

HEALTHCARE OPERATIONS
- Hospital operations and patient flow
- Hospital staffing
- Clinical trial design

SUSTAINABLE OPERATIONS
- Reverse logistics
- Closed-loop supply chain
- Triple bottom line

HUMAN BEHAVIOR AND OPERATIONS
- Operational implications of consumer behavior
- Incentives in procurement
- Collaboration and competition in supply chains

HUMANITARIAN & SOCIALLY RESPONSIBLE OPERATIONS
- Disaster preparedness and response
- Recovery operations
- Coordination within humanitarian organizations

ENERGY RESOURCE MANAGEMENT
- Renewable energy integration
- Energy market competition
- Energy resource investment and operations
- Energy demand management

BUSINESS ANALYTICS, DECISION SCIENCES, AND OPERATIONS RESEARCH

HEALTHCARE ANALYTICS
- Predicting disease progression
- Patient-centric healthcare models
- Decision support for hospitals
- Policy for healthcare coalitions including insurers and Medicare
- Social media and healthcare

ANALYTICS-DRIVEN DECISION MAKING
- Markov decision process
- Bayesian information modeling
- Queueing theory
- Optimization
- Game theory
- Structural estimation

SOCIAL MEDIA ANALYTICS
- Organizational and public policy outcomes from social media platforms
- Role of live chatting tools

WORKFORCE ANALYTICS
- Role of IT in the displacement of service workers
- Online labor markets
- Staffing and turnover

WISDOM OF THE CROWD
- Philanthropic crowdfunding
- Judgment aggregation
- Quantifying uncertainty

ONLINE PLATFORMS AND RECOMMENDATION SYSTEMS
- Algorithm design for recommendation engines
- Marketplace design in the context of B2B platforms

INFORMATION SYSTEMS

IT IMPLEMENTATION AND ADOPTION
- Adoption, use, and impact of technology
- IT-enabled change management
- Business process change

IT-ENABLED DECISION MAKING
- Impact of recommender system on decision making
- IT for the subconscious

DESIGN OF IT SYSTEMS
- Heuristics and biases in systems design
- Science of design

INFORMATION GOODS
- Online piracy of digital goods
- Implementing cybersecurity policies
- Strategy for reducing the impact of fake news and deceptive product reviews

IT AND SOCIAL MEDIA PLATFORMS
- Platform-based healthcare communities
- Engagement on social media platforms

COMPUTER-MEDIATED COLLABORATIVE WORK
- Virtual teams
- Online collaboration
- Social media and virtual worlds

ODT ALUMNI

ANNIE OLER, KELLEY SCHOOL OF BUSINESS, BS - SUPPLY CHAIN AND FINANCE 2008.
Senior Manager, Finance Analytics, Grainger.

“I apply my technology and business knowledge to understand my client’s challenges and analyze the current state of their analytics and information management capabilities. I design and implement solutions that deliver powerful insights to my client’s organization and help them achieve their future state vision by connecting people, business, and technology.”

JEFFERSON BARROS, KELLEY SCHOOL OF BUSINESS, MBA - SUPPLY CHAIN AND BUSINESS ANALYTICS 2014.
Program Manager, Supply Chain Design, Google.

“I recently joined Google as a Program Manager for Supply Chain Design, providing tactical support and analytical recommendations to the Global Infrastructure Group in planning and inventory. The work relies heavily on data analytics concepts to drive operational improvements and being around so many smart people pushes me to be on the top and deliver fast and intelligent solutions. I’m glad I experienced a good mix of analytics and supply chain while I was in Kelley.”

NOVITA MAHARANI DWI, KELLEY SCHOOL OF BUSINESS, MBA – BUSINESS ANALYTICS AND FINANCE 2018.
Senior Consultant, Deloitte Consulting.

“I was involved in IoT planning for a conglomerate client during my summer internship. I consulted with multiple stakeholders ranging from potential B2B clients, technical specialist, IoT experts, and potential vendors to create initial MVP (minimum viable product) ideas. I developed financial projection through leveraging knowledge from Business Analytics and Finance that I obtained from the Kelley MBA Program.”

JOHN BORGO, KELLEY SCHOOL OF BUSINESS, MBA – BUSINESS ANALYTICS AND FINANCE 2012.
Director of Data Analytics at Angie’s List.

“I manage a team of business analysts and data scientists whose mission is to provide information and insights to our stakeholders that enable them to make sound tactical and strategic decisions.”

LINWOOD WATKINS III, KELLEY SCHOOL OF BUSINESS, BS - INFORMATION SYSTEMS 2011 AND MS IN INFORMATION SYSTEMS 2012.
Consultant at Inspire11.

“As an IT consultant, I play the role of a business analyst and help bridge business process with IT systems. My role involves process mapping, creating design documentation, and testing the solution.”

KYLIE CHERCO, KELLEY SCHOOL OF BUSINESS, BS - MANAGEMENT 2012 AND MS IN INFORMATION SYSTEMS 2013
Senior Consultant, Deloitte Consulting.

“I apply my technology and business knowledge to understand my client’s challenges and analyze the current state of their analytics and information management capabilities. I design and implement solutions that deliver powerful insights to my client’s organization and help them achieve their future state vision by connecting people, business, and technology.”