

IT'S TIME TO EARN YOUR GRADUATE CERTIFICATE

Missouri S&T's Business and Information Technology Department offers nearly a dozen graduate certificates in fast-growing industries like data science, digital media, enterprise resource planning, and many others to keep you current and competitive.



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BUSINESS ANALYTICS AND DATA SCIENCE

"You can have data without information, but you cannot have information without data." - Daniel Keys Moran

Big Data is an emerging phenomenon. Computing systems today are generating 15 petabytes of new information every day- eight more times than the combined information in all the libraries in the U.S.; about 80% of the data generated every day is textual and unstructured data.

Data analytics facilitates realization of objectives by identifying trends, creating predictive models for forecasting, and optimizing business processes for enhanced performance. Three main categories of analytics are:

- 1) Descriptive: the use of data to find out what happened in the past
- 2) Predictive: the use of data to find out what could happen in the future
- 3) Prescriptive: the use of data to prescribe the best course of action for the future.

Admission requirements

The graduate certificate program is open to all individuals holding a BS, MS or PhD degree in areas such as business, social sciences, technology, engineering, or related disciplines. In order to receive a Graduate Certificate, the student must have an average graduate cumulative grade point of 3.0 or better on a 4.0 scale in the certificate courses taken. Students admitted only to the certificate program will have non-degree graduate status but will earn graduate credit for the courses they complete. If the four-course sequence approved by the graduate advisor is completed with a grade of B or better in each of the courses taken, the student will, upon application, be admitted to the Master of Business Administration or to the Master of Science in Information Science and Technology. The certificate courses taken by students admitted to the program will count towards the MBA program or the M.S. in Information Science and Technology degree program. Once admitted to the Certificate program, a student will be given three years to complete the program as long as a B or better average is maintained in the courses taken.

The Business Analytics and Data Science graduate certificate prepares students for positions as data scientists, and provides working IT professionals with must-have skills in the expanding "Big Data" field.

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COURSE DESCRIPTIONS

Most courses are offered both on campus and via distance education

REQUIRED COURSES

IST 5420: Business Analytics & Data Science

This course addresses the foundations of using predictive statistics on big data sets to impact decision-making. Focus is applied examples using realistic data. Models implemented include regression (parametric/nonparametric), classification, decision trees, and clustering with analytical estimation accomplished using popular software.

Prerequisites: Calculus, Statistics, and Programming knowledge.

IST 6450: Information Visualization

Topics/activities include: the visualization development framework, traditional presentations of data, human perception and aesthetics, color space theory, visualization algorithms and software, case studies of modern topology, research into visualization algorithms and implementations in R. Students will produce significant programs and visualizations.

Prerequisites: Statistics, Calculus, and Programming Knowledge

Notes:

- 1) There is overlap between the course offerings for this graduate certificate and other big data graduate certificates. No course can be used to satisfy the requirement for more than one certificate.
- 2) Curriculum is subject to change. Please contact the department for up-to-date information on courses. Other courses approved by the department may be substituted for any of the above listed courses on a case-by-case basis. The administrative coordinators must approve the substitution prior to enrolling in the course.
- 3) Please check JoeSS for up-to-date course prerequisites.

CORE COURSES (CHOOSE ONE)

ERP 5410: Use of Business Intelligence

Introduces data-oriented techniques for business intelligence. Topics include Business Intelligence Architecture, Business Analytics, and Enterprise Reporting. SAP Business Information Warehouse, Business Objects, or similar tools will be used to access and present data, generate reports, and perform analysis.

IST 5001 Data Methods in Python

Python methodologies for manipulating, processing, cleaning, grouping, slicing, reshaping and summarizing information in data-intensive applications; managing files, scraping web pages, mining social media; describing, modeling, analyzing, and visualizing data. Tools include Pandas, NumPy, SciPy, and Matplotlib libraries.

CSc 6304: Cloud Computing and Big Data Management

Cloud computing architecture, data management and indexing in cloud computing, security and privacy issues in cloud computing, scheduling, and cost analysis, sensor and mobile cloud, Ajax/mapreduce and EC3 cloud.

CSc 5204: Regression Analysis

Simple linear regression, multiple regression, regression diagnostics, multicollinearity, measures of influence and leverage,

model selection techniques, polynomial models, regression with autocorrelated errors, introduction to non-linear regression.

CSc 5402: Data Mining and Machine Learning

Classical and modern data mining and machine learning algorithms; data preprocessing/warehousing, mining association rules, classification/prediction methods, clustering techniques, Bayesian networks; unsupervised/supervised/reinforcement learning, learning decision trees, artificial neural networks, support vector machines, and ensemble learning.

ClE 6330: Clustering Algorithms

An introduction to cluster analysis and clustering algorithms rooted in computational intelligence, computer science and statistics. Clustering in sequential data, massive data and high dimensional data. Students will be evaluated by individual or group research projects and research presentations.

Stat 5814: Applied Time Series Analysis

Introduction to time series modeling of empirical data observed over time. Topics include stationary processes, autocovariance functions, moving average, autoregressive, ARIMA, and GARCH models, spectral analysis, confidence intervals, forecasting, and

ELECTIVE COURSES (CHOOSE ONE)

IST 6443: Information Retrieval and Analysis

IST 6444: Essentials of Data Warehouses

IST 6445 Database marketing

IST 6448: Building the Data Warehouse

IST 6887: Research Methods in Business and IS&T

ERP 5210 Performance Dashboard, Scoreboard and Data Visualization

ERP 6220 Enterprise Performance Dashboard Prototyping

ERP 6610 Advanced Customer Relationship Management in ERP Environment

BUS 6425 Supply Chain and Project Management

CYBERSECURITY AND INFORMATION ASSURANCE MANAGEMENT

Acquire the knowledge and experience in cybersecurity and risk management to protect data and infrastructures.

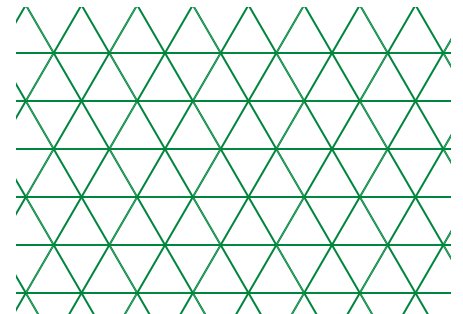
The unique skills of cybersecurity professionals are in short supply and are vital to the security of businesses today and in the future. Cybersecurity is a focus of a broad range of disciplines, particularly, business and information technology.

The technologies and methods used to ensure the protection of information systems, as well as the confidentiality, integrity, and authenticity of information is the focus of the graduate certificate in Cybersecurity and Information Assurance Management. These topics and skills are priorities in the business world and are critical

to the well-being and success of all organizations.

The vast majority of cybersecurity job openings are within the private sector and exist across all industries. Cybersecurity is one of the fastest growing employment segments in IT. As technology grows and progresses, with our

devices and lives becoming more and more interconnected, the challenges of cybersecurity and information assurance will continue to grow. This presents a career to those with the necessary skills that will be exciting, rewarding, fast-paced, and highly sought after.



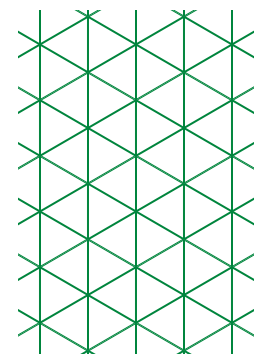
Admission requirements

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COURSE DESCRIPTIONS

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REQUIRED CORE COURSES

BUS 5910 Privacy and Information Security Law
Explores a variety of issues concerning the use, disclosure, and protection of information (personal, organizational, health, and financial) from a legal perspective. A focus on understanding, planning, protecting, and responding to data breaches and other information risk and threats. Case studies based on litigation are reviewed and analyzed.

Prerequisites: Understanding of Management Information Systems

IST 6780 Adv Human and Organizational Factors in Cybersecurity

In-depth examination of human and organizational factors in cybersecurity and information assurance. Examines current challenges to protecting the integrity, availability, and confidentiality of information, as well as tools, methods, principles, and analytics for fraud prevention, insider threat detection, and forensic investigations. Project Required.

Prerequisites: None, but recommended: IS&T 3333 or IS&T 6336 or Comp Sci 3600 or another introductory cybersecurity or information assurance course.

ELECTIVE COURSES (CHOOSE TWO)

ERP 5240 Enterprise Application Development and Software Security

This course provides conceptual foundation and hands on experience in web and mobile based (HTML5) applications development deployed through an enterprise platform. Enterprise development tools, such as SAP HANA Cloud Platform, will be used to build these apps. This course also covers software cybersecurity from a web and mobile perspective.

Prerequisites: Programming knowledge and either ERP 2110 or preceded or accompanied by ERP 5110.

IST 6335 Mobile Technology for Business

Overview of mobile technology use in business environments. Topics include: mobile industry; mobile network and wireless standards; mobile devices; mobile web design and app development; social and user experience issues; mobile marketing and commerce. Project required.

Prerequisites: IST 3333 or equivalent.

IST 6336 Foundations of Internet Computing

The foundations of Internet Computing include computer networks and Web sites. Networks are covered thoroughly and research directions for networking and information security are discussed. Web site design and research findings about site usability considerations are examined.

Prerequisites: IS&T entrance requirements, including solid programming knowledge.

IST 6641 Adv Electronic and Mobile Commerce
Fundamental concepts of management and application to IT and support of commerce. Examines the use of IT in business processes and the management issues of integrating IT into organization processes to gain a competitive advantage. Includes a major end-of-semester project.

Prerequisites: Knowledge of management information systems.

BUSINESS INTELLIGENCE

The Graduate Certificate in Business Intelligence focuses on the technologies that allow an organization to make effective business decisions based on operational data pulled together from many different sources inside an organization. The target audience consists of any individual who would manage any type of IT professionals, database administrators, business analysts, and any person who would need to understand the technologies behind their job functions.

Required Core Courses:

- ERP 5410 Use of Business Intelligence
- ERP/IST 6444 Essentials of Data Warehouses

Elective courses (choose two):

- ERP 5110 ERP Systems Design and Implementation
- ERP 5210 Perform. Dashboard, Scorecard, and Data Visualization
- ERP 6610 Adv. Customer Relationship Mgmt in ERP Environ.
- IST 6443 Information Retrieval & Analysis
- IST 6445 Database Marketing
- ERP 6220 Enterprise Performance Dashboard Prototyping

DIGITAL MEDIA

Digital media is growing as consumers change the way they access information. In fact, Jupiter Research is projecting that connected home service revenue, for homes accessing digital media, will grow from \$20 billion in 2012 to \$60 billion in 2017. Students in this certificate program will acquire the skills and knowledge to create, design and analyze digital media. The focus will be on the media itself, the social/digital network that connects these media, the interfaces that connect these media with users, and the application of these skills in business and other creative contexts. Thus this certificate program will address the pressing demand and opportunities for graduates with advanced knowledge and skills in areas such as networked communication and marketing, web-based media creation and design, and methods for designing and building effective human-media interfaces.

Required Core Course:

- IST 6654 Adv. Web and Digital Media Development

Core courses (choose two):

- IST 5885 Human-Computer Interaction
- IST 6680 Advanced Web and New Media Studies
- MKT 5310 Digital Marketing and Promotions

Elective courses (choose one):

- IST 5652 Advanced Web Development
- IST 5886 Prototyping Human-Computer Interactions

DIGITAL SUPPLY CHAIN MANAGEMENT

This certificate is designed to give the student the tools and ideas that help shape and define the various components of value creation. Students can gain knowledge and skills in the full spectrum of supply chain activities: supplier relationships, purchasing management, operations and inventory management, logistics and transportation, quality management, and information technology.

Required Core Courses:

- ERP 5110 ERP Systems Design and Implementation
- ERP 5310 Supply Chain Mgmt Systems in an ERP Environ.

Core courses (choose one):

- BUS 6425 Supply Chain and Project Management
- ME 5708 Rapid Product Design and Optimization

Elective courses (choose one):

- ERP 5410 Use of Business Intelligence
- ERP 6610 Adv. Customer Relationship Mgmt in ERP. Environ.
- ERP 6120 Erp Systems Configuration and Integration
- ME 5757 Integrated Product and Process Design
- ME 5656 Design for Manufacture
- ME 5760 Probabilistic Engineering Design
- ME 5763 Principles and Practice of Computer Aided Design

ELECTRONIC & SOCIAL COMMERCE

Social commerce is just one sub-set of e-commerce, however it is growing rapidly. According to a Forbes magazine article "The Six Pillars of Social Commerce", while the principle of social commerce has been successful since the start of E-bay, the rise of social media has contributed to its recent substantial growth. The Department of Business and Information Technology (BIT) has leveraged its' strengths in both business and technology for this certificate, which is designed to create successful students by developing skills in technological business practices that will provide opportunities for succeeding in today's fast paced world.

Required Core Courses:

- IST 6641 Advanced Electronic and Mobile Commerce

Core courses (choose one):

- BUS 6723 Corporate Information Systems Management
- IST 5251 Technological Innovation Mgmt and Leadership

Elective courses (choose two):

- IST 5652 Advanced Web Development
- IST 5168 Law and Ethics in E-Commerce
- IST 5885 Human Computer Interaction
- IST 5886 Prototyping Human-Computer Interactions
- IST 6335 Mobile Technology for Business
- IST 6445 Database marketing
- IST 6680 Advanced Web and New Media Studies
- MKT 5310 Digital Marketing and Promotions
- MKT 6580 Advanced Marketing Strategy

ENTERPRISE RESOURCE PLANNING

Corporations worldwide have focused on improving business processes for the past two decades. In fact, while most Fortune 500 companies have already adopted Enterprise Resource Planning (ERP) systems, now many midsize companies are also planning ERP implementations. With a commitment to keep pace with these changes in business processes and technology, the University of Missouri system joined SAP's™ University alliance and Microsoft's™ University Alliance programs in order to continue and expand classroom capabilities for integrating ERP software into the curriculum.

ERP can be viewed as a combination of business management practice and technology, where Information Technology integrates with a company's core business processes to enable the achievement of specific business objectives. This certificate prepares students for positions as both technical and business consultants in the ERP field.

Required Core Courses:

- ERP 5110 ERP Systems Design and Implementation
- ERP 6120 ERP Systems Configuration and Integration

Elective courses (choose two):

- ERP 5240 Enterprise Portal and Mobile Application Development
- ERP 5410 Use of Business Intelligence
- ERP 5310 Supply Chain Management Systems in an ERP Environment
- ERP 5210 Performance Dashboard, Scorecard and Data Visualization
- ERP 5510 ERP Systems Administration
- ERP 6610 Adv. Customer Relationship Mgmt in ERP Environment
- ERP/IST 6444 Essentials of Data Warehouses
- ERP 6220 Enterprise Performance Dashboard Prototyping

ENTREPRENEURSHIP & TECHNOLOGICAL INNOVATION

Change and growth in Missouri and America require the training, nourishing, and flourishing of entrepreneurs. Many college students, however, do not yet recognize the entrepreneurial spirit in themselves. While these students are not sure if they have what it takes to drive innovation, recent entrepreneurship research indicates that many of the skills and much of the knowledge of successful entrepreneurs can be developed and taught in the classroom. The Department of Business and Information Technology has created this certificate to spark the entrepreneurial spirit in the students of Missouri S&T, and provide them with a solid foundation on which to build.

Required Core Courses:

- BUS 5980 Business Models for Entrepreneurship and Innovation
- MKT 5310 Digital Marketing and Promotions

Elective courses (choose two):

- BUS 5580 Strategic Management
- BUS 6150 Advanced Customer Focus and Satisfaction
- IST 5251 Technological Innovation Management and Leadership
- IST 6654 Advanced Web and Digital Media Development
- IST 5886 Prototyping Human Computer Interactions
- IST 6335 Mobile Technology for Business

HUMAN-COMPUTER INTERACTION & USER EXPERIENCE

There is a growing demand within industry for workers with expertise in human-computer interaction (HCI), who generally hold titles such as interface designer; usability researcher analyst; usability engineer; user experience specialist; or information architect. HCI specialists bridge the gap in organizations between groups who build the technologies and groups who use the technologies.

This certificate prepares students for positions as HCI specialists, and provides working IT professionals with additional skills to aid in the design and evaluation of usable systems.

Required Core Courses:

- IST 5885 Human-Computer Interaction
- IST 5886 Prototyping Human-Computer Interactions
- IST 5887 Human-Computer Interaction Evaluation

Elective courses (choose one):

- IST 6680 Advanced Web and New Media Studies
- IST 6887 Research Methods in HCI

MANAGEMENT & LEADERSHIP

The Department of Business and Information Technology created this certificate in order to better enable students to manage through the use of technology. Understanding technology is becoming ever more critical in business as a tool used by efficient and effective managers. These leaders not only understand the managerial process and how to inspire others as a true leader, but also how to harness technology to expedite the process.

This certificate is designed to prepare students to be the leaders of the future. It does so by incorporating management theories, technological savvy and leadership skills to create a student who is ready for the challenges of a fast paced managerial position.

Required Core Course:

- BUS 6121 Team-building and Leadership

Elective courses (choose three):

- BUS 5580 Strategic Management
- IST 5251 Technological Innovation Mgmt and Leadership
- IST 6261 Adv. Information Systems Project Management
- IST/PHILOS 5168 Law and Ethics in E-Commerce
- BUS 6111 Business Negotiations
- MKT 6150 Advanced Customer Focus and Satisfaction
- BUS 5470 Human Resource Management
- EMGT 5320 Project Management

MOBILE BUSINESS & TECHNOLOGY

Interest in the use of mobile technology among organizations has seen a strong, upward trend over the past few years. The proliferation of smart phone and tablet devices has presented organizations with new challenges in creating and developing a coherent strategy associated with this innovation. In order to create this strategy, organizations need an understanding of the mobile industry in general and specific technologies supporting the trend. People capable of creating and maintaining mobile technology strategies are needed, but the in-depth education necessary for these people is limited.

This certificate is designed to cover the mobile industry as well as the technologies, devices, operating systems, user interface design, and tools of mobile applications. The focus will be on the mobile industry and technologies that allow an organization to make decisions in this dynamic domain.

Required Core Courses:

- ❑ IST 6335 Mobile Technology for Business
- ❑ ERP 5240 Enterprise Portal and Mobile Application and Development

Elective courses (choose two):

- ❑ ERP 5310 Supply Chain Mgmt Systems in an ERP Environment
- ❑ ERP 5210 Performance Dashboard, Scorecard, and Data Visualization
- ❑ ERP 6610 Adv. Customer Relationship Mgmt in ERP Environment
- ❑ IST 5886 Prototyping Human-Computer Interactions
- ❑ IST 5652 Advanced Web Development

INFORMATION TECHNOLOGY PROJECT MANAGEMENT

This certificate aims to equip students with a set of tools that will allow them to understand Project Management Institute (PMI) standards in the project management area, to successfully manage resources, and to analyze, evaluate, and improve complex projects. Project managers are in demand and the department's mission of blending business and technology allows graduates to perform in this role.

Required core courses:

- ❑ IST 6261 Adv. Information Systems Project Management
- ❑ EMGT 5320 Project Management
- ❑ EMGT 6322 Case Studies in Project Management
- ❑ EMGT 6323 Global Project Management

BUSINESS PROJECT MANAGEMENT

Project managers identify problems, make sound decisions, and organize and manage complex projects. This certificate aims to equip students with a set of tools that will allow them to understand Project Management Institute (PMI) standards in the project management area, to successfully manage resources, and to analyze, evaluate, and improve complex projects.

Required core courses:

- ❑ BUS 6425 Supply Chain and Project Management
- ❑ BUS 6723 Corporate Information Systems Management
- ❑ EMGT 5320 Project Management
- ❑ EMGT 6322 Case Studies Project Management

