Big Data Emphasis Areas of Study

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Missouri S&T is Certified by the National Security Agency (NSA) Committee on National Security Systems (CNSS) for National Standards 4011 (National Training Standard for Information Systems Security (INFOSEC) Professionals) and 4014E (Information Assurance Training Standard for Information Systems Security Officers (ISSO)).

Admissions Requirements
Graduate certificate programs are open to all individuals who hold a bachelor’s, master’s or Ph.D. degree and who have a minimum of 12 months of post-BS professional employment experience. Students must satisfy the prerequisites for any course they take in a program. A student who completes a graduate certificate program with grades of “B” or better in all four courses, may be admitted into the corresponding master’s degree program without having to take the GRE. Check with department for details.

Course Delivery
Unless otherwise noted, courses are delivered over the Internet via live streaming video, with live collaboration software, archived class recordings, and Blackboard learning management system. Classes are archived online for review and easy access.
Big Data Management and Analytics
Department of Computer Science
This is a specialized graduate certificate program to teach practicing computing professionals and graduate students the skills that are necessary for the use and development of big data management, big data analytics, data mining, cloud computing, and business intelligence.

Curriculum*
The following courses are required:
- COMP SCI 5001 (401) Introduction to Data Mining
- COMP SCI 6001 (401) Cloud Computing

One of the following courses is required:
- IST 3001 (301) Introduction to Big Data Analytics
- COMP ENG 6330 (439) / ELEC ENG 6340 (439) / SYS ENG 6214 (439) / COMP SCI 6300 (439)
- STAT 6239 (439) Clustering Algorithms
- ERP 5410 (345) Use of Business Intelligence

The following courses are required:
- COMP SCI 6302 (438) Heterogeneous and Mobile Databases
- COMP SCI 6301 (437) Web Data Management and XML
- COMP SCI 6302 (438) Heterogeneous and Mobile Databases

One of the following courses is required:
- COMP SCI 5001 (401) Introduction to Data Mining
- COMP ENG 6330 (439) / ELEC ENG 6340 (439) / SYS ENG 6214 (439) / COMP SCI 6300 (439)
- STAT 6239 (439) Clustering Algorithms
- ERP 5410 (345) Use of Business Intelligence

The following courses are required:
- ERP 5110 (346) Systems Design and Implementation
- ERP 5210 (348) Strategic Enterprise Management Systems
- ERP 5610 (422) Customer Relationship Management in ERP Environment
- IST 6443 (443) Information Retrieval & Analysis
- IST 6445 (445) Database Marketing or ERP 6220 (448) Strategic Enterprise Management System Configuration

Big Data Analytics and Data Science
Department of Business and Information Technology
This is an emerging phenomenon. Data analytics facilitates realization of objectives by identifying trends, creating predictive models for forecasting, and utilizing business processes for enhanced performance. This graduate certificate program will look at three main categories of analytics: descriptive, prescriptive, and predictive.

The following course is required:
- IST 3001 (301) Introduction to Big Data Analytics

One of the following courses is required:
- ERP 5410 (345) Use of Business Intelligence
- ERP 5410 (345) Use of Business Intelligence
- COMP SCI 6001 (401) Cloud Computing
- COMP SCI 5001 (401) Introduction to Data Mining
- COMP SCI 6302 (438) Heterogeneous and Mobile Databases

One of the following courses is required:
- ERP 5110 (346) Systems Design and Implementation
- ERP 5210 (348) Strategic Enterprise Management Systems
- ERP 5610 (422) Customer Relationship Management in ERP Environment
- IST 6443 (443) Information Retrieval & Analysis
- IST 6445 (445) Database Marketing or ERP 6220 (448) Strategic Enterprise Management System Configuration

Business Intelligence
Department of Business and Information Technology
This graduate certificate program teaches the technologies that allow an organization to make effective business decisions based on operational data pulled together from many different sources inside an organization. This certificate is for IT professionals, database administrators, business analysts, and any person who would need to understand the technologies behind the capabilities of those technologies.

Curriculum*
The following two courses are required:
- ERP 5110 (346) Systems Design and Implementation
- ERP 5210 (348) Strategic Enterprise Management Systems
- ERP 5610 (422) Customer Relationship Management in ERP Environment
- IST 6443 (443) Information Retrieval & Analysis
- IST 6445 (445) Database Marketing or ERP 6220 (448) Strategic Enterprise Management System Configuration

Computational Intelligence
Department of Computer Engineering, Department of Computer Science, and Department of Systems Engineering
This graduate certificate program provides practicing engineers the opportunity to develop the necessary skills in the use and development of computational intelligence algorithms based on evolutionary computation, neural networks, fuzzy logic, and complex systems theory. Engineers can also learn how to integrate common sense reasoning with computational intelligence elective courses such as data mining and knowledge discovery.

Information Assurance & Security Officer Essentials
Department of Computer Science and Department of Electrical and Computer Engineering
Protecting information systems is key to protecting the nation's critical infrastructures. Only through diligence and a well-trained workforce will we be able to adequately defend the nation's vital information resources. (continued)

*Missouri S&T courses are being updated to a new four digit numbering system that will take effect this fall. To help with the transition, the old course numbers are listed in parentheses next to the new numbers. Please consult the course catalog for more details.

Credit earned for a certificate program may be applied toward the corresponding master's degree. See admissions requirements for more details.