Information Systems Management

Building on more than 30 years of innovative graduate education and professional development programs in information technology, the McKelvey School of Engineering at Washington University in St. Louis now offers a 30-unit Master of Information Systems Management. This new program combines the best of two very successful programs that have attracted students from across the world: the Master of Information Systems and the Master of Information Management.

This integrated program is a key component of Washington University's strategy to prepare the next generation of technology leaders. Offered through the Sever Institute, the 30-unit Master of Information Systems Management brings together candidates with interests and backgrounds in technology and management into a blend of outstanding courses led by Washington University faculty and industry leaders in information, systems, management and leadership. Students may pursue the program full-time or part-time. A 15-unit Graduate Certificate in Information Systems Management is also offered and can be transferred into the degree program at any time.

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Faculty

Program Director
Director of Graduate Studies, Information Systems Management
MBA, University of Missouri
MS, Information Systems, University of Missouri
MA, Applied Mathematics, University of Missouri
BS, University of Evansville

For a list of our program faculty (https://sever.wustl.edu/faculty/#information_systems_management), please visit our website.

Requirements

Master of Information Systems Management

Total units required: 30

In order to earn the degree/certificate, all courses must be passed with a C- or higher. In addition, a student must have a cumulative grade-point average of at least 2.70 over all courses applied toward the degree/certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CYBER 559</td>
<td>Introduction to Cybersecurity*</td>
<td>3</td>
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<tr>
<td>INFO 517</td>
<td>Operational Excellence &amp; Service Delivery</td>
<td>3</td>
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<tr>
<td>INFO 540</td>
<td>IT Architecture &amp; Infrastructure*</td>
<td>3</td>
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<td>INFO 563</td>
<td>IT Governance &amp; Risk Management*</td>
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<td>INFO 575</td>
<td>Enterprise Data Management*</td>
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<tr>
<td>INFO 585</td>
<td>Capstone</td>
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Electives: Choose 12 units

Cybersecurity Emphasis

- CYBER 560 | Cybersecurity Technical Fundamentals                 | 3     |
- CYBER 561 | Oversight for Excellence: Cybersecurity Management and Governance | 3     |
- CYBER 562 | Efficient and Effective Cybersecurity Operations      | 3     |
- CYBER 567 | The Hacker Mindset: Cyber Attack Fundamentals         | 3     |

Management Emphasis

- ETEM 504 | Engineering Management & Financial Intelligence      | 3     |
- ETEM 505 | Decision Analysis & Optimization                      | 3     |
- ETEM 582 | Human Performance in the Organization                 | 3     |
- ETEM 587 | Communication Excellence for Influential Leadership  | 3     |
- INFO 570 | Leadership Seminar for Technology Professionals       | 3     |

Applied Data Analytics & Machine Learning Emphasis

- INFO 552 | Special Topics in Information Technology             | 3     |
- INFO 558 | Applications of Deep Neural Networks                 | 3     |
- INFO 574 | Foundations of Analytics                             | 3     |
- INFO 576 | Analytics Applications                                | 3     |
- INFO 577 | Applied Data Science for Practitioners               | 3     |

Mathematical Data Analytics Emphasis

- CSE 412A | Introduction to Artificial Intelligence              | 3     |
- CSE 417T | Introduction to Machine Learning                     | 3     |
- CSE 514A | Data Mining                                          | 3     |
- CSE 517A | Machine Learning                                     | 3     |
- ESE 415  | Optimization                                         | 3     |
for Information and Related Technology (COBIT). Through the application of continuous service improvement, students will understand the IT service life cycle and be able to assess the effectiveness of processes and services. Credit 3 units.

**T81 INFO 540 IT Architecture & Infrastructure**
This course will demonstrate the importance of understanding organizational strategies and goals and then designing and deploying an information technology (IT) infrastructure that supports those strategies and goals. The course will showcase how fundamental IT building blocks are integrated in meaningful ways in order to support IT services that drive core business outcomes. Through a hands-on enterprise architecture design project, students will learn to design IT infrastructure in a rational, innovative, and cost-effective manner. We will cover a range of enterprise architecture design considerations that are commonly faced by organizations as they enhance their services, launch new products, or expand to new markets. Credit 3 units.

**T81 INFO 552 Special Topics in Information Technology**
The material for this course varies among offerings, but this course generally covers advanced or specialized topics in emerging topics in information technology, data science, and cybersecurity. Credit 3 units.

**T81 INFO 558 Applications of Deep Neural Networks**
Deep learning is a group of exciting new technologies for neural networks. Through a combination of advanced training techniques and neural network architectural components, it is now possible to create neural networks of much greater complexity. Deep learning allows a neural network to learn hierarchies of information in a way that is like the function of the human brain. This course will introduce the student to computer vision with Convolution Neural Networks (CNN), time series analysis with Long Short-Term Memory (LSTM), classic neural network structures and application to computer security. High Performance Computing (HPC) aspects will demonstrate how deep learning can be leveraged both on graphical processing units (GPUs), as well as grids. Focus is primarily upon the application of deep learning to problems, with some introduction mathematical foundations. Students will use the Python programming language to implement deep learning using Google TensorFlow and Keras. It is not necessary to know Python prior to this course; however, familiarity of at least one programming language is assumed. This course will be delivered in a hybrid format that includes both classroom and online instruction. Recommended completion of T81 577. Credit 3 units.

**T81 INFO 563 IT Governance & Risk Management**
Firms with superior IT governance designed to support the organization's strategy achieve better performance -- and higher profits -- than firms with poor (or no) governance. Just as corporate governance aims to ensure quality decisions about all corporate assets, IT governance links IT decisions with company objectives and monitors performance and accountability. This course shows how the design and implementation of an IT governance system can transform IT from an expense to a profitable investment. Essential to IT governance is risk management. In this regard, students will learn key aspects of managing risk, including risk identification, risk quantification,
risk monitoring, risk control, and risk mitigation. Particular focus is placed on project risk management and understanding the process of risk identification, assessment, prevention, mitigation, and recovery. The course will also cover the roles of IT governance, auditing, and control of the confidentiality, integrity, and availability of data.

Credit 3 units.

T81 INFO 570 Leadership Seminar for Technology Professionals
This seminar is designed to develop the leadership capacity of professionals working in the information technology (IT) and cybersecurity fields. Although domain expertise plays an important role in the success of a technology professional, it is when this expertise is integrated with the ability to lead people that transforms the merely competent into multidimensional force multipliers for the organization. In this course, students will participate in an immersive seminar-based learning experience targeted toward professional and personal development on a range of essential leadership skills. Students will benefit from interaction with industry experts in the IT and cybersecurity fields and receive coaching support to achieve professional and personal goals. Each student will complete a series of self-assessments and multi-rater assessments as well as a personal leadership development plan to gain insight and build competencies critical to effective leadership. Topics include creating a shared vision, strategy development, building and sustaining a healthy culture, essentials of finance and budgeting, driving results, energizing people for performance, innovation, emotional intelligence, navigating organizational politics, managing up, negotiations, stress resilience, talent coaching and development, effective communication, and time management.

Credit 3 units.

T81 INFO 574 Foundations of Analytics
The steeply decreasing costs of gathering, storing, and processing data have created a strong motivation for organizations to move toward "data-driven" approaches to problem solving. As such, data analytics continues to grow rapidly in importance across industry, government, and nonprofit organizations. This course seeks to equip students with a wide range of data analytics techniques that serve as the foundation for a broad range of applications, including descriptive, inferential, predictive, and prescriptive analytics. Students will learn the process of building a data model as well as a variety of analytics techniques and under what situations they are best employed. Through lectures and practical exercises, students will become familiar with the computational mathematics that underpin analytics; the elements of statistical modeling and machine learning; model interpretation and assessment; and structured and unstructured data analysis. Students will also undertake a project to build an analytical model using a "real-world" data set.

Credit 3 units.

T81 INFO 575 Enterprise Data Management
Organizations have begun generating, collecting, and accumulating more data at a faster pace than ever before. The advent of "Big Data" has proven to be both opportunity and challenge for contemporary organizations who are awash in — even drowning in — data but starved for knowledge. Unfortunately, organizations have not developed comprehensive enterprise data strategy and management (EDM) practices that treat data as a strategic imperative. EDM is a comprehensive approach to defining, governing, securing, and maintaining the quality of all data involved in the business processes of an organization. EDM enables data-driven applications and decision making by establishing policies and ownership of key data types and sources. The ultimate goal is to create a strategic context for the technology underpinnings of data life cycle management and to ensure good stewardship of an organization's data. This course will cover the critical components of building an enterprise data strategy, including but not limited to data strategy, data governance, data security, data architecture, data quality, data ownership, and metadata management.

Credit 3 units.

T81 INFO 576 Analytics Applications
This course builds on the content taught in Enterprise Data Management and Foundations of Data Analytics. It focuses on the strategic, operational, tactical, and practical use of data analytics to inform decisions within an organization across a range of industry and government sectors as well as within organizational functions. Students will be introduced to specific analytics techniques that are used currently by practitioners in areas of diagnostic, descriptive, predictive, and prescriptive analytics. Students will learn the critical phases of analytics including data preparation, model development, evaluation, validation, selection, and deployment. In so doing, students will learn to apply data analytics in order to optimize organizational processes, improve performance, and inform decision-making. Recommended completion of T81 574.

Credit 3 units.

T81 INFO 577 Applied Data Science for Practitioners
Organizations are rapidly transforming the way they ingest, integrate, store, and serve data and perform analytics. In this course, students will learn the steps involved with designing and implementing data science projects. Topics addressed include ingesting and parsing data from various sources, dealing with messy and missing data, transforming and engineering features, building and evaluating models, and visualizing results. Using Python as well as tools such as Numpy, Pandas, and Scikit-learn, students will complete a practical data science project that addresses the entire design and implementation process. Students will also become familiar with the best practices and current trends in data science, including writing elegant code, documenting and version controlling, creating reproducible research in container platforms, and working in a cloud environment. Upon completion of the course, students will emerge equipped with data science knowledge and skills that can be applied from day one on the job. Recommended completion of T81 INFO 574.

Credit 3 units.

T81 INFO 585 Capstone
This capstone course is the culmination of the Masters of Information Systems Management program. The capstone project provides the opportunity for students to employ the knowledge and skills they have gained from their course work in a rigorous and systematic manner. Projects are sponsored by external corporate, government, and non-profit organizations, and they provide the opportunity for students to deliver meaningful research and recommendations for "real-world" IT challenges and problems.

Credit 3 units.
T81 INFO 599 Applied Research Study
Applied Research Study (ARS) is an advanced, project-based course designed to allow students to develop in-depth knowledge and further their education building on the education offered in the Programs. Applied research is a type of examination looking to find practical solutions for existing problems. These can include challenges in the workplace, education, and society. Students collaborate with an adjunct faculty advisor to collect data. Findings are applicable and may be implemented upon completion of a study. Applied research focuses on answering one specific applied research question for a client or sponsor. Applied Research Study must have prior approval of a faculty sponsor and the Program Director. Credit 3 units.