Master of Information Systems Management

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                          information-systems/index.html

Courses

INFO 5509 Fundamentals of Information Technology

This course is designed to provide a comprehensive survey of the information technology field. The enterprise relies heavily on information technology to generate value, efficiency, and effectiveness. As such, organizational leaders must ensure that the enterprise transforms to keep pace in the competitive environment. Globalization, mergers and acquisitions, and the proliferation of new business and operating models require management to continuously reconsider technology infrastructures, organizational structures, process re-engineering, outsourcing, innovation, technology effectiveness, and the creation and management of data and knowledge. Given these challenges and opportunities, the IT professional has never been more crucial to organizational success. In this context, students will become familiar with core IT concepts, processes, and technology and gain an increased understanding of the crucial role of IT in the modern enterprise.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5517 Operational Excellence & Service Delivery

This course examines needed management skills and processes for the efficient and effective functioning of IT infrastructure and operational environments to deliver the right set of services, at the right quality, and at the right costs for internal and external users and customers. Specific emphasis is placed on understanding the roles of IT operations including system administration, network administration, help desk services, asset management, DevOps, and reporting. Students will study the application of industry best practice frameworks for the management of information technology infrastructure, operations, and development. Frameworks covered include the Information Technology Infrastructure Library (ITIL) and Control Objectives for Information and related Technology (COBIT). Through the application of continuous service improvement, students will understand the IT service lifecycle and will be able to assess the effectiveness of processes and services.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5521 Special Topics: Principles of Software Design & Architecture

Software applications harness the power of IT infrastructure to deliver powerful capabilities to users enabling them to transact with accuracy and efficiency. Software applications take on many forms such as web applications, mobile apps, and eCommerce sites, which are taken for granted by the users, business and consumers. However, developing, deploying, and maintaining secure and scalable commercial software applications is a complicated task, which if not managed correctly, can result in significant financial losses and waste of time. In this class students learn how to architect and design software taking into account business drivers and important attributes such as availability, performance, scalability, reliability, and security, and trade-offs between different design objectives. We discuss various topics from software lifecycle management to integration of applications. Contemporary topics like CI/CD pipelines, application containerization, serverless architecture are also discussed in detail. Through class lectures, discussions, assignments, case studies, and group projects, students will build a solid understanding of application architectures and frameworks. Given the depth of topics covered, some level of prior programming experience is helpful but is not a requirement for this course.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5540 IT Architecture & Infrastructure

This course will demonstrate the importance of understanding organizational strategy and goals, then designing and deploying an IT infrastructure that supports that strategy and those 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 commonly faced by organizations as they enhance their services, launch new products, or expand to new markets. There is a $15/student fee that covers the cost of transportation for the Washington University's Medical School data center tour. Students are also required to use their own method of payment for the Azure course materials ($150-$200).

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5552 Special Topics in Block Chain

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.

Typical periods offered: Fall, Spring, Summer

INFO 5558 Applications of Deep Neural Networks

Deep learning is a group of exciting new technologies for neural networks. It is now possible to create neural networks of much greater complexity through a combination of advanced training techniques and neural network architectural components. 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), transformers, large language models (LLMs), and classic neural network structures. The focus is primarily on applying deep learning to problems, with some introduction to mathematical foundations. High-Performance Computing (HPC) aspects demonstrate how one can leverage deep learning on graphical processing units (GPUs). Students will use Python to implement deep learning using PyTorch and other libraries. It is unnecessary to know Python before this course; however, familiarity with at least one programming language is assumed. We deliver this course in a hybrid format, including classroom and online instruction.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5559 Applications of Generative AI and Large Language Models

This course covers the dynamic world of Generative Artificial Intelligence providing hands-on practical applications of Large Language Models (LLMs) and advanced text-to-image networks. Using Python as the primary tool, students will interact with OpenAI's models for both text and images. The course begins with a solid foundation in generative AI principles, moving swiftly into the utilization of LangChain for model-agnostic access and the management of prompts, indexes, chains, and agents. A significant focus is placed on the integration of the Retrieval-Augmented Generation (RAG) model with graph databases, unlocking new possibilities in AI applications. As the course progresses, students will delve into sophisticated image generation and augmentation techniques, including LoRA (Low-Rank Adaptation), and learn the art of fine-tuning generative neural networks for specific needs. The final part of the course is dedicated to mastering prompt engineering, a critical skill for optimizing the efficiency and creativity of AI outputs. Ideal for students, researchers, and professionals in computer science or related fields, this course offers a transformative learning experience where technology meets creativity, paving the way for innovative applications in the realm of Generative AI. Note: This course will require the purchase of up to $100 in OpenAI API credits to complete the course.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5563 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. We will start with developing an understanding of IT governance and go over the decision-rights and decision-making processes associated with it. We will study various enterprise operating models and strategies and see how they in turn determine the IT strategy and operating model. We will also review practices to provide business oversight and transparency into IT investments and go over how IT leaders can proactively partner with other business leaders to drive top-line growth and/or operational cost savings. We will also review how to classify initiatives into projects and programs and group them into portfolios. Furthermore, we will discuss different project implementation approaches, ranging from waterfall to agile methodologies. We will also cover how many IT departments are transitioning towards a more productized delivery model. Finally, we will also review technology selection processes, architectural governance, procurement of products and services, as well as service and vendor management. Throughout this process, we will be reviewing decision-making from the perspective of both leveraging business opportunities and managing risk. Risk management is an essential component of an IT leader's role. We will cover the risk management process and use it to identify and manage & control some of the common risks that contemporary IT organizations face. This includes guarding against cyber threats, protecting data, and managing vendor, business continuity, regulatory, project, and operational risks etc.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5574 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 dataset.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5575 Enterprise Data Management

In the 4th Industrial Revolution of Digital Transformation, Data is a key and necessary foundational element. Enterprise Data Management is the responsibility and opportunity to effectively utilize data and make it useful to achieve organizational goals. 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 an opportunity and challenge for organizations who are awash, even drowning-in data, but starved for knowledge. Unfortunately, many organizations have not developed comprehensive enterprise data management (EDM) practices that treat data as a true organizational asset. EDM is a comprehensive approach to defining, governing, securing, and maintaining the access & quality of the right data involved in the business processes of an organization. This course will cover many aspects of building an enterprise data management program, including areas such as data governance, data security, data architecture, data quality, data ownership, metadata management, data strategy, and others.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5576 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.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5577 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.

Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5985 Capstone

The 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 coursework in a rigorous and systematic manner. Projects are sponsored by external corporate, government, and non-profit organizations and provide the opportunity to deliver meaningful research and recommendations for "real-world" IT challenges and problems. In order to protect sponsoring company's interests, students may be required to sign an NDA (non-disclosure agreement) to participate in this course.
Credit 3 units.

Typical periods offered: Fall, Spring, Summer

INFO 5998 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.

Typical periods offered: Fall, Spring, Summer