

# INFORMATION SYSTEMS

## Lam Family College of Business

Dean: Dr. Eugene Sivadas

### Department of Information Systems

BUS 310

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Chair: Dr. Leigh 'Lei' Jin

Undergraduate Advisors: Tai-Yin Chi, Guillaume Faddoul, Leigh Jin, Nasrin Mohabbati, Lutfus Sayeed, Nasser Shahrasbi, Sameer Verma

Information Systems prepares students for the rapidly evolving digital landscape and enables them to identify information needs and delivery systems within business organizations and define the business and organizational context of information systems. The comprehensive program delivers expertise in artificial intelligence, machine learning, Python programming, and data analytics alongside essential skills in business application development, project management, and application analysis and design. Students master data management, network administration, and security management. These skill sets and competencies are increasingly critical as organizations undergo digital transformation. With the explosive growth in AI adoption and data-driven decision-making, IS graduates are uniquely positioned for high-demand roles such as AI/ML business analysts, data specialists, database designers/analysts/administrators, network administrators, security analysts, and digital transformation managers. The concentration emphasizes technical knowledge of information system components and infrastructure and how to apply them in business applications. It also helps graduates develop essential soft skills in communication and leadership and prepares graduates to effectively manage diverse teams and complex projects while fostering a mindset of lifelong learning and professional growth.

### Professor

Leigh Jin (2001), *Professor in Information Systems*. Ph.D. Georgia State University.

Lutfus Sayeed (1996), *Professor in Information Systems*. Ph.D. Georgia State University.

Sameer Verma (1999), *Professor in Information Systems*. Ph.D. Georgia State University.

### Associate Professor

Guillaume Faddoul (2018), *Associate Professor in Information Systems*. Ph.D. Claremont Graduate University.

Nasser Shahrasbi (2022), *Associate Professor in Information Systems*. Ph.D. HEC Montréal.

### Assistant Professor

Tai-Yin Chi (2018), *Assistant Professor in Information Systems*. Ph.D. Claremont Graduate University.

Nasrin Mohabbati (2023), *Assistant Professor in Information Systems*. Ph.D. Auburn University.

### Major

- Bachelor of Science in Business Administration: Concentration in Information Systems (<https://bulletin.sfsu.edu/colleges/business/information-systems/bs-business-administration-concentration-information-systems/>)
- Bachelor of Science in Business Administration: Concentration in Business Analytics (<https://bulletin.sfsu.edu/colleges/business/decision-sciences/bs-business-administration-concentration-business-analytics/>)

### Minor

- Minor in Information Systems (<https://bulletin.sfsu.edu/colleges/business/information-systems/minor-information-systems/>)

### Certificate

- Certificate in Information Technology Auditing (<https://bulletin.sfsu.edu/colleges/business/information-systems/certificate-information-technology-auditing/>)
- Certificate in Cybersecurity Management (<https://bulletin.sfsu.edu/colleges/business/information-systems/certificate-cybersecurity-management/>)

### Graduate Certificate

- Graduate Certificate in Enterprise Cybersecurity (<https://bulletin.sfsu.edu/colleges/business/information-systems/gct-enterprise-cybersecurity/>)
- Graduate Certificate in Enterprise Information Systems (<https://bulletin.sfsu.edu/colleges/business/information-systems/certificate-enterprise-information-systems/>)

#### ISYS 198 Information Systems Spreadsheet Make-Up (Unit: 1)

Prerequisite: Permission of the instructor.

Additional study to make up the spreadsheet component of otherwise equivalent courses in order to receive full credit. (CR/NC grading only)

#### ISYS 263 Introduction to Information Systems (Units: 3)

Examine how artificial intelligence, data, and digital systems reshape Information Technology (IT) and Information Systems (IS) in business, society and everyday life. Topics include AI, databases, networking, hardware, mobile and cloud systems, software applications, cybersecurity, and ethical AI. Prepare to solve real-world problems and make data-informed decisions in global contexts and develop skills for success in college, careers, and a rapidly changing global tech landscape through the use of hands-on simulations and projects, including Excel and generative AI tools.

#### Course Attributes:

- 4: Social/Behavioral Sciences
- D1: Social Sciences
- Global Perspectives

**ISYS 350 Building Business Applications (Units: 3)**

Prerequisite: ISYS 263 with a grade of C- or better.

Discover the power of Python, a programming language that fuels business innovation through technologies such as Artificial Intelligence. Explore essential coding concepts, practical problem-solving techniques, and hands-on exercises grounded in real-world business contexts. Develop efficient code with AI assisted tools, perform data analysis, and create applications that enhance core business functions including data-driven decision-making and business intelligence. Apply Python in machine learning and data analytics to address complex business challenges and create value for customers.

**ISYS 363 Information Systems for Management (Units: 3)**

Prerequisite: ISYS 263\* with a grade of C- or better or Statistics majors.

Explore how businesses create value in a world powered by information systems. Examine the role of management information systems (MIS) in decision-making, collaboration, and digital transformation across all areas of business. Learn how organizations use data, analytics, artificial intelligence, and cloud computing to enhance performance and customer experience. Includes hands-on projects with Microsoft Excel (MOS certification option), Salesforce CRM, AI prompt engineering, and agentic AI. Emphasis on both opportunities and risks of digital transformation.

**ISYS 412 Application Development for Data Analytics (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

Development of business applications in Python with an emphasis on data analytics using Pandas library, graphical tools, and model development. AI-assisted programming tools will be included to enhance coding efficiency.

**ISYS 463 Information Systems Analysis and Design (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better or Statistics majors.

Be immersed in the analysis, design, and development of modern information systems through a hands-on, learn-by-doing approach. Explore Agile methodologies alongside structured and object-oriented techniques, applying them to real-world scenarios. Engage with cutting-edge technologies, including cloud computing, open-source e-commerce platforms, and blockchain security. Experiment with AI-powered tools for system modeling, process automation, and software development. Through interactive exercises and projects, develop practical expertise in designing efficient, secure, and scalable systems, preparing for careers in IT consulting, business analysis, and system development.

**ISYS 464 Managing Enterprise Data (Units: 3)**

Prerequisites: ISYS 363 with a grade of C- or better.

In-depth exploration of database systems and their foundational role in modern business operations processing multimodal data. Covers relational database design principles including tables, keys, and relationships, with emphasis on normalization techniques for optimal data organization. Gain practical experience through hands-on projects with SQL querying, create functional database projects for business applications, and explore emerging architectures, including NoSQL and vector databases, that power modern AI language models and agentic AI innovations. (Plus-minus letter grade only)

**ISYS 475 Building Web Applications with Open Source Software (Units: 3)**

Prerequisites: ISYS 363 and ISYS 350 with grades of C- or better.

Concepts, techniques, and tools to develop Internet-oriented business application systems with emphasis on the web.

**ISYS 556 Building Mobile Business Applications (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

Master the fundamentals of iOS development with hands-on experience with Xcode, Swift, and SwiftUI. Explore advanced frameworks, including MapKit, External APIs with JSON parsing, data modeling in SwiftData, data visualization using Swift Charts, and Generative AI powered by Apple Foundation Models. Leverage AI-assisted coding tools to transform learning to code into an exciting, effortless adventure. Introduce Design Thinking method to ideate, prototype, and refine innovative mobile applications that solve real-world business challenges with creativity and impact. Prepare for careers in UI/UX design, mobile app development, quality assurance testing, product management, and tech entrepreneurship.

**ISYS 565 Managing Enterprise Networks (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

Fundamentals of network management in the enterprise context, focusing on understanding the role of networks in a heterogeneous IT environment and addressing challenges such as standards, interoperability, and network management. Addresses various models, protocols, hardware, software, and networking approaches for implementing effective information systems infrastructure in a contemporary enterprise. Covers standard approaches to sourcing, acquiring, and implementing networks, with the knowledge to manage networks effectively in a diverse IT ecosystem.

**ISYS 567 Information Systems Internship (Units: 3)**

Prerequisites: ISYS 363; completed an application form; a minimum GPA of 3.0 in ISYS courses; permission of the instructor.

Provides Information Systems majors the opportunity to participate in a field experience in their chosen concentration. Major report required.

**Course Attributes:**

- Internship Component Req./Opt.

**ISYS 568 Multimedia Business Applications Development (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

Learn to develop multimedia-rich applications to drive business performance, boost customer engagement, and elevate user experiences. Gain hands-on experience in content creation and software development, learning to seamlessly integrate voice, image, video, and extended reality (XR) content into web and mobile platforms. Explore the power of AI tools to design high-quality multimedia assets and build dynamic, interactive business applications. Prepare for careers in UI/UX design, digital content creation, multimedia app development, product management, and tech entrepreneurship.

**ISYS 569 Information Systems for Business Process Management (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better or Statistics majors.

Explore how Enterprise Resource Planning (ERP) systems enable business process integration across organizations. Gain hands-on experience with SAP ERP (S/4HANA) while examining procurement, production, fulfillment, and financial management. Analyze real-world business process challenges through case studies and compare SAP with a non-SAP ERP system to understand broader applications. Discover the role of Agentic AI in Business Process Management (BPM) and explore emerging technologies for extending BPM, such as AI Agent platforms (e.g., n8n, crewAI) and GenAI tools like ChatGPT, Gemini, and Copilot. (Plus-minus letter grade only)

**ISYS 573 Generative Artificial Intelligence (Gen AI) and Large Language Models (LLMs) for Business (Units: 3)**

Prerequisites: ISYS 350 and ISYS 363 with grades of C- or better.

Apply Gen AI and LLMs to automate a wide range of tasks, boost efficiency, and unlock new opportunities for innovation. Deep dive into business-oriented LLMs, focusing on their implementation across various industries. Key topics include working with text data, semantic search, prompt engineering, fine tuning, retrieval-augmented generation, and deploying Gen AI and LLM solutions in practical business settings. Implement responsible AI principles for ethical development, deployment, and governance of artificial intelligence.

**ISYS 574 Artificial Intelligence (AI)/Machine Learning (ML) for Business Applications (Units: 3)**

Prerequisites: ISYS 350 and ISYS 363 with grades of C- or better.

An in-depth, project-based exploration of AI and Machine Learning (ML), from fundamentals to advanced deep learning. ML has been instrumental in breakthroughs across industries, including autonomous vehicles, search engines, genomics, medical diagnosis, image recognition, and social network analysis. Explain supervised, unsupervised, semi-supervised, and reinforcement learning techniques, applying them to real-world business challenges like price prediction, customer churn, risk assessment, and image classification. Implement the best practices for data-driven decision-making and ethical considerations in AI/ML applications.

**ISYS 575 Information Security Management (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

Basics of information security, providing a comprehensive understanding of how to protect organizational information assets from threats. Knowledge of identifying key assets, prioritizing risks, and developing an effective information security strategy and architecture. Planning for and responding to cyber attacks, as well as the legal and public relations implications of security breaches. Disaster recovery planning to ensure the safe recovery of sensitive information after a security incident.

**ISYS 650 Business Intelligence (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better or Statistics majors.

Examine how business intelligence, data analytics, and artificial intelligence (AI) convert complex data into strategic business decisions. Apply descriptive, predictive, and prescriptive analytics frameworks to generate actionable business knowledge. Practice data preparation, visual analytics, and storytelling techniques with industry-standard tools such as Tableau and SAP cloud platforms. Introduce AI foundations, including data mining, machine learning, Agentic AI, and ethical considerations such as data privacy and security. Explore Generative AI practices, including prompt engineering and tools for text, image, video, voice, and avatar generation, as well as applications for coding, app development, and research. (Plus-minus letter grade only)

**ISYS 663 Information Technology Project Management (Units: 3)**

Prerequisite: ISYS 363 with a grade of C- or better.

A comprehensive study of Information Technology project management, focusing on both technical and behavioral dimensions. Covers managing project scope, cost, time, quality, risk, human resources, communications, and procurement. Incorporates emerging Artificial Intelligence technologies and tools to enhance project delivery and decision-making. Introduces foundations of AI, prompt engineering, and the use of ChatGPT for project management. Explains how AI is transforming project management practices. Trains students in applying generative AI tools to improve productivity and streamline workflows. Includes hands-on work with industry-standard software like MS Project and SAP to effectively deliver complex technology projects and drive organizational value.

**ISYS 699 Independent Study (Units: 1-3)**

Prerequisite: Permission of the instructor, adviser, and department chair.

Intensive problem analysis under the direction of a business computer information systems faculty member. Open only to upper-division students who have demonstrated the ability to do independent work.

**ISYS 782 Information Systems for Management (Units: 3)**

Prerequisites: Restricted to graduate Business students; graduate students in other programs admitted with the permission of the Faculty Director of Graduate Programs.

A comprehensive study of Management Information Systems (MIS), focusing on a wide range of topics including the components of Information systems, IT infrastructure, IT governance, database management, software development methodologies, ethics, and practical data analysis/visualization techniques using tools like Excel. Explores emerging technologies (e.g., cloud, AI, IoT) and their implications for innovation, alongside strategies to address information security, privacy risks, and compliance. Includes hands-on labs, case studies, and career-focused modules to develop technical proficiency and articulate in-demand MIS skill sets.

**ISYS 812 Programming and Applications for Data Analytics (Units: 3)**

Prerequisites: Graduate Business students; ISYS 782 or one semester of programming. Graduate students in other programs admitted with the permission of the Faculty Director of Graduate Programs.

Development of business applications in Python with an emphasis on data analytics using Pandas library, graphical tools, and model development. AI-assisted programming tools will be introduced to enhance coding efficiency. Solve real world operational and strategic challenges through group projects. (Plus-minus letter grade only)

**ISYS 814 Information Systems for Strategic Advantage (Units: 3)**

Prerequisites: Restricted to graduate Business students; ISYS 782; Graduate students in other programs admitted with the permission of the Faculty Director of Graduate Programs.

Explore how organizations leverage Information Technology to gain competitive advantage and business strategic goals. Examine well-known frameworks for IT strategic planning, IT- Business Alignment, IT governance, digital transformation, and data-driven decision-making. Address the importance of integrating emerging technologies such as AI, analytics, cloud computing and blockchain, as the drivers of innovation and disruption in organizations. Provide ethical considerations and risk management in tech-enabled innovation through case studies and tools such as SWOT analysis and business model canvases to optimize IT investments. (Plus-minus letter grade only)

**ISYS 850 Seminar in Business Intelligence (Units: 3)**

Prerequisites: Restricted to graduate Business students; ISYS 782; Graduate students in other programs admitted with the permission of the Faculty Director of Graduate Programs.

Examine the tools and techniques for extracting Business Intelligence (BI) from large volumes of data or "Big Data" to support strategic decision-making. Focus on the analysis of applications of business intelligence techniques and business analytics methodologies in different functional areas of a business. Additionally, the managerial implications of business intelligence will be analyzed. Explore visual analytics and applications of Generative AI in data analytics. The latest theoretical frameworks from Information Systems serve as the source to provide hands-on experience using Generative and Agentic AI tools. Tableau and SAP data warehousing will be used extensively. (Plus-minus letter grade only)

**ISYS 856 Enterprise Mobile Applications (Units: 3)**

Prerequisites: Graduate Business students; ISYS 782 or equivalent; graduate students in other programs permitted with the permission of the Faculty Director of Graduate Programs.

Engage in the creative design, development, and evaluation of enterprise mobile applications. Analyze business strategies of industry-leading mobile solutions through case studies and project-based exploration. Apply the Design Thinking methodology to Ideate, prototype, and refine innovative mobile applications that address complex business challenges. Gain hands-on experience in iOS development while leveraging AI-assisted code generation tools to accelerate development and unlock new possibilities in mobile innovation. Explore data modeling with SwiftData, data visualization using Swift Charts, and Generative AI integration. Prepare for dynamic careers in UI/UX design, mobile app development, product management, and technology entrepreneurship. (Plus-minus letter grade only)

**ISYS 864 Data Management for Analytics (Units: 3)**

Prerequisites: Restricted to graduate Business students; ISYS 812 or equivalent; graduate students in other programs permitted with the permission of the Faculty Director of Graduate Programs.

Fundamentals of database management in the context of multimodal data, business analytics processing with an introduction to the principles, design, security, and use of database management systems in business. Topics include data models and physical representation of databases; the conceptual and logical design of databases; database definition, control, and manipulation using SQL; data warehousing architecture; and big data platforms and the use of generative AI to assist in a database environment. (Plus-minus letter grade only)

**ISYS 865 Managing Enterprise Networks (Units: 3)**

Prerequisites: Graduate Business students; ISYS 782 or equivalent; graduate students in other programs permitted with the permission of the Faculty Director of Graduate Programs.

Fundamentals of distributed systems, communication networks, and network management in the enterprise context, focusing on understanding the role of networks in a heterogeneous technology environment and addressing challenges such as standards, interoperability, and network management. Cost-benefit analysis of distributed vs. centralized architectures, as well as the challenges of implementing effective information systems infrastructure. Approaches to sourcing, acquiring, and managing networks for addressing standards, interoperability, and network management challenges.

**ISYS 869 Business Process Management (Units: 3)**

Prerequisites: Graduate Business students; ISYS 782 or equivalent; graduate students in other programs permitted with the permission of the Faculty Director of Graduate Programs.

Examine how Enterprise Resource Planning (ERP) systems facilitate complex business process integration across global organizations. Gain hands-on experience with SAP ERP (S/4HANA) while analyzing procurement, production, fulfillment, and financial management. Evaluate real-world business process challenges through case studies and compare SAP with a non-SAP ERP system for a comprehensive understanding of enterprise solutions. Discover the role of Agentic AI in Business Process Management (BPM) and explore emerging technologies for extending BPM, such as AI Agent platforms (e.g., n8n, crewAI) and GenAI tools like ChatGPT, Gemini, and Copilot. (Plus-minus letter grade only)

**ISYS 875 Enterprise Cyber Security Management (Units: 3)**

Prerequisites: Graduate Business students; ISYS 782 or equivalent; graduate students in other programs permitted with the permission of the Faculty Director of Graduate Programs.

Provides a foundation for understanding critical issues in protecting information assets, including identifying levels of protection and response to cyber threats. Explore various aspects of cybersecurity, such as data and network attack vectors, spyware, and cryptographic communication platforms. Integrate cybersecurity measures into business operations, create solutions to improve business processes, and develop skills to effectively communicate cybersecurity recommendations to management.

**ISYS 895 Research Project in Information Systems (Units: 3)**

Prerequisites: ISYS 814 and three 800-level required courses in the chosen emphasis. Open only to computer information systems and electronic commerce MSBA candidates; permission of the instructor and approval of Advancement to Candidacy (ATC) and Culminating Experience (CE) forms by Graduate Studies.

Research methodology and supervised research culminating in oral and written presentations. Advancement to Candidacy and Proposal for Culminating Experience Requirement forms must be approved by Graduate Studies before registration. (Plus-minus letter grade; no CR/NC allowed; RP)

**ISYS 899 Independent Study (Units: 1-3)**

Prerequisites: Restricted to graduate Business students; permission of the instructor, adviser, and department chair; open only to graduate students who demonstrate the ability to work independently.

Intensive study of a particular problem under the direction of an Information Systems faculty member. (Plus-minus letter grade only)