

# INFORMATION SYSTEMS AND TECHNOLOGY MANAGEMENT

## UNDERGRADUATE

### Bachelor's program

- Bachelor of Science with a major in information systems (STEM) (<https://bulletin.gwu.edu/business/information-systems-technology-management/bs/>)

### Concentration

- Information systems technology management concentration (<https://bulletin.gwu.edu/business/information-systems-technology-management/bs-business-istm-concentration/>)

### Minor

- Minor in information systems technology management (<https://bulletin.gwu.edu/business/information-systems-technology-management/minor-information-systems-technology-management/>)

### Combined program

- Dual Bachelor of Arts or Bachelor of Science and GW School of Business Master's Degree (<https://bulletin.gwu.edu/business/dual-ba-bs-and-business-masters/>)

## GRADUATE

### Master's program

- Master of Science in the field of information systems technology (<https://bulletin.gwu.edu/business/information-systems-technology-management/ms/>)

### Combined programs

- Dual Master of Business Administration and Master of Science in the Field of Information Systems Technology (<https://bulletin.gwu.edu/business/dual-mba-msist/>)
- Dual Bachelor of Arts or Bachelor of Science and GW School of Business Master's Degree (<https://bulletin.gwu.edu/business/dual-ba-bs-and-business-masters/>)

## CERTIFICATES

### Graduate certificate programs

- Artificial intelligence (<https://bulletin.gwu.edu/business/information-systems-technology-management/artificial-intelligence-certificate/>)
- Cloud, applications, and information systems (<https://bulletin.gwu.edu/business/information-systems-technology-management/cloud-applications-information-technology-certificate/>)
- M (<https://bulletin.gwu.edu/business/information-systems-technology-management/technology-innovation-management-certificate/>)anagement of technology and innovation

## FACULTY

Professors: E.G. Carayannis, W. Duan

Associate Professors: S. Dasgupta (*Chair*), R.G. Donnelly, Y.C. Ho, Y. Lu, Y. K. Park

Assistant Professors: F. Bradley (*Teaching*), S. Chung, A. Wadhwa (*Visiting*)

## COURSES

### Explanation of Course Numbers

- Courses in the 1000s are primarily introductory undergraduate courses
- Those in the 2000s to 4000s are upper-level undergraduate courses that can also be taken for graduate credit with permission and additional work assigned
- Those in the 6000s and 8000s are for master's, doctoral, and professional-level students
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office

Note: MSIST candidacy or departmental approval is prerequisite to ISTM 6201 Information Systems Development and Applications–ISTM 6225 Cloud Foundations.

#### **ISTM 3119. Introduction to Programming. 3 Credits.**

Introductory course in writing simple computer programs using Python; data-analytic thinking and business applications through hands-on practices. No prior knowledge or experience in programming is required.

#### **ISTM 4120. Business Systems Development. 3 Credits.**

Analysis, design, and implementation of management information systems (MIS). Structured methodologies and techniques for various stages of the MIS development process. Computer-aided software engineering tools. May be taken for graduate credit with permission of the program director and instructor and extra assigned work.

#### **ISTM 4121. Database Principles and Applications. 3 Credits.**

Theory, architecture, and implementation of database management systems in corporate and organization information systems; fundamental concepts of database management and processing; hands-on experience with database management packages.

#### **ISTM 4123. Business Data Communications. 3 Credits.**

A technical overview of data communication concepts that are useful in the design and management of local and wide area networks. Internet technologies and their business applications are emphasized. Prerequisite: BADM 2301.

#### **ISTM 4123W. Business Data Communications. 3 Credits.**

A technical overview of data communication concepts that are useful in the design and management of local and wide area networks. Internet technologies and their business applications are emphasized. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement. Prerequisite: BADM 2301.

**ISTM 4130W. Writing On The Ethics of Technology. 3 Credits.**

Complex ethical dilemmas inherent in the introduction of new technologies and the influence human behavior asserts on these problems. Students write stories to explore and evaluate specific ethical problems relative to technology from various perspectives. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement.

**ISTM 4205. Web Applications Development. 3 Credits.**

Concepts and practice necessary for creating Internet content. Technical overview of the Internet environment and the structure of the World Wide Web. Prerequisites: ISTM 3119.

**ISTM 4206. Foundations of Information Systems Security and Ethics. 3 Credits.**

Computer security issues from the design, management, and business information system ownership perspectives. System security concepts, methods, and policies from design and planning to implementation. Risk assessment strategies. Recommended background: ISTM 4120.

**ISTM 4209. Foundations of Web Analytics. 3 Credits.**

Concepts, techniques, and tools of reporting and analyzing web data to derive actionable customer intelligence, develop digital strategies, and evaluate their impacts. Prerequisites: ISTM 3119; and DNSC 1001 or STAT 1051 or STAT 1053 or STAT 1111 or APSC 3115.

**ISTM 4210. Information Systems Capstone. 3 Credits.**

Application of conceptual and technical knowledge to analyzing, planning, and designing an online information system. Culminates with a system proposal and design presentations. Restricted to eligible students in their final semester. Prerequisites: ISTM 3119, ISTM 4120, ISTM 4121, ISTM 4205, ISTM 4206, and ISTM 4209.

**ISTM 4212. Data Management for Analytics. 3 Credits.**

Traditional and contemporary tools for data wrangling, databases, data warehousing. Focus on schema design and dimensional modeling; hands-on experience using these tools and other contemporary methods for managing and analyzing data at scale.

**ISTM 4213. Foundations of Cloud Applications. 3 Credits.**

Enterprise applications concepts, architecture, and technologies for emerging technologies and IT frameworks. The Internet as a major resource for globally distributed applications using grid and utility computing. Prerequisites: ISTM 3119.

**ISTM 4214. Foundations of Artificial Intelligence. 3 Credits.**

A comprehensive introduction to the recent developments in AI through the coverage of fundamental AI concepts, practical business applications and the hands-on experiences with modern deep learning frameworks such as Keras. Prerequisites: ISTM 3119.

**ISTM 4215. Human-Computer Interaction. 3 Credits.**

An introduction to and overview of the field of human-computer interaction (HCI), an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design, and other areas. Readings cover current theory and practice in interface specification, design, and evaluation, and include current and classic research papers in the field.

**ISTM 4216. Mobile Application Development. 3 Credits.**

The creation of mobile solutions for various modern platforms, including major mobile operating systems, and how to program using Java and apply this knowledge to the Android platform in smart phones. Prerequisites: ISTM 3119, or ISTM 6200, or ISTM 6205.

**ISTM 4217. Internet of Things Management. 3 Credits.**

Apache Spark technology skills to analyze huge data sets. Taught in Python, continuing on to learning to use Spark DataFrames with the latest Spark 2.0 syntax; the MLlib Machine Library with the DataFrame syntax and Spark.

**ISTM 4223. Innovation Ventures. 3 Credits.**

Process of innovation entrepreneurship used to launch and build new ventures; technology ventures; organizing for innovation, raising venture capital, wealth creation, managing the growing innovation venture, marketing technology products and services. Students enrolled at the graduate level are expected to do additional work. (Same as ISTM 6223)

**ISTM 4233. Emerging Technologies. 3 Credits.**

New developments in scientific and technological innovation, including automation, energy, medicine, bioengineering, social science, information technology, and space; forecasting technological advances and assessing their economic and social effects. Students enrolled at the graduate level are expected to do additional work. (Same as ISTM 6233)

**ISTM 4900. Special Topics. 3 Credits.**

Topics vary by semester. May be repeated once for credit provided the topic differs. Consult the Schedule of Classes for additional information.

**ISTM 4900W. Special Topics. 3 Credits.**

Experimental offering; new course topics and teaching methods. May be repeated once for credit. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement.

**ISTM 4995. Independent Study. 1-4 Credits.**

Students undertake research in an area of particular interest under the direction of an information systems and technology management faculty member. May be repeated for credit. Faculty and department chair approval are required to enroll.

**ISTM 5099. Variable Topics. 1-99 Credits.**

**ISTM 6200. Python Program Database Applications. 3 Credits.**

Introduction to the Python programming language and applications using R.

**ISTM 6201. Information Systems Development and Applications. 3 Credits.**

The information systems life cycle evaluated in terms of technologies, impact, and management. Structured and object-oriented analysis, prototyping, software reuse, testing, life-cycle costs, software development environments, and organizational and behavioral aspects of development projects. Restricted to students in the MS in information systems technology program or with permission of the department.

**ISTM 6202. Relational Databases. 3 Credits.**

Introduction to the theory of relational databases and commences an in-depth discussion of Relational database theory and design at the conceptual, logical, and physical levels. Structured query language (SQL) is covered in depth. Restricted to Students in the MS in Information Systems Technology program or with permission of the department.

**ISTM 6203. Managing Cloud Security. 3 Credits.**

Enterprise data and telecommunications networks with emphasis on operations and security on the cloud; functional characteristics of network technologies, gateways, and configurations; operational best practices to enhance the security of data and systems.

**ISTM 6204. Information Technology Project Management. 3 Credits.**

Project and program management practices with an emphasis on information technology projects. The basic tools of project management: work breakdown structure, cost, schedule and performance goal setting, and risk analysis. Restricted to students in the MS in information systems technology program or with permission of the department.

**ISTM 6205. Web Application Development. 3 Credits.**

Concepts and practice for creating Internet content. Technical overview of the Internet environment and the structure of the World Wide Web. Design and implementation of an effective web site with HTML, CSS, and JavaScript. Restricted to students in the MS in information systems technology program or with permission of the department. Prerequisites: ISTM 3119 or ISTM 6200.

**ISTM 6206. Information Systems Security. 3 Credits.**

Examination of computer security issues from the design, management, and business information system ownership perspectives. System security concepts, methods, and policies from the design and planning stages to multi-level system implementation. Restricted to students in the MS in information systems technology program or with permission of the department.

**ISTM 6209. Web and Social Analytics. 3 Credits.**

Concepts, techniques, and tools of collecting, analyzing, and reporting digital data concerning how users interact with organizations through the Internet and social media; business intelligence; key performance indicators; new business models. Restricted to students in the MS in information systems technology program or with permission of the department.

**ISTM 6210. Integrated Information Systems Capstone. 3 Credits.**

Students apply conceptual and technical knowledge in analyzing, planning, and designing an online information system. Culminates with system proposal/design presentations. Restricted to students in their final semester in the MS in information systems technology program or with permission of the department. Prerequisites: ISTM 6201, ISTM 6202, ISTM 6204, ISTM 6205, ISTM 6206, and ISTM 6209.

**ISTM 6212. Data Management for Analytics. 3 Credits.**

Relational databases, data warehousing, and dimensional modeling. Practical experience with these and other traditional and contemporary methods for managing and analyzing data at scale, including Unix command line and Apache Spark. Restricted to students in the MS in business analytics program.

**ISTM 6213. Cloud Applications. 3 Credits.**

Enterprise applications concepts, architecture, and technologies for emerging technologies and IT frameworks. The internet as a major resource for globally distributed applications. Prerequisites: ISTM 3119 or ISTM 6200.

**ISTM 6214. Foundations of Artificial Intelligence. 3 Credits.**

Foundations of artificial intelligence. Introduction to advanced programming design and development of solutions to automate business processes. Prerequisites: ISTM 3119 or ISTM 6200.

**ISTM 6216. Mobile Application Development. 3 Credits.**

Creation of mobile solutions for various modern platforms, including major mobile operating systems. Programming using Java and applying this knowledge to Android platform in smart phones. Prerequisites: ISTM 3119 or ISTM 6200. Recommended background: Prior completion of ISTM 6205.

**ISTM 6217. Internet of Things Management. 3 Credits.**

Technology skills to analyze huge data sets using Apache Spark. Taught in Python, continuing on to learning to use Spark DataFrames. Using the MLlib machine learning library with the DataFrame syntax and Spark. Prerequisites: ISTM 3119 or ISTM 6200. Recommended background: Prior completion of ISTM 6214.

**ISTM 6218. Business Applications of Artificial Intelligence. 3 Credits.**

Comprehensive introduction to recent developments in artificial intelligence (AI) through the coverage of fundamental AI concepts, practical business applications, and hands-on experiences with modern deep learning frameworks. Prerequisites: ISTM 6214.

**ISTM 6222. IS/IT Strategy and Implementation. 3 Credits.**

The development and implementation of information systems and technology strategies designed to align with and maximize business strategy applications and approaches in a challenging and increasingly global business environment.

**ISTM 6223. Technology Entrepreneurship. 3 Credits.**

Case studies on the innovation-entrepreneurship processes used to launch and build new ventures based on information technology and on technology more broadly. Organizing for innovation, raising venture capital, managing the small technology-based venture, marketing technology products and services, intellectual property considerations, and new venture proposal development.

**ISTM 6224. Management of Technology and Innovation. 3 Credits.**

Business, technological, economic, and political factors that influence the development and deployment of new technology products, processes, and services. Managing technology, corporate innovation, alternatives, sources of competitive advantage.

**ISTM 6225. Cloud Foundations. 3 Credits.**

Concepts of cloud managed enterprise architecture as a management tool to align information technology assets, people, operations, and projects with operational characteristics.

**ISTM 6233. Emerging Technologies. 3 Credits.**

Developments in scientific and technological innovation, including automation, energy, medicine, bioengineering, social science, information technology, and space. Forecasting technological advances and assessing their economic and social effects.

**ISTM 6234. New Venture Financing. 3 Credits.**

Fundamentals and practice of due diligence and screening of early-stage investment opportunities. Same as FINA 6234.

**ISTM 6239. Technology Commercialization. 3 Credits.**

Integration of the commercialization of technology in the private sector and the impact on competitiveness; the implementation of technology in the public sector; and technology development, from new product concept to utilization. Restricted to graduate students only. Prerequisites: ISTM 6224 and ISTM 6233 or with the permission of the instructor.

**ISTM 6290. Special Topics. 3 Credits.**

Topics vary by semester. May be repeated for credit provided the topic differs. Consult the Schedule of Classes for more details.

**ISTM 6298. Directed Readings and Research. 1-3 Credits.****ISTM 6500. Technology Skills for Managers. 1.5 Credit.**

Introduction to information technologies in multiple business domains for oversight by managers. Topics vary by semester. May be repeated for credit provided the topic differs. Consult the Schedule of Classes for more information. Restricted to students in the MBA program.

**ISTM 6514. Introduction to Artificial Intelligence. 1 Credit.**

Decision making using artificial intelligence. Real-world examples from finance, health care, marketing, and operations illustrate applications of machine learning methods. Includes hands-on exercises with programming software (R and RStudio).

**ISTM 6522. Digital Transformation. 1 Credit.**

Use of information and digital technologies to restructure organizations and business processes and survive and thrive in an intensively digitized business world.

**ISTM 8300. Thesis Seminar. 3 Credits.****ISTM 8333. Seminar: Management of Science, Technology, and Innovation. 3 Credits.****ISTM 8340. Philosophical Issues in Information Systems. 3 Credits.**

Seminar for doctoral students interested in information systems. Various philosophical traditions and insights from those traditions applied to problems in information systems.

**ISTM 8341. Advanced Topics in MIS Research. 3 Credits.**

For information systems doctoral students. Seminal papers and leading methods and instruments as applied to MIS research.

**ISTM 8385. Special Topics in Research Methods. 3 Credits.**

Research problems and issues related to student dissertations form topics for readings, group discussions, and assigned papers.

**ISTM 8390. Philosophical Foundations of Administrative Research. 3 Credits.**

Philosophy of science as applied to research in administration. Topics include the nature and current problems of epistemology, the development and role of theories, and the relationship between theory, methodology, and empirical data.

**ISTM 8391. Contemporary Research Topics in Information Systems. 3 Credits.**

Doctoral students are introduced to recent research issues and challenges in the field of information systems (IS) and other, related fields. Restricted to PhD students.

**ISTM 8392. Empirical Research in Information Systems, Cross-Disciplinary Overview. 3 Credits.**

A broad introduction to empirical research in the key topics of information and digital systems for doctoral students across different disciplines. Restricted to PhD students.

**ISTM 8393. Behavioral Theories in Information Systems Research. 3 Credits.**

Seminar discussing classic writings in the field of behavioral information systems. Students discuss readings, plan their research project, and conduct a pilot study for their research. Restricted to PhD students.

**ISTM 8394. Advanced Empirical Methods in Information Systems. 3 Credits.**

Prepares doctoral students to be scholars equipped with advanced empirical methods of research. Restricted to PhD students.

**ISTM 8395. Research in Digital Business Strategy. 3 Credits.**

Examines IT-enabled business strategy in turbulent environments from a research and theory building perspective. Restricted to PhD students.

**ISTM 8397. Doctoral Seminar. 1-3 Credits.**

Current research and scholarly issues in management science.

**ISTM 8398. Advanced Readings and Research. 1-12 Credits.**

Provides doctoral students in information systems and technology management with academic training useful for reading, analyzing, and writing high-quality journal papers. May be repeated for credit. Restricted to doctoral candidates preparing for the general examination.

**ISTM 8399. Dissertation Research. 1-12 Credits.**

Limited to doctoral candidates. May be repeated for credit.