Information Systems (IS) Courses

IS 1022. Programming and Formal Logic. (2-0) 2 Credit Hours.
An introduction to the elements of modern formal logic and program semantics. Modern formal logic uses symbolic techniques for an analysis of validity, and related notations such as grammatical form and truth. This course addresses logical notations (syntax) and how to assign meaning to them (semantics), which are essential for an understanding of many aspects of contemporary philosophy, mathematics, and informal processing. (Formerly IS 1023. Credit cannot be earned for both IS 1022 and IS 1023.)

IS 1403. Business Information Systems Fluency. (3-0) 3 Credit Hours. (TCCN = BCIS 1305)
Required course for all students majoring in Business at UTSA. This three-unit course concentrates on a set of core computing skills that are essential to student success, such as using e-mail, word processing, spreadsheets, basic data management, presentation software and on- and off-campus Internet resources. This is a Web-based course. Instructions and exams are accomplished through the use of a computer. Generally offered: Fall, Spring, Summer.

IS 1503. Introduction to Cyber Security. (3-0) 3 Credit Hours.
An introduction to the principles and best practices for cyber security. This course addresses the fundamental aspects of computer and network security. Issues concerning home computer security, internet security, privacy, viruses and worms, spam, and ethics will be included in this course. Public Component software will be used to illustrate the principles discussed in the class.

IS 2031. Introduction to Programming Concepts Laboratory. (0-2) 1 Credit Hour.
Prerequisite: Concurrent enrollment in, or completion of, IS 2033 or an equivalent with a grade of “C-” or better. Laboratory accompanies IS 2033. The laboratory uses an object-oriented programming language and software development tools to develop basic applications that underline the concepts learned in IS 2033. Generally offered: Fall, Spring, Summer.

IS 2033. Introduction to Programming Concepts. (3-0) 3 Credit Hours.
Prerequisite: Concurrent enrollment in, or completion of, IS 2031 or an equivalent with a grade of “C-” or better. An introduction to programming concepts with an object-oriented language. Addresses basic elements of programming concepts and object-oriented programming principles which include control structures, arithmetic and logical operators, classes and objects, methods and class behavior, arrays, ArrayList, and a brief introduction to GUIs (graphical user interfaces) and exception handling. Generally offered: Fall, Spring, Summer.

IS 2041. Intermediate Object-Oriented Programming Laboratory. (0-2) 1 Credit Hour.
Prerequisites: Concurrent enrollment in IS 2043 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of “C-” or better; or completion of IS 2043 or an equivalent with a grade of “C-” or better. Laboratory accompanies IS 2043. Laboratory uses an object-oriented programming language and software development tools to develop applications that underline the concepts learned in IS 2043. Generally offered: Fall, Spring, Summer.

IS 2043. Intermediate Object-Oriented Programming. (3-0) 3 Credit Hours.
Prerequisites: Concurrent enrollment in IS 2041 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of “C-” or better; or completion of IS 2041 or an equivalent with a grade of “C-” or better. An object-oriented programming course designed to reinforce introductory object-oriented principles learned in IS 2033 and focus on concepts including inheritance, polymorphism, exception handling, data structures, searching and sorting, recursion, generic collections, file processing, object serialization, regular expressions, and GUIs (graphical user interfaces). Generally offered: Fall, Spring, Summer.

IS 3003. Principles of Information Systems for Management. (3-0) 3 Credit Hours.
Prerequisite: IS 1403 with a grade of “C-” or better. An analysis of managerial/organizational information needs. Systematic procedures for developing information systems are covered. Includes coverage of hardware and software tools, information structures, and formal problem-solving techniques. Issues related to organizational controls, security, and globalization as a result of changing technologies are discussed. Cases will be assigned to illustrate the use of specific tools and techniques for problem solving. Generally offered: Fall, Spring, Summer.

IS 3033. Operating Systems. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better, or consent of instructor, Department Chair, and Dean of the College. This course examines the role of computer operating systems in the overall vulnerability of the network. A comparison of the more popular operating systems will be used to illustrate the concepts to the class.

IS 3043. Mobile Application Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better. As mobile devices such as smartphones and tablets become ubiquitous, the demand for developers who specialize in mobile technology also surges. This course will cover the fundamental design principles, programming techniques, and user experience considerations underlying mobile apps and their development environments. To bring these concepts alive, the course will involve hands-on examples from popular mobile platforms such as Android, iOS, and Windows Phone. Students will complete projects that focus on building real-world mobile apps on these platforms and learn how to take their mobile apps to market.

IS 3063. Database Management for Information Systems. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better. A study of database management systems (DBMS) features, functions, and architecture, including logical design, data models, normalization, object-oriented data, and database administration. A DBMS product will be used to illustrate principles. Generally offered: Fall, Spring.

IS 3073. Application Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better. A study of the use of information systems techniques to solve managerial problems. Includes cases where students are asked to design and implement information systems that address various classes of analytic problems. Principles of decision theory are addressed. Generally offered: Fall, Spring.

IS 1022. Programming and Formal Logic. (2-0) 2 Credit Hours.
An introduction to the elements of modern formal logic and program semantics. Modern formal logic uses symbolic techniques for an analysis of validity, and related notations such as grammatical form and truth. This course addresses logical notations (syntax) and how to assign meaning to them (semantics), which are essential for an understanding of many aspects of contemporary philosophy, mathematics, and informal processing. (Formerly IS 1023. Credit cannot be earned for both IS 1022 and IS 1023.)

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An introduction to the principles and best practices for cyber security. This course addresses the fundamental aspects of computer and network security. Issues concerning home computer security, internet security, privacy, viruses and worms, spam, and ethics will be included in this course. Public Component software will be used to illustrate the principles discussed in the class.

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Prerequisite: Concurrent enrollment in, or completion of, IS 2033 or an equivalent with a grade of “C-” or better. Laboratory accompanies IS 2033. The laboratory uses an object-oriented programming language and software development tools to develop basic applications that underline the concepts learned in IS 2033. Generally offered: Fall, Spring, Summer.

IS 2033. Introduction to Programming Concepts. (3-0) 3 Credit Hours.
Prerequisite: Concurrent enrollment in, or completion of, IS 2031 or an equivalent with a grade of “C-” or better. An introduction to programming concepts with an object-oriented language. Addresses basic elements of programming concepts and object-oriented programming principles which include control structures, arithmetic and logical operators, classes and objects, methods and class behavior, arrays, ArrayList, and a brief introduction to GUIs (graphical user interfaces) and exception handling. Generally offered: Fall, Spring, Summer.

IS 2041. Intermediate Object-Oriented Programming Laboratory. (0-2) 1 Credit Hour.
Prerequisites: Concurrent enrollment in IS 2043 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of “C-” or better; or completion of IS 2043 or an equivalent with a grade of “C-” or better. Laboratory accompanies IS 2043. Laboratory uses an object-oriented programming language and software development tools to develop applications that underline the concepts learned in IS 2043. Generally offered: Fall, Spring, Summer.

IS 2043. Intermediate Object-Oriented Programming. (3-0) 3 Credit Hours.
Prerequisites: Concurrent enrollment in IS 2041 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of “C-” or better; or completion of IS 2041 or an equivalent with a grade of “C-” or better. An object-oriented programming course designed to reinforce introductory object-oriented principles learned in IS 2033 and focus on concepts including inheritance, polymorphism, exception handling, data structures, searching and sorting, recursion, generic collections, file processing, object serialization, regular expressions, and GUIs (graphical user interfaces). Generally offered: Fall, Spring, Summer.

IS 3003. Principles of Information Systems for Management. (3-0) 3 Credit Hours.
Prerequisite: IS 1403 with a grade of “C-” or better. An analysis of managerial/organizational information needs. Systematic procedures for developing information systems are covered. Includes coverage of hardware and software tools, information structures, and formal problem-solving techniques. Issues related to organizational controls, security, and globalization as a result of changing technologies are discussed. Cases will be assigned to illustrate the use of specific tools and techniques for problem solving. Generally offered: Fall, Spring, Summer.

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IS 3063. Database Management for Information Systems. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better. A study of database management systems (DBMS) features, functions, and architecture, including logical design, data models, normalization, object-oriented data, and database administration. A DBMS product will be used to illustrate principles. Generally offered: Fall, Spring.

IS 3073. Application Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of “C-” or better. A study of the use of information systems techniques to solve managerial problems. Includes cases where students are asked to design and implement information systems that address various classes of analytic problems. Principles of decision theory are addressed. Generally offered: Fall, Spring.
IS 3413. Introduction to Telecommunications for Business. (3-0) 3 Credit Hours.
Includes an in-depth look at basic telecommunications terminology and concepts. Introduction to voice and data networks, signaling and multiplexing. Network topologies and protocol fundamentals and architectures are presented and compared. Ethernet, IEEE 802.11x, TCP/IP, dedicated circuit, and VPN technologies are introduced. Network security fundamentals are explored. Generally offered: Fall, Spring.

IS 3423. Network Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor, Department Chair, and Dean of the College. The course provides a foundation in networking technologies that are core to creating secure networks. Topics included in this course are basic cryptography, secure networking protocols, logical and physical security management and security devices. Relation between these technologies and operational and implementation issues for these technologies will also be discussed. (Formerly titled "Secure Network Design.") Generally offered: Fall, Spring.

IS 3433. Introduction to Digital Forensics. (3-0) 3 Credit Hours.
The digital forensic investigation process involves organizational preparation, incident response, data collection, data analysis, and communication of findings. This course will teach students how to prepare for incidents, how to respond to incidents, and how to reliably collect digital data. Students will be introduced to various types of storage media and sources of volatile data. Students will also be introduced to forensic accounting principles and practices as well as fundamental legal issues related to digital forensics.

IS 3453. Networking Fundamentals. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor, Department Chair, and Dean of the College. This course will focus on the principles of telecommunication with particular emphasis on networking. Networking and transmission protocols will be emphasized. Both IPv4 and IPv6 will be included. This class will also include the hardware side of the network. The role of servers, switches and routers will be included. Security will be introduced.

IS 3503. Attack and Defend – An Introduction to Information Assurance. (3-0) 3 Credit Hours.
An introduction to information assurance. This survey course will present common ways that hackers attack a network and how to defend against the attacks. It will also include related subjects such as how to protect data, encryption, physical security, and hiding data. The course is a "hands-on" class and students will gain experience with readily available software packages. This course is intended for non-Cyber Security majors. Information Systems and Cyber Security majors cannot use IS 3503 toward their degree requirements. (Formerly ACC 3503. Credit cannot be earned for both ACC 3503 and IS 3503.)

IS 3513. Information Assurance and Security. (3-0) 3 Credit Hours.
This course provides an in-depth presentation of information assurance topics such as fraud, eavesdropping, traffic analysis, intrusion detection and prevention, hacking, viruses, and cryptography. Risk management will also be discussed. (Formerly IS 4453. Credit cannot be earned for both IS 3513 and IS 4453.) Generally offered: Fall, Spring.

IS 3523. Intrusion Detection and Incident Response. (3-0) 3 Credit Hours.
Prerequisite: IS 3513 with a grade of "C-" or better. This course provides an in-depth look at intrusion detection methodologies and tools and the approaches to handling intrusions when they occur; examines the laws that address cybercrime and intellectual property issues; and includes a study of proper computer and network forensics procedures to aid in the identification and tracking of intruders and in the potential prosecution of cyber criminal activity. Generally offered: Spring.

IS 3533. Cyber Law and Legal System. (3-0) 3 Credit Hours.
An introductory course in laws and legal issues that affect law enforcement, businesses, and investigators related to the preservation, collection, and analysis of digital data. Students will examine computer crime laws, civil and criminal laws that often involve electronic evidence, search and seizure of electronic evidence, judicial issues involving the admissibility of electronic evidence and related testimony, and legal issues involved with electronic surveillance. (Formerly titled "Cyber Law").

IS 4033. Network Operations. (3-0) 3 Credit Hours.
Prerequisite: IS 3453 with a grade of "C-" or better or consent of instructor, Department Chair, and Dean of the College. The course will explore the fundamentals of operating a network. Issues to be included are physical security, electrical and air conditioning issues, data storage and retention, and backup and redundancy of data. Other topics include floor loading, patch management, converting user requirements to system requirements and disaster recovery.

IS 4053. Systems Analysis and Design. (3-0) 3 Credit Hours.
Prerequisites: IS 3063 with a grade of "C-" or better and MGT 3003. An introduction to systems theory and development techniques. Topics include problem definition, system development life cycle, feasibility analyses, project management, system models and CASE tools. Generally offered: Fall, Spring.

IS 4063. Advanced Topics in Information Systems. (3-0) 3 Credit Hours.
Prerequisites: MGT 3003 and 15 semester credit hours of information systems courses (excluding IS 1403 and IS 3003). Survey of recent developments in information technology. Analysis will focus on applications in the business community and theoretical developments that relate to those applications. Ordinarily taken during semester of graduation. Generally offered: Fall, Spring, Summer.

IS 4073. The Information Resource. (3-0) 3 Credit Hours.
Prerequisites: IS 3003 with a grade of "C-" or better, MGT 3003, and MGT 3013. A study of the principles and concepts involved in the management of organizational information systems resources. Topics include project control, CIO functions, information systems planning, and strategic impact of information systems, multinational organizations, and relevant legal, professional, and ethical issues.

IS 4103. Business Process Management and Control. (3-0) 3 Credit Hours.
Prerequisite: IS 3003. Business professionals are frequently responsible for designing, implementing, supporting and managing technology-based business processes in organizations. In order to accomplish those tasks, these professionals must understand the business processes that support an organization and how they are controlled. This course contributes to the student's understanding of how key business processes are managed, controlled and integrated in enterprise resource planning systems. SAP will be used to illustrate the concepts discussed in the class. (Same as ACC 4103. Credit cannot be earned for both IS 4103 and ACC 4103.)
IS 4143. Wide Area Networks. (3-0) 3 Credit Hours.
Prerequisites: IS 3413 with a grade of "C-" or better and MGT 3003 or consent of instructor, Department Chair, and Dean of the College. This course explores the telecommunication technologies used in wide area networks. Technologies such as frame relay, ATM, TCP/IP, and voice over IP will be studied. The role of the common carriers will also be discussed. Secure network traffic over TCP/IP will be included.

IS 4153. Web Site Development. (3-0) 3 Credit Hours.
Prerequisites: IS 3073 with a grade of "C-" or better and MGT 3003 or consent of instructor, Department Chair, and Dean of the College. A study of issues related to the use of electronic networks to facilitate intra- and intra-organizational business activities. The principles of Web site design from the consumer and the information systems points of view will be presented. The course will also include the development of a Web site. (Formerly titled "Electronic Commerce.").

IS 4183. Advanced Database Concepts. (3-0) 3 Credit Hours.
Prerequisites: IS 3063 with a grade of "C-" or better and MGT 3003. In-depth consideration of concepts governing the design and management of database systems. Topics include database design, distributed databases, database administration, object-oriented data modeling, and performance evaluation.

IS 4213. Data Center Infrastructure Planning. (3-0) 3 Credit Hours.
Prerequisite: IS 4033 with a grade of "C-" or better or consent of instructor, Department Chair, and Dean of the College. The purpose of this class will be to explore the electrical power, air conditioning, and fire suppressant requirements of a data center. Electrical grids, standby generators, and uninterruptable power supplies will be discussed. The course explores the various aspects of power quality, interruption of service, voltage flicker and control, voltage swings and sags and power surges. Air conditioning requirements and methods will also be included. Fire suppressant techniques will also be part of the class. A comprehensive project involving the design of the data center to include these three major issues will be part of the class. (Formerly titled "Power and Air Conditioning.").

IS 4223. Emerging Network Technologies. (3-0) 3 Credit Hours.
Prerequisite: IS 3453 with a grade of "C-" or better or consent of instructor, Department Chair, and Dean of the College. Cloud computing has become popular in industry. This class will look at what it is and how it works. How cloud computing interfaces with current networks, computing ability and storage requirements will be discussed. Security issues will be an important part of the course. Other topics include virtual machines, storage area networks and remote systems management.

IS 4233. Cloud Technologies for Business. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better. Cloud computing has driven a significant shift in how enterprises operate. It changes the way businesses and their customers interact with their applications and data. Cloud technologies offer highly elastic scalability in the delivery of enterprise applications through software, platform, or infrastructure as a service. This course will look at how businesses can benefit from cloud technologies to stay competitive; it will cover fundamental concepts and models of cloud computing, as well as cloud computing mechanisms, architectures, and security.

IS 4463. Web Application Security. (3-0) 3 Credit Hours.
Prerequisites: IS 3513 with a grade of "C-" or better and MGT 3003 or consent of instructor. The security issues related to web applications will be discussed in this course. Topics include web application authentication, authorization, as well as browser and web database security principles. Various web application security attack types such as code injection, cross-site scripting, and cross-site request forgery will be studied. The course will also include discussions about business aspects that contribute to a secure web-based transaction environment. (Formerly titled "Secure Electronic Commerce.").

IS 4473. Information Assurance Policy. (3-0) 3 Credit Hours.
Prerequisites: IS 3413 with a grade of "C-" or better, MGT 3003, and one 3-semester-credit-hour security course, or consent of instructor, Department Chair, and Dean of the College. There are many policy issues, within the firm and at various levels of government, that affect information assurance. This course will examine how these policies affect electronic security. Subjects will include privacy of information, intellectual property protection, globalization of information systems, and other policy matters. The protection and control of secured information will also be discussed. Generally offered: Spring.

IS 4483. Digital Forensic Analysis I. (3-0) 3 Credit Hours.
An introductory course in collecting, examining, and preserving evidence of computer crimes. This course examines the issues, tools, and control techniques needed to successfully investigate illegal activities facilitated through the use of information technology. The tools of collecting, examining, and evaluating data in an effort to establish intent, culpability, motive, means, methods, and loss resulting from e-crimes will be examined. (Formerly titled "Cyber Forensics."). Generally offered: Fall.

IS 4513. Cyber and Physical Systems. (3-0) 3 Credit Hours.
Prerequisites: IS 3513 with a grade of "C-" or better and MGT 3003 or consent of instructor, Department Chair, and Dean of the College. Many of the critical infrastructure systems contain a system control and data acquisition (SCADA) component. Frequently, the control systems are remotely accessed and therefore becomes the focal point for attack. This course examines the control system components from the standpoint of vulnerability and protection. (Formerly titled "System Control and Data Acquisition."). Generally offered: Summer.

IS 4523. Digital Forensic Analysis II. (3-0) 3 Credit Hours.
Prerequisite: IS 4483. This course examines advanced digital forensic analysis topics, tools, techniques, and control mechanisms. Advanced topics include operating system artifacts, non-standard file systems, mobile devices, malware, and volatile memory. Students will gain experience with state-of-the-art forensics tools and techniques needed to successfully investigate illegal activities perpetuated through the use of information technology.

IS 4911. Independent Study. (0-0) 1 Credit Hour.
Prerequisites: MGT 3003, a 3.0 College of Business grade point average, and permission in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for the required forms. Independent research in an information systems topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor’s degree.
IS 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: MGT 3003, a 3.0 College of Business grade point average, and permission in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for the required forms. Independent research in an information systems topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor’s degree.

IS 4933. Internship in Information Systems. (0-0) 3 Credit Hours.
Prerequisites: MGT 3003, 9 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and permission in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for required forms. The opportunity to gain knowledge through experiential activities in professional life. Joint cooperation with business and governmental institutions in structuring and monitoring work experience aimed at supplementing the classroom learning process. May not be repeated for credit.

IS 4943. Internship in Cyber Security. (0-0) 3 Credit Hours.
Prerequisites: MGT 3003, 9 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and permission in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for required forms. The opportunity to gain knowledge through experiential activities in professional life. Joint cooperation with business and governmental institutions in structuring and monitoring work experience aimed at supplementing the classroom learning process. May not be repeated for credit.

IS 4951. Special Studies in Information Systems. (1-0) 1 Credit Hour.
Prerequisite: Consent of instructor. An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor’s degree.

IS 4953. Special Studies in Information Systems. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor’s degree.

IS 4993. Honors Thesis. (0-0) 3 Credit Hours.
Prerequisite: MGT 3003. Enrollment limited to students applying for Honors in Information Systems. Supervised research and preparation of an honors thesis. May be repeated once for credit with advisor’s approval. No more than 3 semester credit hours may apply toward information systems major requirements.