IS 1001. Inside Cyber. (1-0) 1 Credit Hour.
An introduction to the cyber world with emphases on the security, business, technology, and career aspects of cyber. This course offers a high-level overview of the potential benefits of information systems and technology, along with the associated challenges and risks. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 1403. Business Information Systems Fluency. (TCCN = BCIS 1305)
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. Course Fees: BISP $10; BTSI $15; DL01 $75; LRB1 $15.

IS 1413. Excel for Business Information Systems. (3-0) 3 Credit Hours.
This course concentrates on the use of Microsoft Office Excel as a tool for organizing, presenting, and analyzing data. This is a Web-based course. All coursework (lessons, exams, and projects) is completed online using a computer. Microsoft Excel is required to complete the projects assigned in the course. Successful completion of this course will help prepare the student for taking the Microsoft Office Specialist (MOS): Microsoft Office Excel Core exam. Students who are MOS (Microsoft Office Excel 2016 Core or Microsoft Office Excel 2013 Core) certified or have taken an equivalent course that specifically prepares students for the MOS Excel exam can petition for exemption from the course. Students in quantitative majors (such as Accounting, Actuarial Science, Economics, Finance, Management Science, and Statistics and Data Science) are strongly encouraged to take this course in lieu of IS 1403. Generally offered: Fall, Spring, and Summer. Course Fees: BISP $10; BTSI $15; DL01 $75; LRB1 $15.

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 underlie the concepts learned in IS 2033. Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; LRB1 $15.

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. Course Fees: BISP $10; BTSI $15; LRB1 $15.

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 underlie the concepts learned in IS 2043. Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; LRB1 $15.

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. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 3003. Principles of Information Systems for Management. (3-0) 3 Credit Hours.
Prerequisite: IS 1403 or IS 1413 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3033. Operating Systems Security. (3-0) 3 Credit Hours.
Prerequisites: IS 2031, IS 2033, and IS 3413 with a grade of "C-" or better, or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3043. Secure Mobile App Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043, or the instructor's consent. As mobile devices such as smartphones and tablets become ubiquitous, the demand for mobile apps and developers who specialize in mobile technology also surges. This course teaches students how to develop a mobile app in an advanced development environment (e.g., Android Studio) and principles of secure software engineering. The course will cover requirements analysis, interface design, functionality development, testing vulnerabilities, data security and other secure software design strategies with a focus on the usability of mobile apps in the real world. The course will also cover other technical, social, and marketing issues related to the adoption of mobile apps. This course can be an elective for the information systems major and cybersecurity major and minor. Course Fees: BISP $20; BTSI $15; LRB1 $21.
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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3313. Introduction to Pathogenic Outbreak Investigations. (3-0) 3 Credit Hours.
This is a cross-disciplinary introduction to genetic and digital pathogens, their characteristics and methods for rapid analysis, geared toward predicting behavior during real-time outbreak investigations. The course examines both similarities and differences between biological and digital pathogens and presents core concepts from each domain to build a cohesive base for future multi-disciplinary research. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3423. Network Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3453. Networking Fundamentals. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3513. Information Assurance and Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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 criminal activity. Generally offered: Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4023. Applied Big Data with Machine Learning. (3-0) 3 Credit Hours.
This course provides an overview of machine learning techniques to explore, analyze, and leverage data. Students will be introduced to tools and algorithms they can use to create machine learning models that learn from data, and to scale those models up to big data problems. This course will help prepare students for more advanced courses in cyber analysis and data-driven decision making. Course Fees: BISP $20; BTSI $15; LRB1 $21.
IS 4033. Network Operations. (3-0) 3 Credit Hours.
Prerequisite: IS 3453 with a grade of "C-" or better or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4053. Systems Analysis and Design. (3-0) 3 Credit Hours.
Prerequisite: IS 3063 with a grade of "C-" or better. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4063. Advanced Topics in Information Systems. (3-0) 3 Credit Hours.
Prerequisite: 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4083. Agile Project Management. (3-0) 3 Credit Hours.
This introductory course presents concepts and techniques for leading agile teams in many types of projects including software development, engineering, construction, product development, as well as science and technology focused efforts. The course will give students the opportunity to develop an agile mindset and a range of adaptive skills including agile methods, practices and values that are associated with achieving higher levels of performance and customer satisfaction. The course will also prepare the student to sit for the Project Management Institute's PMI-ACP certification exam. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4143. Wide Area Networks. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4183. Advanced Database Concepts and Applications. (3-0) 3 Credit Hours.
Prerequisite: IS 3063 with a grade of "C-" or better. Databases play a critical role in the business operations of most organizations. This course provides an in-depth coverage on concepts governing the design and management of database systems. Topics include data modeling, database design, administration, optimization and performance evaluation, SQL language, procedures, functions and triggers. Students will have the opportunity to learn how to design and build modern database systems through a set of hands-on exercises and projects using MS SQL Server, Oracle and other contemporary database software. The course also covers some advanced topics such as database security, database connectivity and Web applications. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4213. Data Center Infrastructure Planning. (3-0) 3 Credit Hours.
Prerequisite: IS 3033 with a grade of "C-" or better or consent of instructor and Department Chair. 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 swells 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4223. Emerging Network Technologies. (3-0) 3 Credit Hours.
Cloud computing has become popular in industry. This class will look at what it is and how it works. Security issues will be an important part of the course. Other topics include virtual machines, storage area networks, software defined networks, and remote systems management. New hardware will also be included. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4233. Introduction to Cloud Computing. (3-0) 3 Credit Hours.
Cloud computing has gone from a leading trend in IT to a widely adopted mainstream computing platform. This course introduces cloud computing concepts where students explore the basics of cloud services ecosystem and deployment models. Students will become acquainted with commonly used industry terms, typical business scenarios and applications for the cloud, security models, and benefits and limitations inherent in the new paradigm of computing. This course will help prepare students for more advanced courses in big data technology and cyber analysis. (Formerly titled Cloud Technologies for Business.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4463. Web Application Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3513 with a grade of "C-" or better 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.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4473. Information Assurance Policy. (3-0) 3 Credit Hours.
Prerequisites: IS 3413 with a grade of "C-" or better and one 3-semester-credit-hour security course or consent of instructor and Department Chair. 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. Course Fees: BISP $20; BTSI $15; LRB1 $21.
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. Generally offered: Fall. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4513. Industrial Control Systems. (3-0) 3 Credit Hours.
Prerequisite: IS 3513 with a grade of “C-” or better, or consent of instructor and Department Chair. Many of the critical infrastructure systems contain a system control and data acquisition (SCADA) component. Frequently, the control systems are remotely accessed and therefore become the focal point for attack. This course examines the control system components from the standpoint of vulnerability and protection. (Formerly titled Cyber and Physical Systems.) Generally offered: Fall. Course Fees: BISP $20; BTSI $15; LRB1 $21.

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. Generally offered: Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4533. Malware Analysis. (3-0) 3 Credit Hours.
Prerequisites: IS 3033 and IS 3513 with grades of "C-" or better, or instructor's consent. This class is designed to introduce students to concepts, tools and techniques associated with modern malicious code analysis. The course will examine the methods employed by malicious actors to prevent analysis and neutralization of their exploits and discuss ways of leveraging resources and tools to effectively examine malicious code. Safe handling practices for malware analysis such as sandboxing, virtualization, and system isolation will be taught/practiced throughout the course. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4543. Cyber Attack and Defend. (3-0) 3 Credit Hours.
This course will bridge the concepts of implementing a secure network with actual cyber threats. Students will learn the necessary skills to implement key IT system components, create security policies, and understand the background of what hackers do to mandate such security measures. Students will conduct red team assessments against common infrastructure components, and monitor residual effects of attacks. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: A 3.0 College of Business grade point average, and approval 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. Course Fees: BISP $20; BTSI $15.

IS 4933. Internship in Information Systems. (0-0) 3 Credit Hours.
Prerequisites: 6 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the College of Business. Directed internship of at least 200 hours of work under the supervision of a professional providing students with opportunities to apply concepts, principles, and techniques learned in the classroom. Written report required. A proposal form must be completed and approved prior to registration. Internship may not be repeated for credit. Course Fees: BISP $20; BTSI $15.

IS 4943. Internship in Cyber Security. (0-0) 3 Credit Hours.
Prerequisites: 6 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the College of Business. Directed internship of at least 200 hours of work under the supervision of a professional providing students with opportunities to apply concepts, principles, and techniques learned in the classroom. Written report required. A proposal form must be completed and approved prior to registration. Internship may not be repeated for credit. Course Fees: BISP $20; BTSI $15.

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. Course Fees: BISP $20; BTSI $15; LRB1 $21.