## IT - Information Technology

### INFORMATION TECHNOLOGY Courses

**IT 150G. Basic Information Literacy and Research. 3 Credits.**
This course is designed to provide students with the basic skills necessary to identify, to access and to utilize task appropriate information. Students will learn to evaluate information sources and to apply good research strategies. The course will address qualitative, quantitative, visual and auditory data sources along with the ethical use of data and respect for intellectual property. Focus will be given to research topics in various fields including business, humanities, social science and technology.

**IT 200T. Cybersecurity, Technology, and Society. 3 Credits.**
Students will explore how technology is related to cybersecurity from an interdisciplinary orientation. Attention is given to the way that technologically-driven cybersecurity issues are connected to cultural, political, legal, ethical, and business domains.

**IT 201. Introduction to Information Systems. 3 Credits.**
An introduction to the major hardware/software components of modern information systems. Topics include introduction to the history of computers, numbering systems conversion, system and application software, networks and the Internet. Additional topics include Information Systems and Systems Development Life Cycle, Introduction to Programming, Databases and Business Intelligence, Information Security, and Privacy and Ethics in the cyber world. Intended as a comprehensive introduction course to the Information Systems majors.

**IT 205. Introduction to Object-Oriented Programming. 3 Credits.**
An introductory course on object-oriented programming that emphasizes top down design and documentation representative of business needs and requirements. The programming language is Java or instructor's choice. Topics include simple data types, input/output streams, control structures and logical expressions, functions, arrays, records, and pointers.

**IT 310. Object-Oriented Programming with C++. 3 Credits.**
An advanced C++ programming course focusing on object-oriented design/ methodologies and the development of Graphic User Interfaces (GUI) for business applications. Special topics include: dynamic variables, linked lists, abstract data types, classes, inheritance, composition, exception handling, templates, and overloading. Prerequisites: IT 205 and a declared major in the university or permission of the Dean's Office.

**IT 315. Introduction to Networking and Security. 3 Credits.**
Introduction to modern networking concepts and technology. Provides students with the fundamental concepts, technologies, components and issues related to communications and data networks. Topics include network architectures, infrastructures, services, protocols, cyber attacks, adversaries, and defense. Prerequisites: IT 201.

**IT 317. Enterprise Information Architecture. 3 Credits.**
A comprehensive treatment of the fundamental concepts of enterprise information architecture. Topics include enterprise architecture, information technology infrastructure, components of modern computing environments, system usability and security. Prerequisites: IT 201 with a C or better (grade requirement may be waived by the department), and a declared major in the university or permission of the Dean's Office.

**IT 325. Web Site and Web Page Design. 3 Credits.**
Advanced design and hands-on implementation skills in designing and creating dynamic web sites. Key topics include: web page design, usability principles, HTML, XHTML, Cascading Style Sheets (CSS), JavaScript and Internet security. Prerequisites: IT 150G.

**IT 360T. Principles of Information Technology. 3 Credits.**
A survey of computer hardware, software, procedures, applications, and management information concepts. Provides an understanding of the application of the computer to the support of managerial decision making. Information Systems majors may not use this course for credit toward the B.S.B.A. degree. Prerequisites: completion of general education information literacy and research requirement and junior standing; and a declared major in the University or permission of the Dean's Office.

**IT 363. Systems Analysis and Design. 3 Credits.**
This course provides an introduction to the analysis and design of computer-based information systems. Emphasis is placed upon the development of requirements that serve the business needs of the organization as well as the logical and physical design of business information systems. This course covers both the structured and the object-oriented approach of system analysis and design process. Topics covered include introduction to the software development methodologies, requirement gathering, modeling, and logical/physical design techniques. Students are also exposed to emerging topics that promise major improvements in software development area. Factors relevant to the creation of business information systems through development and implementation will be examined in detail. Prerequisites: IT 201 with a C or better, IT 205, and a declared major in the university or permission of the Dean’s Office.

**IT 368. Student Internship. 1-3 Credits.**
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Available for pass/fail grading only. (qualifies as a CAP experience) Prerequisites: junior standing and a declared major in the university or permission of the Dean’s Office.

**IT 369. Practicum. 1-3 Credits.**
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Available for pass/fail grading only. (qualifies as a CAP experience) Prerequisites: junior standing and a declared major in the university or permission of the Dean’s Office.

**IT 372. COBOL and Applications. 3 Credits.**
Introduction to the COBOL programming language and its application in industry and government. Prerequisite: IT 310 and a declared major in the university or permission of the Dean's Office.

**IT 374. C# and Applications. 3 Credits.**
An introduction to programming concepts and skills of the C# programming language and Visual Studio .NET. Topics include: computing fundamentals and Microsoft .NET platform, C# programming fundamentals and object-oriented programming, web app development and cloud app development. Prerequisite: CS 150 or equivalent.

**IT 376. PHP and Applications. 3 Credits.**
An introduction to programming concepts and skills of the PHP programming language. Topics include: Internet and web concepts, HTML, CSS and XML, PHP programming basics, database with PHP, PHP web services. Prerequisite: IT 201.

**IT 401. Mobile and Cloud Computing. 3 Credits.**
An introduction to key concepts and techniques of mobile and cloud computing. Topics include: cloud deployment and service models, cloud programming and software environments, performance and security of cloud systems, cloudlets and mobile cloud computing. Prerequisite: IT 450 or CS 450.
IT 408. E-Business Portal Programming. 3 Credits.
An introduction to key concepts, programming techniques, technologies and standards involved in the development of E-Business portal. Topics include: E-Business programming technologies, software development environments, developing a practical E-business project, securing the E-business portal, performance tuning and evaluation. Prerequisite: IT 325.

IT 410. Business Intelligence. 3 Credits.
Business intelligence, data warehouse, data mining, and OLAP. The course will use state-of-the-art business intelligence software tools including SAS products to provide hands-on experience in designing and using data warehouses. Prerequisite: BNAL 206.

IT 416. Network Server Configuration and Administration. 3 Credits.
Advanced course on configuration and management of network servers. Topics include: user and storage management, ACLs, group policy, configuring security, backups and disaster recovery, and server management. Prerequisites: A grade of C or better in IT 315 and a declared major in the university or permission of the Strome College of Business Dean’s Office.

IT 417. Management of Information Security. 3 Credits.
This course emphasizes the need for management and technology to successfully implement an information security program in an organization. Threats, attacks, legal and ethical issues, risk assessment and control strategies; planning, development, and maintenance of security policies; contingency planning; firewalls, intrusion detection systems and security tools; and management of information security are some of the topics covered in this course. Prerequisites: A grade of C or better in IT 315 or IT 360T and a declared major in the university or permission of the Strome College of Business Dean’s Office.

IT 418. Enterprise Information Assurance. 3 Credits.
Assure information and manage risks related to the use, processing, storage, and transmission of information. Topics include assurance of integrity, availability, authenticity, non-repudiation and confidentiality. Students will gain a firm understanding of information-related risk management in cyber and physical systems. Hands-on exercises and practice opportunities will be provided to students. Prerequisites: A grade of C or better in IT 315 and a declared major in the university or permission of the Dean’s Office.

IT 419. Enterprise Cyber Defense. 3 Credits.
Provide students with an awareness of the options available to mitigate security threats in enterprise information systems. Topics include network mapping, network security techniques and components, applications of cryptography, malicious activity detection, countermeasures, and vulnerability scanning. Students will learn how to describe potential attacks, defense tools and methods, and measures to be taken when compromises occur. Prerequisites: A grade of C or better in IT 315 and a declared major in the university or permission of the Dean’s Office.

IT 420. Object-Oriented Application Development Using Visual Basic. 3 Credits.
Advanced design and implementation strategies are utilized to create dynamic client/server applications that solve complex problems in a secure and robust manner. Key concepts include: abstractions, encapsulation, inheritance, polymorphism, persistence, and dynamic binding. Prerequisites: IT 205 and a declared major in the university or permission of the Strome College of Business Dean's Office.

IT 425. Information Systems for International Business. 3 Credits.
The international business organization and its relationship to information systems architecture with emphasis on the role of connectivity technology as a driver of globalization. An introduction to the economics and structure of the international information technology marketplace. Prerequisites: The general education impact of technology requirement, a declared major in the university or permission of the department.

IT 430/530. Object-Oriented Application Development with JAVA. 3 Credits.
Using JAVA as an object-oriented language to write business applications that solve complex problems in a secure and robust manner. Business examples incorporating multimedia, multithreading, networking, and advanced graphical interfaces are used to reinforce the object-oriented concepts of abstraction, encapsulation, inheritance, polymorphism, persistence, and dynamic binding. Prerequisites: IT 205 and a declared major in the university or waiver approved through the Strome College of Business Undergraduate Advising.

IT 440. Secure Programming. 3 Credits.
An introduction to methods of secure software design and development. Key topics include principles and practices of secure programming, input validation, type checking, parameter validation, buffer overflow prevention, error handling, web application issues (SQL injection, Cross site scripting, Cross site request forgery, etc.), static analysis tools and black box testing tools. Prerequisite: IT 205.

IT 450. Database Concepts. 3 Credits.
Introduction to database concepts. Historical development, data models, database analysis, design and implementation, query languages, data security, and introduction to business transaction systems. Prerequisites: IT 201 with a C or better or IT 360T for non-IT major students and a declared major in the university or waiver approved through the Strome College of Business Undergraduate Advising; permission of the instructor is required for non-IT major students.

IT 451. Database Administration. 3 Credits.
An introduction to the theory and practice for performing the standard database administrative tasks. Course could serve as a basis in preparation to OCA Exams 1Z0-051 and 1Z0-052 for Oracle Administrator Certified Associate. Topics to be covered include: advance SQL statements, creating schema objects, database installation and configuration, database architecture, performance monitoring and tuning, storage management, database security, user management, database connectivity, backup/recovery techniques and usage analysis. Oracle will be the primary DBMS software used in the course; other software may be used as well. Hands-on exercises and practice opportunities will be provided to students. Prerequisites: IT 450, and a declared major in the university or permission of the instructor.

IT 452. Cloud Database. 3 Credits.
An introduction to the principles, techniques, and systems of cloud database. Topics include: cloud service models, cloud database design, cloud database management, cloud database development, cloud security, and cloud database services. Prerequisite: IT 450 or instructor approval.

IT 453. Advanced Database Concepts. 3 Credits.
This course examines the theoretical and practical foundations of advanced database concepts. It also covers techniques and methodologies that are used to perform the advanced database management tasks and to assure the deployment of efficient, secure, and high-performance database applications. Topics include: advanced database and application design, database performance tuning and query optimization, data movement and distribution, distributed DBMS, Business Intelligence and Data Warehouses, Big Data Analytics and NoSQL databases and the Internet, and other advanced database concepts. This course also examines the material included in OCA Exams 1Z0-051 and 1Z0-052 for Oracle Administrator Certified Associate. Prerequisites: IT 450 and a declared major in the university or permission of the instructor.

IT 454. Web-based Database Administration. 3 Credits.
An introduction to key concepts and techniques related to web-based database administration. Students will gain hands-on experience with a variety of web-based database technologies. Topics to be covered include: MySQL, EasyPHP, phpMyAdmin, XML database technologies such as XQuery, XPath, and XML Schemas, performance tuning, trouble shooting, and web log analysis tools. Prerequisite: IT 450, or permission of the instructor.
IT 455. SAP Applications. 3 Credits.
This course introduces students to the concept of enterprise resource planning. Students will learn SAP (Systems, Applications and Products in Data Processing) enterprise software to manage business operations and customer relations by analyzing and presenting data in an engaging way, and producing meaningful and insightful business solutions. Prerequisite: IT 201, or IT 360T, or OPMT 303, or instructor's permission.

IT 461. Implementing Internet Applications. 3 Credits.
Advanced design and implementation strategies are utilized to create dynamic e-commerce applications that solve complex problems in a secure and robust manner. Key concepts include: Internet architecture, structured data languages, scripting languages, programming languages, database connectivity, and Internet security. Prerequisites: IT 205 and IT 363, or instructor's permission.

IT 464/564. Project Management in Information Systems. 3 Credits.
This course focuses on project management techniques and methodologies that can be adopted to Information Technology software and systems projects. Prerequisites: IT 317 with a C or better, IT 363, and a declared major in the university or waiver approved through the Strome College of Business Undergraduate Advising.

IT 474. Strategic IT Administration. 3 Credits.
Focuses on improving business use of existing IT and achieving competitive advantage. All students gain a strategic perspective on an important organizational resource—information. Prepares IT students for managerial positions and effective communication with executives. Prerequisites: IT 317 with a C or better, IT 363, and a declared major in the university or waiver approved through the Strome College of Business Undergraduate Advising.

IT 494. Entrepreneurship in Information Technology. 3 Credits.
This course is designed to help students enhance their personal and professional development through real-world entrepreneurial innovation guided by faculty members and professionals. This course allows students to integrate disciplinary knowledge by developing innovative processes, products, businesses, or other innovations utilizing information technology. The real-world entrepreneurial experience will help students understand how academic knowledge leads to innovation and problem solving. Prerequisite: six credit hours of any IT 300 or 400 level courses.

IT 495/595. Selected Topics in Information Systems. 1-3 Credits.
Taught on an occasional basis. See the course schedule for the particular topic being taught each semester. Prerequisite: permission of the department.

IT 497. Independent Study in Information Systems. 1-3 Credits.
Affords students the opportunity to undertake independent study under the direction of a faculty member. Prerequisite: permission of the department.

IT 530. Object-Oriented Application Development with JAVA. 3 Credits.
Using JAVA as an object-oriented language to write business applications that solve complex problems in a secure and robust manner. Business examples incorporating multimedia, multithreading, networking, and advanced graphical interfaces are used to reinforce the object-oriented concepts of abstraction, encapsulation, inheritance, polymorphism, persistence, and dynamic binding.

IT 564. Project Management in Information Systems. 3 Credits.
This course focuses on project management techniques and methodologies that can be adopted to Information Technology software and systems projects. Prerequisites: Enrolled in a graduate program or a graduate certificate program, or waiver approved by the instructor.

IT 595. Topics. 1-3 Credits.
IT 610. Information Technology Management. 3 Credits.
Information is a critical resource for today's organizations. This course prepares students for the managerial, organizational and technological challenges involved on managing information and information technology resources.

IT 612. Knowledge Management. 3 Credits.
Knowledge processes including knowledge creation, acquisition, transfer and application are studied. Students are introduced to real-world technologies and systems.

IT 614. Information and Knowledge Management. 2 Credits.
Information and knowledge are critical resources for today's organizations. This course prepares students for the managerial, organizational, and technological challenges involved in managing information and knowledge. Prerequisites: Admission to the MBA Program or MBA 600, MBA 601, MBA 602, MBA 603 and MBA 604.

IT 620. Systems Analysis and Design. 3 Credits.
Introduction to the Systems Development Life Cycle (SDLC) from an information systems project perspective. Emphasis is placed on the planning and analysis functions performed during information systems project work. Tools and techniques include: data flow diagrams, entity relationship diagrams, computer-aided systems engineering (CASE), and the project repository. These tools will be employed to create process and data-driven versions of these models.

IT 624. Information Technology Assurance Services. 3 Credits.
Standards, ethics, and practice of information technology assurance services particularly as it concerns the governance and control of information systems. (cross listed with ACCT 624) Prerequisite: ACCT 601 or equivalent.

IT 625. Information Systems for International Business. 3 Credits.
Examines the role of information in the global environment and the global organization. Issues related to information infrastructures for the organization, nation and the world will be covered, as well as how global information systems departments support the organization.

IT 634. Cloud Computing and Security. 3 Credits.
An introduction to key concepts and techniques of cloud computing and security. Topics include: cloud computing systems, virtualization and container technologies, cloud architecture and service platform design, cloud programming models, big data analytics, cloud performance and security.

IT 635. E-Commerce and E-Business. 3 Credits.
Examines the impact of electronic transactions and networked information technologies on a business and the global business environment. The course provides a comprehensive introduction to the use of the Internet and Web technologies for business applications.

IT 649. Information Systems and Network Security. 3 Credits.
Introduces the fundamental issues and concepts of information security, emphasizing security policy, risk management, cryptography and network security.

IT 650. Database Management Systems. 3 Credits.
Introduction to database management systems. The topics addressed include system architecture, data models, database analysis, design and implementation, querying processing, business transaction processing, and database security. Prerequisites: IT 620 or equivalent; or permission of the department.

IT 651. Business Intelligence. 3 Credits.
Introduction to business intelligence and its three components: data warehouse, data mining, and OLAP. Examines traditional techniques as well as emerging technologies. Prerequisite: IT 650 or permission of the instructor or department.

IT 652. Information and Communications Technology for Big Data. 3 Credits.
Introduction to emerging ICT techniques for big data analytics and big data science. Topics cover WSN, cloud computing and IoT. Prerequisite: IT 650 or permission of the instructor or department.

IT 653. Database Administration Fundamentals. 3 Credits.
Overview of database administration of major database platforms such as Oracle and DB2. Topics include database installation and configuration, performance monitoring and tuning, storage management, database security, user management, database connectivity, and backup/recovery techniques. Prerequisite: IT 650.

IT 654. Advanced Database Administration. 3 Credits.
Overview of advanced database administration techniques of state-of-the-art database platforms. Topics include grid infrastructure, database clouds, RAC. Prerequisite: IT 650.
IT 655. Database Programming for the Web. 3 Credits.
In-depth exploration of web-based database administration and implementation. Hands-on experience with a variety of web-based database technologies. Topics include: MySQL, PHP, XML, database technologies such as XQuery, XPath, and XML schemas, web log analysis, and text mining. Prerequisite: IT 650.

IT 660. Digitalizing Enterprises. 3 Credits.
Information and Communication Technologies (ICT) is a critical enabler of the digital enterprise. This class introduces cutting-edge ICT, including enterprise systems, IoT, CPS as the foundation for digitalizing enterprises for the seamless integration of enterprises and supply chain. Topics include intra- and inter-organizational integration, supply chain collaboration and integration, and digitalization technologies. Prerequisites: IT 650 or permission of the instructor or department or admission to a graduate program at ODU.

IT 661. Implementing Internet Applications. 3 Credits.
Advanced design and implementation strategies are utilized to create dynamic e-commerce applications. Key concepts include: Internet architecture, structured data languages, scripting languages, programming languages, database connectivity, and Internet security.

IT 664. Project Management. 3 Credits.
This course provides knowledge of project management including tools and techniques to manage scope, time, cost, quality, risk, team communications, security and procurement. Special issues in the context of information- and technology-based projects are emphasized.

IT 665. Network Systems Administration. 3 Credits.
Covers the essential knowledge and skills required to administer networks. Hands-on experience with commercial software. Topics include architecture, planning, installation, configuration, resource sharing, and network optimization. Prerequisite: IT 635 or permission of the department.

IT 667. Cooperative Education. 1-3 Credits.
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Prerequisites: IT 620 or equivalent.

IT 668. Information Systems Internship. 1-3 Credits.
Approval for enrollment and allowable credits are determined by the department and Career Development Services in the semester prior to enrollment. Available for pass/fail grading only. Prerequisites: IT 620 or equivalent.

IT 672. Enterprise Architectures. 3 Credits.
Introduction to enterprise architectures for business organizations as well as related information architectures. Examines traditional techniques as well as emerging techniques including industrial information integration engineering. Prerequisite: IT 650 or permission of the instructor or department.

IT 674. Managing IT Strategically. 3 Credits.
Focuses on improving business use of information technology and using technology to achieve competitive advantage. Prepares students for technology-related managerial and leadership positions. Students will gain a strategic perspective on information technology as an important organizational resource.

IT 680. Computing Aspects of Medical Informatics. 3 Credits.
Overview of computing aspects of medical informatics. Computational methods in scientific computing of medical informatics are covered. The basic thrust is to demonstrate the usefulness and power of computational methods in solving real-life problems in perspectives of medical informatics.

IT 685. Introduction to Information Security. 3 Credits.
Introduction to technical and administrative aspects of information security. Topics include identification and authentication, access control, security models, computer intrusion detection, trust management, cryptography, PKI, firewalls, network security, web security, and secure e-commerce and e-business.

IT 695. Selected Topics in Information. 1-3 Credits.
3 credits. Prerequisite: permission of the department chair and the graduate program director.

IT 697. Independent Study in Information Systems. 1-3 Credits.
Affords students the opportunity to undertake independent study under the direction of a faculty member. Prerequisite: IT 650 or permission of the department.

IT 698. Master's Project in Information. 3 Credits.
3 credits. Prerequisites: IT 650 and permission of the department.

IT 699. Master's Thesis in Information Systems. 1-6 Credits.
1-6 credits. Prerequisites: IT 650 and permission of the department.

IT 795. Selected Topics in Management Information Systems. 1-3 Credits.
3 credits. Prerequisite: permission of the department chair and the graduate program director.

IT 800. Theoretical Foundation in Supply Chain/Information Technology Research. 3 Credits.
A survey of research methodology in supply chain and operations management, data science, and information technology including empirical, behavioral, computational, and interdisciplinary methods and techniques in different types of problem domains.

IT 850. Enterprise Architecture. 3 Credits.
This course examines the latest advances in enterprise architecture and computing. Topics include enterprise architecture design and modeling, service-oriented architecture (SOA), and integration of enterprise information and applications. Prerequisite: IT 800.

IT 890. Seminar in Business Process and Enterprise Systems. 3 Credits.
This course discusses how firms achieve business excellence through business process management (BPM), business process improvement (BPI), and business process reengineering (BPR) supported by IT. Topics include business process and workflow modeling, analysis, integration, monitoring and management. Prerequisite: IT 800.

IT 891. Seminar in Business Intelligence. 3 Credits.
The objective of this course is to provide an overview of managerial and technical issues associated with business intelligence. Topics covered include the state-of-the-art data warehousing, data mining and OLAP technologies. Prerequisites: IT 800.

IT 892. Seminar in Knowledge Management. 3 Credits.
The course examines the latest advances in knowledge management (KM) including identifying, capturing, sharing and evaluating an enterprise’s knowledge assets. The course reviews and discusses existing technologies in KM and new emerging KM technologies and practices. Prerequisites: IT 800.

IT 893. Supply Chain Management for E-Commerce. 3 Credits.
This course examines how supply chain management and information technology integrate to support global e-commerce opportunities. Topics include the theories and practices of material flow management, omnichannel distribution and retailing, maritime, logistics, procurement, and inventory management. Prerequisites: IT 800.

IT 895. Selected Topics in Management Information Systems. 1-3 Credits.
3 credits. Prerequisite: permission of the department chair and the graduate program director.

IT 899. Dissertation. 1-12 Credits.
Ph.D. level research and writing of dissertation. Prerequisite: IT 893; departmental approval required.

IT 998. Master's Graduate Credit. 1 Credit.
This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.