COMPUTING

Department Information

PhD Program in Computing website
https://www.southalabama.edu/colleges/soc/phdprogram.html

Title	Name
Assistant Professor & Director of Graduate Studies	Dr. Debra Chapman

Computing is a discipline that involves the understanding and design of computers and computational processes. In its most general form, it is concerned with the understanding of information transfer and transformation. Particular interest is placed on making processes efficient and endowing them with some form of intelligence. The discipline includes both advancing the fundamental understanding of algorithms and information processes in general, as well as the practical design of efficient, reliable software to meet given specifications. Courses offer students the opportunity to explore current trends in computing such as: game development, robotics, graphics, and data mining.

Degrees, Programs, or Concentrations

- Computing (PhD) (http://bulletin.southalabama.edu/programs-az/computing/computing/computing-phd/)

Courses

Computer Info Sciences (CIS)

CIS 010 Computer Proficiency Exam 0 cr
The purpose of this course is to administer the Computer Proficiency Exam (CPE) for enrolled students. The CPE consists of multiple choice and performance-based questions for general computer, internet, WWW, e-mail, and office application concepts. Performance-based questions require a series of actions in a simulated environment to demonstrate specific skills being assessed. No outside materials or assistance from the applications' Help files are allowed.

CIS 100 Information Tech in Society 1 cr
A discussion of the impact of information technology on personal, local, national, and global issues. Not to be taken with CIS 110.

CIS 101 Freshman Seminar CIS 2 cr
A course for first-time students that assists with maximizing the student's potential to achieve academic success and to adjust responsibly to the individual and interpersonal challenges presented by college life for a major in the School of CIS. Taught in small groups, the course provides an introduction to the nature of higher education and a general orientation to the functions and resources of the University and the School of CIS. Extensive reading and writing assignments relevant to the student's first year experience are required.

CIS 110 Intro to Comp-Info Sciences 3 cr
An introduction to information technology using a programming language to study applications in text searching, in real-time 3-D animation, and in sound production. A discussion of the social, ethical, economic, and philosophical implications of computing.

CIS 115 Beginning Programming 3 cr
A first course in programming uses an interpreted, interactive, object-oriented programming language. Coverage includes algorithmic problem solving, logical thinking, fundamentals of programming, variables and static values, sequential coding, decisions, and repetition.
Prerequisite: MMT 080 or A02 23 or (MA 112 Minimum Grade of C or MA 171 Minimum Grade of C) or MA 267 Minimum Grade of C or (MA 125 Minimum Grade of C or MA 132 Minimum Grade of C)

CIS 121 Prob Solv-Prog Concepts II 4 cr
Continuation of CIS 120. Topics include: design concepts, abstract data types, use of object libraries, dynamic storage allocation, stacks, queues, link lists, random access files, testing and software engineering practices.
Prerequisite: (CIS 120 Minimum Grade of C or CIS 141 Minimum Grade of C)

CIS 140 Intro to Tech for Healthcare 3 cr
This course is designed to provide a broad-based introduction to the use of computers and productivity software technologies for healthcare providers. Topics to be covered include use of a current Operating System and basic file management; the fundamentals of word processing, spreadsheet and graphics-based presentation software; basic image management related to documents and reports; as well as electronic health records systems. Other topics covered include information assurance, protecting patient privacy, social networks, computing safety, and professional coping skills.

CIS 150 Intro to Computer Applications 3 cr
This course is designed to provide a broad based introduction to the use of computers and productivity software technologies. Topics to be covered include: use of a current Operating System and basic file management; the fundamentals of word processing, spreadsheet and graphics-based presentation software; and basic image management related to documents and reports. Other topics covered include information assurance and computing safety as related to PC/Internet usage.

CIS 150L Intro to Comp Applications Lab 0 cr
Laboratory course for CIS 150, Introduction to Computer Applications.

CIS 190 Special Topics- 1-3 cr
Selected topics in computer and information sciences. Requires permission of Specialization Coordinator.

CIS 210 Intro to C++ Programming 3 cr
Introduction and fundamentals of C++ programming, input-output operations, variables, data types, arithmetic expressions, control statements, looping, functions, arrays, pointers, strings, structures, and abstract data types.
Prerequisite: MA 125 (may be taken concurrently) Minimum Grade of C
Cross-Listed: CPE 260

CIS 211 Advanced C++ Programming 1 cr
Advanced concepts in C++ programming, constructors, destructors, classes and operation overloading.
Prerequisite: (CIS 121 Minimum Grade of C or CIS 210 Minimum Grade of C)

CIS 227 Numerical Computation I 3 cr
Floating point numbers, representation, and errors; software tools for scientific computing; elementary problems in scientific computing.
Prerequisite: MA 126 Minimum Grade of C or MA 233 Minimum Grade of C

CIS 230 Adv Data-File Structures 3 cr
Extension of elementary data structures as covered in CIS 121, techniques to organize and access collections of data. Definition, implementation, and use of Classes and Abstract Data Types (ADT). The use of ADTs and objects for solving CIS problems. Network, hierarchical, and relational data models leading to Database Management Systems. Topics include: recursion, search trees, algorithmic complexity, advanced searching and sorting algorithms, and graphs.
Prerequisite: (CIS 121 Minimum Grade of C or CIS 142 Minimum Grade of C or CIS 211 Minimum Grade of C) and MA 267 Minimum Grade of C

CIS 235 Programming Language Seminar 3 cr
Fundamentals of syntax and style for a relevant, or current programming language. Includes application development in that language. Recommended: Knowledge of a programming language.

CIS 250 Advanced Comp Applications 3 cr
This course is designed to provide continuing, advanced coverage of productivity software technologies. Topics to be covered in depth include: fundamental and advanced features of spreadsheet and database management software. Other topics covered include information assurance and computing safety as related to PC/Internet usage.

CIS 250L Adv Comp Applications Lab 0 cr
Laboratory course for CIS 250, Advanced Computer Applications.
Prerequisite: CIS P or CIS 150 Minimum Grade of C

CIS 300 Information Tech in Society 1 cr
A discussion of personal, local, national, and global impact of information technology on ethical, legal, and social issues. Requires Junior standing in the School of Computing.

CIS 321 Data Comm and Networking 3 cr
An introduction to data communications, computer networking and network operating systems. Topics include: basic concepts of data transmission, network architectures, communications devices, and communication protocols.
Prerequisite: ISC 245 Minimum Grade of C or ITE 271 Minimum Grade of C or CIS 120 Minimum Grade of C or CSC 120 Minimum Grade of C

CIS 322 Operating Systems 3 cr
This course covers the development of operating systems that control computing systems. Topics include: file systems, process management, scheduling, memory management (real and virtual), security, and concurrency. Case studies of operating systems are examined.
Prerequisite: (CIS 230 Minimum Grade of C or CIS 263 Minimum Grade of C)

CIS 324 Database Design-Dev-Mgt 3 cr
Analysis, design, and development of desktop database systems. Coverage of normalization concepts, DBMS models, E-R/Semantic modeling, and query processing.
Prerequisite: ((MA 112 Minimum Grade of C or MA 171 Minimum Grade of C) or (MA 120 Minimum Grade of C or MA 287 Minimum Grade of C) or MA 267 Minimum Grade of C or (MA 125 Minimum Grade of C or MA 132 Minimum Grade of C) or A02 23) or MMT 080 and (ISC 245 Minimum Grade of C or ITE 271 Minimum Grade of C) or (CSC 121 Minimum Grade of N or CIS 121 Minimum Grade of C)

CIS 401 Accelerated Programming 3 cr
This course presents programming concepts in an accelerated manner. Coverage includes ADT's, Classes and Class Libraries, and simple data structures such as linked lists, stacks, queues. Laboratory assignments will be done in a high level, object-oriented language. This course does not count towards a graduate degree in CIS. Requires prior programming experience and permission of Coordinator.
Cross-Listed: CIS 121, CIS 123, CIS 501

CIS 402 Accelerated OS-Comp Arch 3 cr
This course presents computer architecture and operating systems concepts in an accelerated manner. Coverage includes machine and assembly languages, functioning of a simple processor, machine level data flow, microprogramming, I/O, interrupts and processing drivers, memory management, dynamic process scheduling, and multi-tasking. This course does not count toward a graduate degree in CIS. Requires prior programming experience desired and permission of Coordinator.
Cross-Listed: CIS 322, CIS 502

CIS 403 Accelerated Data-File Structs 3 cr
This course applies advanced programming concepts and techniques to data structures such as linear and linked list trees, records, files, and database. Sequential and random access file processing methods; searching and sorting methods. Laboratory assignments will be done in a high- level, object-oriented language. This course does not count toward a graduate degree in CIS.
Prerequisite: CIS 121 Minimum Grade of B or CIS 123 Minimum Grade of B or CIS 142 Minimum Grade of B or CIS 401 Minimum Grade of B or CIS 501 Minimum Grade of B
Cross-Listed: CIS 230

CIS 404 Accelerated Networks-Comm 3 cr
This course presents network and communications concepts in an accelerated manner. Coverage includes signaling concepts, communication devices, switching, network architectures and protocols, OSI reference model, network management and planning. This course does not count toward a graduate degree in CIS.
Prerequisite: CIS 222 Minimum Grade of B or CIS 322 Minimum Grade of B or CIS 402 Minimum Grade of B or CIS 502 Minimum Grade of B
Cross-Listed: CIS 321, CIS 504

CIS 405 Programming Languages 3 cr
This course examines formal language concepts of programming languages including syntax and basic grammars. Language features such as data types and structures, control structures, and data flow will be studied. Laboratory assignments include the use of high level languages as well as the use of windows API.
Prerequisite: CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B
Cross-Listed: CIS 333

CIS 406 IS in Organizations 3 cr
An examination of the relationship of information systems in organizations and the impact on people in the organization with respect to planning and decision making. Other topics covered include general systems theory, data security and integrity, application access control, project management, and large group behaviors.
Prerequisite: (CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B or CIS 503 Minimum Grade of B or (ITE 285 Minimum Grade of B or ISC 508 Minimum Grade of B) or ITE 451 Minimum Grade of B)

CIS 407 Database Programming 3 cr
This course examines implementation and access of databases via event-driven applications developed with visual programming tools. Other topics covered are elementary E-R modeling, data integrity, referential integrity, report development, interface design. This course does not count towards a graduate degree in CIS.
Prerequisite: (CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B)
Cross-Listed: CIS 324

CIS 439 Windows Programming 3 cr
This course continues and expands the study of programming begun in either ITE 285 or CIS 121. Concepts previously learned are extended to application programming in the windows (GUI) environments. Students will make use of the OLE, DDE, API features of windows in programming projects. Students will write and use their own DLL's in producing user interfaces and applications projects.
Prerequisite: CIS 230 Minimum Grade of C or CIS 263 Minimum Grade of C or ITE 285 Minimum Grade of C or ITE 451 Minimum Grade of C or CSGD 030

CIS 490 CIS Sp Top - 3 cr
Advanced selected topics in computer and information sciences. Requires permission of the specialization coordinator.
Prerequisite: CSPC 30

CIS 494 Directed Studies 1-3 cr
May be taken for a maximum of six credits, only three of which may be applied to the CIS major or minor. Requires permission of the specialization coordinator.

CIS 496 CIS Internship 3 cr
CIS internship program is designed to give advanced students practical experience in the computer industry. Students will work on sponsored projects with faculty advisors. Credit may apply to degree with approval of the dean. Requires GPA 2.75 or higher and permission of the Dean.

CIS 497 Senior Capstone Experience-W 3 cr
A comprehensive team project will be completed and documented. Writing assignments will reinforce the importance of life-long learning, leadership skills, and the ethical issues of computing as well as appropriate resume and job application cover letter creation. Oral and written reports will be required. This course is to be taken the final semester of the student's degree program. Requires application for graduation filed the semester before registering for the course. Completion of the following courses according to major: Computer Science-CSC 322 and CSC 333; Information Systems-ISC 360; Information Technology-ITE 370.
Prerequisite: (EH 372 Minimum Grade of C or EH 373 Minimum Grade of C) and (CSC 322 Minimum Grade of C and CSC 333 Minimum Grade of C) or ISC 360 Minimum Grade of C or ITE 370 Minimum Grade of C
Corequisite: CIS 498

CIS 498 CIS Senior Seminar 0 cr
A series of mini-seminars designed to prepare graduating seniors for transition to professional careers in computing or graduate study and to assess student learning outcomes in the curriculum. Mini-seminars would include, but would not be limited to: resume development, interviewing tips and techniques, career planning, professionalism and ethics in the workplace, and advanced graduate study and professional development. Each student will be required to complete one or more senior exit exams and a senior exit survey. Prerequisite: Computer Science: CSC 331; Information Systems: ISC 360; Information Technology: ITE 370.
Prerequisite: CIS 497 (may be taken concurrently) Minimum Grade of C and (CSC 331 Minimum Grade of C or ISC 360 Minimum Grade of C or ITE 370 Minimum Grade of C)
Corequisite: CIS 497

CIS 499 CIS Senior Honors Project - H 3-6 cr
Under the advice and guidance of a faculty mentor, honors students will identify and carry out a research project, relevant to the field of computing, that will lead to a formal presentation at the annual Honors Student Colloquium. The senior honors project will be judged and graded by three faculty chaired by the honors mentor. This course is required for Honors recognition and may be repeated for up to 6 credit hours. Requires completion of an approved project prospectus and permission of the appropriate Coordinator.
Prerequisite: CSPC 30

CIS 500 Basic Computing Prin and Appl 3 cr
Introduction to computers and computer applications. Components of a computer system will be presented. Word processing, systems design and implementation, and programming concepts will be introduced. Not to be taken for CIS graduate credit.

CIS 501 Accelerated Programming 3 cr
This course presents programming concepts in an accelerated manner. Coverage includes ADT's, Classes and Class Libraries, and simple data structures such as linked lists, stacks, queues. Laboratory assignments will be done in a high level, object-oriented language. This course does not count towards a graduate degree in CIS. Prerequisite: Prior programming experience desired and permission of Coordinator.
Cross-Listed: CIS 121, CIS 401

CIS 502 Accelerated OS-Comp Arch 3 cr
This course presents computer architecture and operating systems in an accelerated manner. Coverage includes machine and assembly languages, functioning of a simple processor, machine level data flow, microprogramming, I/O, interrupts and processing drivers, memory management, dynamic process scheduling, and multi-tasking. This course does not count towards a graduate degree in CIS. Prerequisites: Prior programming experience and permission of Coordinator.
Cross-Listed: CIS 322, CIS 402

CIS 503 Accelerated Data-File Structs 3 cr
This course applies advanced programming concepts and techniques to data structures such as linear and linked list, trees, records, files, and database. Sequential and random access file processing methods; searching and sorting methods. Laboratory assignments will be done in a high-level object-oriented language. This course does not count towards a graduate degree in CIS.
Prerequisite: (CIS 121 Minimum Grade of B or CIS 123 Minimum Grade of B or CIS 142 Minimum Grade of B or CIS 501 Minimum Grade of B) or CIS 401 Minimum Grade of B
Cross-Listed: CIS 230, CIS 403

CIS 504 Accelerated Networks - Comm 3 cr
This course presents networks and communications concepts in an accelerated manner. Coverage includes signaling concepts, communications devices, switching, network architectures and protocols, OSI reference model, network management and planning. This course does not count towards a graduate degree in CIS.
Prerequisite: (CIS 222 Minimum Grade of B or CIS 322 Minimum Grade of B or CIS 402 Minimum Grade of B or CIS 502 Minimum Grade of B or ISC 506 Minimum Grade of B)
Cross-Listed: CIS 321, CIS 404

CIS 505 Programming Languages 3 cr
This course examines formal language concepts of programming languages including syntax and basic grammars. Language features such as data types and structures, control structures, and data flow will be studied. Laboratory assignments include the use of high level languages as well as the use of windows API.
Prerequisite: (CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B or CIS 503 Minimum Grade of B or ISC 508 Minimum Grade of B)
Cross-Listed: CIS 333, CIS 405

CIS 506 IS in Organizations 3 cr
An examination of the relationship of information systems in organizations and the impact on people in the organization with respect to planning and decision making. Other topics covered include general systems theory, data security and integrity, application access control, project management, and large group behaviors. This course does not count toward a graduate degree in CIS.
Prerequisite: (CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B or CIS 503 Minimum Grade of B or ISC 508 Minimum Grade of B) or (ITE 285 Minimum Grade of B or ITE 451 Minimum Grade of B)
Cross-Listed: CIS 406

CIS 507 Database Programming 3 cr
This course examines implementation and access of databases via event-driven applications developed with visual programming tools. Other topics covered are elementary E-R modeling, data integrity, referential integrity, report development, interface design. This course does not count towards a graduate degree in CIS.
Prerequisite: (CIS 230 Minimum Grade of B or CIS 263 Minimum Grade of B or CIS 403 Minimum Grade of B or CIS 503 Minimum Grade of B or ISC 508 Minimum Grade of B)
Cross-Listed: CIS 324, CIS 407

CIS 518 CIS Research Methodologies 3 cr
A review of computer and information science literature and research topics. Techniques for defining research goals will be described. Students will be expected to identify a research area and conduct a complete review of the literature.
Prerequisite: CSGR P

CIS 530 Information Assurance/IT Audit 3 cr
This course covers the understanding and managing of risks and threats to information and information systems. This includes protecting and defending information and information systems by ensuring through authorization and other means concepts such as accessibility, secrecy, reliability, and authentication.
Prerequisite: CSGR P

CIS 535 Digital Forensic Analysis 3 cr
This course provides students with advanced tools, techniques, and methodologies for accumulating, securing, analyzing, managing, and reporting evidence related to a forensics examination. The professional communication and presentation of the results of forensic investigations will be emphasized.
Prerequisite: CSGR P

CIS 538 OS Concepts and Security 3 cr
This course examines the concepts of operating systems such as memory and virtual memory management, as well as processor, process, device, and file management. Topics include the management and organization of network operating systems and operating system security and ethics. Students will manage, configure, and secure operating systems such as Windows, Unix, and Linux in laboratory environments.
Prerequisite: CSGR P

CIS 539 Windows Programming 3 cr
The practice and principles of developing interactive desktop computer applications. Aspects to be covered will include graphical user interface; use of sophisticated widget, container, and utility libraries; event-driven programming; two-dimensional graphics; in-memory database; and deployment.
Prerequisite: CSGR P

CIS 540 Network Security Management 3 cr
This course examines network and web security issues including: risks and threats, system access points, hardware and software defense methods, and organizational security policies. The course will cover the analysis of systems for vulnerabilities, the implementation of security procedures, the monitoring of systems for security breaches, and the recovery or restoration of breached systems.

CIS 590 CIS Sp Top - 3 cr
Advanced selected topics in computer and information sciences. Requires permission of the CSC Coordinator
Prerequisite: CSGR P

CIS 594 Directed Studies - 1-3 cr
May be taken for a maximum of three credits to count toward the degree. Requires permission of the Director of Graduate Studies.

CIS 595 CIS Research Development 1-3 cr
Development of the research proposal for master's thesis. Graduate Professional Component. Requires permission of the Director of Graduate Studies.
Prerequisite: CIS 518 Minimum Grade of S

CIS 596 CIS Graduate Internship 3 cr
CIS graduate internship program is designed to give graduate students practical experience in the computer industry. Students will work on sponsored projects with faculty advisors. Up to three hours may be counted toward the degree. Requires permission of the Director of Graduate Studies.

CIS 597 CIS Graduate Seminar 1 cr
This course prepares graduate assistants in the School of CIS to provide support and assistance to faculty for instruction in School of CIS classes. Topical coverage includes but is not limited to: graduate assistant expectations and responsibilities, protection of student educational information (FERPA), practical skills in assisting in computing instruction, graduate assistant best practices, and tips from faculty and experienced graduate assistants. This course does not count towards a graduate degree in CIS. Requires permission of the Director of CIS Graduate Studies.

CIS 598 CIS Project 1-3 cr
Approved investigation of original problems under direction of a faculty member. This course may be repeated for a maximum of three hours of credit towards the degree. Requires permission of the Director of Graduate Studies.

CIS 599 CIS Thesis 1-9 cr
This course may be repeated for a maximum of six credits. A thesis committee will provide direction during the thesis. Requires approval of the thesis project by graduate faculty and the Director of Graduate Studies.
Prerequisite: CIS 595 Minimum Grade of B

CIS 694 Directed Study - 3 cr
This course focuses on the development of the doctoral prospectus leading to the the defense of a dissertation.

CIS 799 Dissertation 1-9 cr
This course focuses on the development of the dissertation.

Computer Science (CSC)

CSC 108 Introduction to Programming 2 cr
Problem-solving and pre-programming skills developed using hands-on activities in preparation for the introductory programming course.
Prerequisite: MA 112 Minimum Grade of C or A02 22 or MMT 070

CSC 120 Prob Solv and Prog Concepts 4 cr
An introduction to the design of algorithms and their implementation in a high-level programming language. Topics include: problem solving strategies, programming concepts, programming environment, control structures, methods, arrays, searching, sorting, object-oriented programming, and file input/output.
Prerequisite: (MA 113 Minimum Grade of C or MA 172 Minimum Grade of C) or (MA 115 Minimum Grade of C or MA 121 Minimum Grade of C) or (MA 125 Minimum Grade of C or MA 132 Minimum Grade of C) or A02 27 or MMT 090

CSC 121 Prob Solv and Prog Concepts II 4 cr
Continuation of CSC 120. Topics include: object-oriented programming concepts, abstract data types, graphical user interfaces and event-driven programming, exception handling, text and binary file I/O, and an overview of dynamic data structures.
Prerequisite: CSC 120 Minimum Grade of C or CIS 120 Minimum Grade of C

CSC 190 CSC Special Topics - 1 cr
Selected topics in computer science. Prerequisite: Permission of the CSC coordinator.

CSC 228 Digital Logic Computer Arch 3 cr
Topics include: Boolean algebra, minimization techniques, combinatorial and sequential circuit analysis, memory organization, microprocessor concepts, and CPU architecture.
Prerequisite: (MA 113 Minimum Grade of C or MA 115 Minimum Grade of C or MA 125 Minimum Grade of C or A02 27 or MMT 090)

CSC 231 Intro Data Structures Algs 4 cr
The course will cover techniques to organize and access collections of data, definition, implementation, and use of Classes and Abstract Data Types(ADT). Topics include: stacks, queues, heaps, search trees, recursion, algorithmic complexity, advance searching and sorting algorithms, and graphs and their application to problems.
Prerequisite: (CSC 120 Minimum Grade of C or CIS 210 Minimum Grade of C or CPE 260 Minimum Grade of C)

CSC 311 Networking and Communications 3 cr
An introduction to computer networks. Topics include: data transmission, network architectures, file compression algorithms, communication devices and protocols, network routing and flow algorithms.
Prerequisite: CSC 231 Minimum Grade of C or CSC 230 (may be taken concurrently) Minimum Grade of C

CSC 320 Computer Org-Architect 3 cr
An introduction to computer organization using a top down approach from system component to the register level, internal representation of data, general assembly and linking concepts, addressing modes, and introduction to a specific processor, its architecture and operating system.
Prerequisite: CSC 228 Minimum Grade of C and CSC 230 Minimum Grade of C or CSC 231 Minimum Grade of C

CSC 322 Operating Systems 3 cr
This course covers the development of operating systems that control computing systems. Topics include: file systems, process management, scheduling, memory management (real and virtual), security, and concurrency. Case studies of operating systems are examined.
Prerequisite: CSC 231 Minimum Grade of C

CSC 324 Database Concepts 3 cr
Introduction to database design and implementation. Aspects of data modeling, database design theory, storage, indexing, and database application development. Entity-relationship model, relational data model, schema refinement, normal forms, file organizations, index structures, and embedded SQL application development.
Prerequisite: CSC 231 Minimum Grade of C

CSC 331 Software Engineering Prin - W 3 cr
Models, techniques, and tools used in project management. Topics include: software development process, task scheduling, estimation and progress measurement. Coordination of development teams. Standards, testing plans, configuration management, metrics and use of CASE tools, system delivery and maintenance strategies.
Prerequisite: ((CSC 231 Minimum Grade of C or CSC 230 Minimum Grade of C or CIS 230 Minimum Grade of C)) and CA 275 (may be taken concurrently) Minimum Grade of C

CSC 332 Adv Data Structures and Algs 3 cr
Techniques for the design and analysis of efficient algorithms, emphasizing methods useful in practice. Topics covered include: mathematical foundations; all five asymptotic notations; analytic, empirical, and qualitative evaluation techniques; sorting algorithms; balanced trees (2-3-4 trees and red-black trees); dynamic programming; and NP-completeness.
Prerequisite: CSC 231 and MA 267

CSC 333 Prog Language Theory 3 cr
Formal examination of programming languages. Formal Language concepts including syntax and basic grammars are studied. Language features such as data types and structures, control structures, and data flow are examined. The run-time environment and the process of interpretation/compilation are covered. Interpreter and compilation techniques are introduced.
Prerequisite: (CSC 231 Minimum Grade of C)

CSC 340 Secure Software Engineering 3 cr
The objective of this course is to enhance the security of software by introducing sound security principles that should be incorporated into the software development process. Students will learn a risk management framework and best practices for software secuirty including code reviews, architectural risk analysis, penetration testing, risk-based security test, abuse cases, security requirements, and security operations.Students will also learn common flaws that lead to exploitation and be able to identify and mitigate such errors in practice. Out of class labs and exercises reinforce concepts presented in class. Prerequisite: CSC 331.
Prerequisite: (CSC 331 Minimum Grade of C or CIS 231 Minimum Grade of C)

CSC 399 Conc and Distributed Comp 3 cr
This course focuses on software development principles for concurrent and distributed systems. Topics include shared versus distributed systems, heterogeneous concurrent computing, high performance computing, concurrent design patterns and more.
Prerequisite: CSC 322 Minimum Grade of C

CSC 404 Web Tech & Knowledge Modeling 3 cr
The students will learn knowledge service design based on Web technologies and will develop a knowledge service project during the course. The course will highlight the features of different Web Services Technologies and introduce various Scripting Languages, provide an up-to-date survey of developments in Web Services Technologies, and Knowledge Modeling.
Prerequisite: (CSC 320 Minimum Grade of C or CSC 331 Minimum Grade of C)

CSC 410 Compiler Design-Construction 3 cr
Lexical analysis, syntactic analysis, intermediate code generation, object code generation, optimization, memory use, generators for scanners and parsers.
Prerequisite: CSC 332 Minimum Grade of C and CSC 333 Minimum Grade of C and CSC 320 Minimum Grade of C or EE 264 Minimum Grade of C

CSC 411 Comm - Network Analysis 3 cr
Data communications and computer networks. An in-depth treatment of network architectures and protocols for both WANS and LANS. Topics include: network routing and flow algorithms, internet working, and distributed systems.
Prerequisite: CSC 311 Minimum Grade of C and (CSC 322 Minimum Grade of C or CIS 322 Minimum Grade of C)

CSC 412 Real-Time Software Systems 3 cr
Design and implementation of software for real-time computer systems. Survey of typical real-time systems; techniques for code-conversion, error checking, and transmission monitoring.
Prerequisite: CSC 311 Minimum Grade of C and CSC 322 (may be taken concurrently) Minimum Grade of C and CSC 332 Minimum Grade of C

CSC 413 Computer Graphics 3 cr
An in-depth study of hardware and software techniques used in computer graphics. Study of display and entry devices, including refresh, storage, and raster scan topics. Software techniques will include display files, windowing, clipping, two and three-dimensional transformations, and hidden-surface removal.
Prerequisite: (CSC 231 Minimum Grade of C) and (MA 237 Minimum Grade of C or MA 227 Minimum Grade of C)

CSC 414 Modeling and Simulation 3 cr
Analytic and simulation models developed using deterministic and stochastic techniques. Topics include: event-driven simulations, queuing theory, Markov processes, and dynamical systems. "Real World" project required.
Prerequisite: (CSC 230 Minimum Grade of C or CIS 230 Minimum Grade of C) and (MA 126 Minimum Grade of C or MA 233 Minimum Grade of C) and (ST 310 Minimum Grade of C or ST 275 Minimum Grade of C) or ST 315 Minimum Grade of C or ST 320 Minimum Grade of C

CSC 415 Numerical Analysis 3 cr
Mathematical preliminaries, solving linear systems numerical solution of ordinary and partial differential equations.
Prerequisite: (CSC 230 Minimum Grade of C or CIS 230 Minimum Grade of C) and (MA 126 Minimum Grade of C or MA 233 Minimum Grade of C)

CSC 416 AI Theory and Programming 3 cr
Introduction to basic concepts, implementation techniques, and philosophies of artificial intelligence and intelligent systems. Introduction to expert systems, fuzzy logic systems, neural networks, and techniques for artificial intelligence programming. The fundamentals of an AI programming language (LISP or PROLOG) will be presented. The language will then be used to solve problems in typical AI applications.
Prerequisite: CSC 332 Minimum Grade of C or CSC 231 Minimum Grade of C

CSC 417 Computer Game Development 3 cr
Introduction to computer game development, including a variety of related topics. The course will be driven by research/technical paper discussions, student presentations and projects. The direction of the course will be guided to some extent by student interest.
Prerequisite: CSC 331 Minimum Grade of C or EE 368 Minimum Grade of C

CSC 418 Adv Game & Simulation Dev 3 cr
This course will cover advance topics related to the development of game and simulation software. Topics include game physics, collision techniques, game mechanics, level design, artificial intelligence, and security. Students will design and implement a game or simulation program that includes elements of artificial intelligence.
Prerequisite: CSC 417 Minimum Grade of C

CSC 426 Data Mining 3 cr
This course provides an in-depth study of data mining. Course content includes data preparation, feature selection, pattern mining, classification, clustering, and sequence mining. New research areas in data mining will also be discussed.
Prerequisite: CSC 332 Minimum Grade of C

CSC 428 Introduction to Bioinformatics 3 cr
Students in this course will study algorithms pertaining to bioinformatics (e.g. sequence alignment, biological database search, and phylogeny reconstruction); gain hands-on experience using bioinformatics tools; and understand the interaction of computer science and modern biology within the context of data-driven knowledge discovery.
Prerequisite: CSC 230 Minimum Grade of C

CSC 433 Adv AI Theory and Programming 3 cr
A study of advanced AI theory and implementation. Topics include neural networks, probability learning, and a variety of related topics. A programming language (LISP or R) will be utilized to solve complex industry problems associated with AI applications.
Prerequisite: CSC 416 Minimum Grade of C

CSC 434 Form Lang - Automata Theory 3 cr
Mathematical preliminaries, languages, context-free grammars, parsing, normal forms, finite automata, regular languages, pushdown automata, Turing machines.
Prerequisite: (CSC 333 Minimum Grade of C or CSC 340 Minimum Grade of C)

CSC 440 Secure Software Engineering 3 cr
The objective of this course is to enhance the security of software by introducing sound security principles that should be incorporated into the software development process. Students will learn a risk management framework and best practices for software security including code reviews, architectural risk analysis, penetration testing, risk-based security test, abuse cases, security requirements, and security operations. Students will also learn common flaws that lead to exploitation and be able to identify and mitigate such errors in practice. Out of class labs and exercises reinforce concepts presented in class.
Prerequisite: CSC 331 Minimum Grade of C and CSC 320 (may be taken concurrently) Minimum Grade of C or EE 264 Minimum Grade of C
Cross-Listed: CSC 340

CSC 450 Surreptitious Software 3 cr
Students in this course will learn about algorithms for software protection and learn how to use tools for program transformation. Specific topics include obfuscation, watermarking, tamperproofing, birthmarking, and hardware protection. Programming projects will be required in several different languages and course activities will involve preparing student-led lectures, working on programming projects, and writing reports.
Prerequisite: CSC 440 Minimum Grade of C

CSC 457 Data Warehousing 3 cr
This course focuses on the design, development and usage of data warehouses. Course content includes dimensional modeling, ETL processes, physical design, and analytical processing. New research areas related to data warehousing technology will also be discussed.
Prerequisite: CIS 324 Minimum Grade of C or CSC 324 Minimum Grade of C

CSC 460 Security of HW Implementations 3 cr
The objective of this course s for the student to build upon logic and architectural principles as applied to hardware designs. The key theme of the course is the security impacts of hardware design implementations.
Prerequisite: (CSC 320 Minimum Grade of C or EE 264 Minimum Grade of C)
Cross-Listed: CSC 560

CSC 485 Cyber-Physical Security 3 cr
This course focuses on the Security of Cyber-Physical Systems (CPS) and Internet of Things (IoT) that go beyond topics commonly considered in Computer and Network Security. This course aims to prepare participants for the cutting edge research undergoing in both areas. The successful participation in this course will require reading number of research papers, presenting learned material, active participation in in-class discussions, and successful accomplishment of a small research project.
Prerequisite: CSC 311 Minimum Grade of C and CSC 322 Minimum Grade of C

CSC 490 Special Topics 3 cr
Advanced selected topics in computer science. Prerequisite: Permission of the CSC Coordinator.

CSC 504 Web Tech & Knowledge Modeling 3 cr
The students will learn knowledge service design based on Web technologies and will develop a knowledge service project during the course. The course will highlight the features of different Web Services Technologies and introduce various Scripting Languages, provide an up-to-date survey of developments in Web Services Technologies, and Knowledge Modeling.

CSC 510 Compiler Design-Construction 3 cr
Lexical analysis, syntactic analysis, intermediate code generation, object code generation, memory use, generators for scanners and parsers.
Prerequisite: CSGR P

CSC 511 Comm-Network Analysis 3 cr
Data communications and computer networks. An in-depth treatment of network architectures and protocols for both WANs and LANs. Topics include: network routing and flow algorithms, internet working, and distributed systems.
Prerequisite: CSGR P

CSC 512 Real -Time Software Systems 3 cr
Design and implementation of software for real-time computer systems. Survey of typical real time systems; techniques for code conversion, error checking, and transmission monitoring.
Prerequisite: CSGR P

CSC 513 Computer Graphics 3 cr
An in-depth study of hardware and software techniques used in computer graphics. Study of display and entry devices, including refresh, storage, and raster scan topics. Software techniques will include display files, windowing, clipping, two and three-dimensional transformation, and hidden-surface removal.
Prerequisite: CSGR P

CSC 514 Modeling and Simulation 3 cr
Analytic and simulation models developed using deterministic and stochastic techniques. Topics include: event-driven simulations, queueing theory, Markov processes, and dynamical systems. "Real World" project required.
Prerequisite: CSGR P

CSC 515 Numerical Analysis 3 cr
Mathematical preliminaries, solving linear systems, numerical solution of ordinary and partial differential equations.
Prerequisite: CSGR P

CSC 516 AI Theory and Programming 3 cr
Introduction to basic concepts, implementation techniques, and philosophies of artificial intelligence and intelligent systems. Introduction to expert systems, fuzzy logic systems, neural networks, and techniques for artificial intelligence programming. The fundamentals of an AI programming language (LISP or PROLOG) will be presented. The language will then be used to solve problems in typical AI applications. Prerequisite: Graduate Professional Component Standing.
Prerequisite: CSGR P

CSC 517 Computer Game Development 3 cr
Introduction to computer game development, including a variety of related topics. The course will be driven be research/technical paper discussions, student presentations, and projects. The direction of the course will be guided to some extent by student interest.
Prerequisite: CSGR P

CSC 520 Computer Architecture 3 cr
Instruction set design, pipelining, instruction-level parallelism, memory hierarchy design, and multiprocessors.
Prerequisite: CSGR P

CSC 522 Performance Eval of Algorithms 3 cr
Mathematical foundations; analytic, empirical, and qualitative evaluation techniques; dynamic programming, greedy algorithms, graph algorithms; and selected advanced topics.
Prerequisite: CSGR P

CSC 524 Computer Language Design 3 cr
A study of programming language design and specification, including the compiling process, parsing, BNF grammars, and models of semantics. Differences between interpreters, assemblers, and compilers will be studied.
Prerequisite: CSGR P

CSC 525 Complexity Theory 3 cr
Mathematical preliminaries, languages, finite automata, Turing machines, decidability, recursive function theory, complexity, tractability and NP-complete problems.
Prerequisite: CSGR P

CSC 526 Data Mining 3 cr
This course provides an in-depth study of data mining. Course content includes data preparation, feature selection, pattern mining, classification, clustering, and sequence mining. New research areas in data mining will also be discussed. Laboratory assignments will provide students with opportunities to interact with and develop data mining technologies.
Prerequisite: CSGR P

CSC 527 Software Engineering Princ 3 cr
Advanced concepts of software engineering will be discussed. Program testing techniques including: structured design and walk throughs, proving program correctness and verifiability, and system coding standardization and integration will be covered in depth. Software team formulation and management techniques will be discussed.
Prerequisite: CSGR P

CSC 528 Introduction to Bioinformatics 3 cr
Bioinformatics is a highly interdisciplinary course between computer science and biology. It focuses on the analysis of proteins, genes, and genomes using computing technologies such as computer algorithms and computer databases. Students in this course will learn algorithms and databases pertaining to bioinformatics (e.g., sequence alignment, suffix tree and its biological/biomedical applications, genome alignment, biological/biomedical database search, and phylogeny reconstruction); gain knowledge and hands-on experience of bioinformatics tools; understand the interaction between computer science (in particular, semantic technologies) and modern biology within the context of data-driven knowledge discovery.
Prerequisite: CSGR P

CSC 532 Distributed Systems 3 cr
This course will further enhance the students understanding of the details of how an operating system functions. It will focus on the advanced concepts associated with distributed systems. The student will learn the underlying concepts of such systems and the algorithms needed to provide the required synchronization and communication.
Prerequisite: CSGR P

CSC 533 Adv AI Theory and Programming 3 cr
This course provides a broad introduction to machine learning and statistical pattern recognition. Topics include: supervised learning (generative/discriminative learning, parametric/non-parametric learning, neural networks, and support vector machines); unsupervised learning (clustering, dimensionality reduction, kernel methods); learning theory (bias/variance tradeoffs, practical advice); reinforcement learning and adaptive control. The course will also discuss recent applications of machine learning, such as to robotic control, data mining, autonomous navigation, bioinformatics, speech recognition, and text and web data processing.
Prerequisite: CSGR P

CSC 550 Surreptitious Software 3 cr
Students in this course will learn about Algorithms for software protection and learn how to use tools for program transformation. Specific topics include obfuscation, watermarking, tamperproofing, birthmarking and hardware protection. Programming projects will be required in several different languages and course activities will involve preparing student-led lectures, working on programming projects, and writing reports.
Prerequisite: CSGR P

CSC 557 Data Warehousing 3 cr
This course focuses on the design, development and usage of data warehouses. Course content includes dimensional modeling, ETL processes, physical design, and analytical processing. New research areas related to data warehousing technology will also be discussed.
Prerequisite: CSGR P

CSC 560 Security of HW Implementations 3 cr
The objective of this course is for the student to build upon logic and architectural principles as applies to hardware designs. The key theme of the course is the security impacts of hardware design implementations.
Prerequisite: CSGR P
Cross-Listed: CSC 460

CSC 580 Data Security 3 cr
The objective of this course is to introduce the inherent strengths and limitations of cryptography in data security applications, focusing on the basic principles of message privacy, key negotiation, and key management. The course covers various aspects of symmetric and asymmetric ciphers and provides a broad coverage of the core areas for engineering cryptographic systems. Students will be expected to implement and analyze simple crytographic schemes and read supporting articles and papers for presentation. Prerequisite: CIS Graduate Professional Component.
Prerequisite: CSGR P

CSC 582 Network Security 3 cr
The objective of this course is to provide students with the knowledge and skills to begin supporting network security within an organization. Students will gain an understanding of fundamental network security concepts and mechanisms, be able to identify security threats and vulnerabilities, and help respond to and recover from security incidents. The course will provide an understanding of how to design and build secure network algorithms and environments while gaining an in-depth knowledge of protocol security, intrusion detection, and principles of cyber defense.
Prerequisite: CSGR P

CSC 585 Cyber-Physical Security 3 cr
This course focuses on the Security of Cyber-Physical Systems (CPS) and Internet of Things (IoT) that go beyond topics commonly considered in Computer and Network Security. This course aims to prepare participants for the cutting edge research undergoing in both areas. The successful participation in this course will require reading number of research papers, presenting learned material, active participation in in-class discussions, and successful accomplishment of a small research project.
Prerequisite: CSGR P

CSC 590 CSC Sp Top - 3 cr
Advanced selected topics in computer science. Prerequisite: Permission of the CSC coordinator.
Prerequisite: CSGR P

CSC 595 CS Project Proposal Develop 1-3 cr
Development of the project proposal for the Computer Science specialization master's project. Prerequisite: Graduate Professional Component and Permission of the Director of Graduate Studies.
Prerequisite: CIS 518 Minimum Grade of S

CSC 598 Computer Science Project 1-3 cr
This course may be repeated for a maximum of six (6) credits. A CIS project committee will provide direction during the project. Prerequisites: Approval of project proposal by student's project committee and permission of the Director of CIS Graduate Studies.
Prerequisite: (CSC 595 Minimum Grade of B and CSCS P)

CSC 612 Cybersecurity 3 cr
This course focuses on developing expertise and preparation for independent research in Cybersecurity through an in-depth review of the Cybersecurity literature. The student will be conversant in broad issues and trends in Cybersecurity as defined by skill sets and occupations.

CSC 626 Advanced Big Data 3 cr
This course focuses on developing expertise and preparation for independent research in big data through an in--depth review of the big data and data science literature. The student will be conversant in broad issues and trends in big data as defined by current tools and technologies.

Cybersecurity (CYB)

CYB 530 Information Assurance/IT Audit 3 cr
This course covers the understanding and managing of risks and threats to information and information systems. This includes protecting and defending information and information systems by ensuring through authorization and other means concepts such as accessibility, secrecy, reliability, and authentication.
Prerequisite: CSGR P

CYB 535 Digital Forensic Analysis 3 cr
This course provides students with advanced tools, techniques, and methodologies for accumulating, securing, analyzing, managing, and reporting evidence related to a forensics examination. The professional communication and presentation of the results of forensic investigations will be emphasized.
Prerequisite: CSGR P

CYB 538 OS Concepts and Security 3 cr
This course examines the concepts of operating systems such as memory and virtual memory management, as well as processor, process, device, and file management. Topics include the management and organization of network operating systems and operating system security and ethics. Students will manage, configure, and secure operating systems such as Windows, Unix, and Linux in laboratory environments.
Prerequisite: CSGR P

CYB 540 Network Security Management 3 cr
This course examines network and web security issues including: risks and threats, system access points, hardware and software defense methods, and organizational security policies. The course will cover the analysis of systems for vulnerabilities, the implementation of security procedures, the monitoring of systems for security breaches, and the recovery or restoration of breached systems.
Prerequisite: CSGR P

CYB 555 Data Security 3 cr
This course examines the major concepts of data security such as confidentiality, integrity, availability, authenticity, and non-repudiation. Topics include the four types of data security, the five major elements of data security, the three A?s of data security, and the seven components of data security strategies. Students will conduct labs that will expose them to the techniques and tools used in data security management within an organization.

CYB 570 Cybersecurity Ethics 3 cr
This course examines the topic of ethics from a cybersecurity perspective. Topics include an introduction to the field of ethics; the three ethical frameworks; ethical hacking; issues related to privacy rights, surveillance, and intellectual property; and current cybersecurity codes of ethics. Students will further examine the topic of ethics through writing assignments, utilizing the major ethical frameworks ? virtue, utilitarian, and communitarian.

Information Systems (ISC)

ISC 190 IS Special Topics 1 cr
Selected topics in information systems. Prerequisite: Permission of the ISC coordinator.

ISC 245 Info Systems in Organizations 3 cr
An overview of information systems topics from an organizational and managerial perspective. Topics include current information technology and systems, such as the Internet and its organizational impacts; the emergence of global economy and digital firms; and the ethical and social impacts of information systems, such as privacy, intellectual property rights, and liability. Issues and strategies regarding information systems planning, systems development, decision making, and using IT for competitive advantage are discussed. Throughout the course, students will investigate the strategic uses of information technology in current industry-specific situations.

ISC 272 Systems Architecture 3 cr
This course introduces students to Information Technology hardware and systems software concepts. Topics include: computer hardware, operating systems, system software, hardware and software integration, operating procedures, system performance, security/safety, and compatibility. Student labs and hands-on activities will include: Windows, Unix, and Linux systems, system utilities and software tools. Credit cannot be received for both ITE 272 and ISC 272.
Prerequisite: CIS 115 Minimum Grade of C
Cross-Listed: ITE 272

ISC 285 Intermediate Programming 4 cr
A second course in programming (using a visual, event-driven programming language) that builds on CIS 115. Topics include: transition to visual language, processing data, decisions, loops, methods, arrays and lists, text processing, structured data types. Programming projects are required. Credit cannot be received for both ISC 285 and ITE 285.
Prerequisite: CIS 115 Minimum Grade of C
Cross-Listed: ITE 285

ISC 300 Health Informatics Clin Env 3 cr
This course provides an overview of concepts, terms, organization, and processes associated with patient care and clinical environments as they pertain to health informatics. The entire process of how a person accesses, moves within, and exits the system both as an inpatient and outpatient to obtain care. Students will observe and report on a variety of clinical settings and healthcare specializations throughout the semester. This course is designed for students with no prior clinical experience.

ISC 305 Info Systems-Technology 3 cr
The analysis, design, and implementation of information systems. Analysis of the functional areas of business and integration of computer tools to satisfy information requirements. Current development in business computer systems, including surveys of current systems and the Internet. Computer classrooms are utilized to provide students with "hands on" experience.
Prerequisite: CIS 250 Minimum Grade of C

ISC 310 Health Informatics 3 cr
This course provides an overview of the concepts, terms, tools, and architectures associated with health informatics as applied to healthcare delivery. Topics include: electronic record systems, computerized physician order entry, health system standards, terminologies, workflow modeling, security and privacy of clinical data, clinical reporting, and the impact of information technology use on the quality and efficiency of health care delivery and outcomes. ISC 300 is a corequisite for students with no prior clinical experience.

ISC 353 Info Sys Appl Development 3 cr
This course provides an accelerated approach to programming in a high-level, object-oriented language, especially for information systems. Coverage includes algorithmic problem solving, fundamentals of programming, procedures, decisions, repetition, arrays, files, exception handling, and object-oriented programming. The format for this course is lecture/lab. The instructor will demonstrate in class, and students will learn by doing homework problems and programming assignments. This course does not count towards a graduate degree in CIS. Some prior programming experience is desired and permission of Coordinator. Prerequisites: Math placement score of 65 or higher.
Prerequisite: UTM 65 or DS 090 Minimum Grade of C or (MA 112 Minimum Grade of C or MA 171 Minimum Grade of C)

ISC 360 Info Sys Analysis and Design-W 3 cr
A thorough examination of the analysis and design of computer information systems from the systems analysts view. The course will use an established software development methodology. At each step in the software development life cycle, both the methodologies used and the documentation required will be examined.
Prerequisite: ISC 245 Minimum Grade of C and (EH 102 Minimum Grade of C or EH 105 Minimum Grade of C)

ISC 361 Advanced Application Development 3 cr
This course explores advanced topics in applications development by connecting web applications written in a modern programming language with databases. Other topics: integrating programming components and libraries, application development and testing methodologies, and using an object oriented approach for multi-tiered applications. Programming projects are required. Credit cannot be received for both ITE 370 and ISC 361
Prerequisite: CIS 324 Minimum Grade of C and (ISC 285 Minimum Grade of C or ITE 285 Minimum Grade of C)
Cross-Listed: ITE 370

ISC 362 IS Object-Oriented Analy-Des 3 cr
This course provides an introduction to an object-oriented analysis and design (OOAD) methodology as well as the tools and techniques for supplementing this methodology. The course will also cover the use of notational metalanguages such as Unified Modeling Language (UML) and OOAD computer-assisted software engineering (CASE) tools.
Prerequisite: ISC 245 Minimum Grade of C

ISC 410 Health Informatics 3 cr
This course provides an overview of the concepts, terms, tools, and architectures associated with health informatics as applied to healthcare delivery. Topics include: electronic record systems, computerized physician order entry, health system standards, terminologies, workflow modeling, security and privacy of clinical data, clinical reporting, and the impact of information technology use on the quality and efficiency of health care delivery and outcomes.

ISC 450 Health Sys Analysis and Design 3 cr
This course provides an overview of the concepts, terms, tools, and architectures associated with health informatics as applied to healthcare delivery. Topics include: electronic record systems, computerized physician order entry, health system standards, terminologies, workflow modeling, security and privacy of clinical data, clinical reporting, and the impact of information technology use on the quality and efficiency of health care delivery and outcomes.
Prerequisite: ISC 410 Minimum Grade of C

ISC 455 Health Data Mgt Decision 3 cr
This course focuses on the design and management of electronic medical record systems and clinical decision support systems. Course content related to electronic medical record systems includes architectural components, technical design issues, and management; and, content related to clinical decision support systems includes decision support roles, extracting useful information from data, and legal and regulatory restrictions. Laboratory assignments will provide students with opportunities to interact with these systems.
Prerequisite: ISC 410 Minimum Grade of C

ISC 457 Data Ware-Decision Support 3 cr
This course examines the analysis and design issues as well as the architectural infrastructures associated with enterprise data warehouses for decision support. Prerequisites: CIS 324.
Prerequisite: CIS 324 Minimum Grade of C

ISC 459 IS Appl Design-Implementation 3 cr
Analysis and design of information systems to support multiple locations via Intranet/Internet access. Additional and supporting topics, such as corporate privacy and security are also covered.
Prerequisite: CIS 324 Minimum Grade of C

ISC 462 IS Strategy and Policy 3 cr
This course provides the top management, strategic perspective for aligning competitive strategy with information systems. Issues include the development and implementation of policies and plans to achieve organizational goals, including security policy.
Prerequisite: CIS 324 Minimum Grade of C

ISC 463 IS Database Admn and Security 3 cr
An examination of the issues and activities associated with the administrator function for databases. This course will cover installation, implementation, user management, backup, and security.
Prerequisite: CIS 324 Minimum Grade of C

ISC 464 IS Security and Risk Mgmt 3 cr
This course provides an introduction to the fundamental principles and topics of information systems security and risk management at the organizational level. This course views information security as a management issue that incorporates technical and management solutions. Topics include risk management, security policy, disaster planning, security law and ethics, and security education, training and awareness.
Prerequisite: (MGT 300 Minimum Grade of C or MGT 322 Minimum Grade of C) and (CIS 321 Minimum Grade of C or CIS 221 Minimum Grade of C)

ISC 467 Enterprise Information Systems 3 cr
This course provides an introduction to enterprise information systems and to business process modeling. Key concepts and techniques for identifying, designing, and documenting business processes will be presented. The way information technology can be used to manage, transform business processes is discussed. Successful organizational change strategies will be reviewed.
Prerequisite: (MGT 300 Minimum Grade of C or MGT 322 Minimum Grade of C) and CIS 324 Minimum Grade of C

ISC 472 Advanced Data Management 3 cr
This course provides an introduction to the concepts and technologies of big data. Key concepts and techniques allow organizations to analyze structured and unstructured data/information collected from transaction processing systems, data warehouses, and distributed systems. The ultimate purpose of descriptive, predictive, and prescriptive analytics is to support high quality decision support for executives and managers. Concepts of data mining, data storage, non-relational platforms, and considerations for new and emerging technologies are described in detail.
Prerequisite: (CIS 324 Minimum Grade of C or CSC 324 Minimum Grade of C) and (ISC 285 Minimum Grade of C or ITE 285 Minimum Grade of C or CSC 231 Minimum Grade of C)

ISC 475 Info Systems Proj Management 3 cr
This course examines the principles and techniques of project management from an information systems perspective. Major topics covered include project context, project selection, and project planning. Students work in collaborative teams and are instructed in the use of a project software tool. Credit cannot be received for both ITE 475 and ISC 475.
Prerequisite: CIS 324 Minimum Grade of C
Cross-Listed: ITE 475

ISC 490 Special Topics 3 cr
Advanced selected topics in information systems. Prerequisite: Permission of the ISC Coordinator.

ISC 501 Programming for IS 3 cr
This course covers programming concepts required by Information Systems professionals to provide a solid foundation for building applications. Coverage includes: data types, decision structures, repetition structures, graphical user interfaces (GUI), methods, arrays, files, and object oriented programming (OOP) concepts.

ISC 507 IS Database Processing 3 cr
Analysis, design and implementation of database systems for IS professionals. Coverage includes DBMS models, E-R modeling, normalization concepts, and the use of queries for processing data.

ISC 510 Health Informatics 3 cr
This course provides an overview of the concepts, terms, tools, and architectures associated with health informatics as applied to healthcare delivery. Selected research topics are introduced and independently studied. Topics include: electronic record systems, computerized physician order entry, health system standards, terminologies, workflow modeling, security and privacy of clinical data, clinical reporting, and the impact of information technology use on the quality and efficiency of health care delivery and outcomes. Prerequisite: Permission of the Director of CI Graduate Studies.
Prerequisite: CSGR P

ISC 516 AI Theory and Programming 3 cr
Introduction to basic concepts, implementation techniques, and philosophies of artificial intelligence and intelligent systems. Introduction to expert systems, fuzzy logic systems, neural networks, and techniques for artificial intelligence programming. The fundamentals of an AI programming language (LISP or PROLOG) will be presented. The language will then be used to solve problems in typical AI applications. Prerequisite: Graduate Professional Component Standing.
Prerequisite: CSGD 030

ISC 545 Management Information Systems 3 cr
This course provides an overview of information systems from an organizational, managerial, and technical perspective. The topics covered will focus on the strategic role of information systems and information technology in business processes, change and knowledge management, group and individual decision-making, and electronic commerce. Specific topics include current hardware, infrastructure and connectivity technologies, software and systems development methodologies. Internet-based applications, management challenges and opportunities created by information systems and global connectivity such as privacy, data and systems security and control, intellectual property, ethical and social consequences of information technology, and the impact of digital integration on an organization's competitiveness, products, services, procedures, and management structures. Prerequisite: Permission of the Director of CIS Graduate Studies.

ISC 550 Health Data Security & Comp 3 cr
This course involves a thorough examination of the security and privacy requirements of the Health Insurance Portability and Accountability Act (HIPAA) and the implementation of these requirements in the clinical environment. Students will learn how to address security development all the way through post-implementation, how to evaluate systems for vulnerabilities, and how to identify protected health information and covered entities.

ISC 551 Human-Comp Interface Design 3 cr
The course covers principles, guidelines, and methods in human computer interface design. Students complete a project involving the development, evaluation, and demonstration of a user interface. The interface is designed around a user and task analysis performed on a given problem. Students plan and conduct a usability study of a working prototype and report on results and recommendations. Prerequisite: Graduate Professional Component.
Prerequisite: (CIS 501 Minimum Grade of B and CIS 507 Minimum Grade of B)

ISC 553 IS Web Site Management 3 cr
This course addresses the design, development, and management of a web server. Topics include the selection, installation, and configuration of an operating system and web server software, web server security and monitoring, and website maintenance. Prerequisites: Graduate Professional Component.
Prerequisite: CSGR P

ISC 555 Health Data Mgt/Decision Supp 3 cr
This course focuses on the design and management of electronic medical record systems and clinical decision support systems. Course content related to electronic medical record systems includes architectural components, technical design issues, and management; and, content related to clinical decision support systems includes decision support roles, extracting useful information from data, and legal and regulatory restrictions. Laboratory assignments will provide students with opportunities to interact with these systems.
Prerequisite: CSGR P

ISC 557 Data Ware-Dec Support Systems 3 cr
This course examines the analysis and design issues as well as well as the architectural infrastructures associated with enterprise-wide data warehouses. Prerequisite: CIS Graduate Professional Component.
Prerequisite: CSGD 030

ISC 559 IS App Design-Implementation 3 cr
Analysis and design of information systems infrastructures to support multiple locations, intranet/internet access, corporate privacy, and security. Capacity analysis and planning, installation, performance monitoring, and problem solving strategies. Prerequisites: ISC 501 and ISC 507
Prerequisite: (ISC 501 Minimum Grade of B and ISC 507 Minimum Grade of B)

ISC 560 Info Systems Analysis-Design 3 cr
This course will include an introduction to the systems development life cycle as well as a survey of analysis and design techniques. Detail topics will include information systems planning and project identification and selection, requirements collection and structuring, process modeling, data modeling, design of interface and data management, system implementation and operation, system maintenance, and change management implications of systems. Globalization issues in systems will also be discussed. Students will use current methods and tools such as rapid application development, prototyping, and visual development.

ISC 561 IS Database Management 3 cr
An introduction to database management systems. The data environment, basic technical concepts and systems resources, database concepts, including use and management of databases. Classical and current DBMS models will be presented. Laboratory project activity will involve definition, creation, and development of a database. Prerequisites: Graduate Professional Component.
Prerequisite: (ISC 507 Minimum Grade of B)

ISC 562 IS Policy and Strategy 3 cr
This course provides the top management, strategic perspective for aligning competitive strategy, core competencies, and information systems. Issues include the development and implementation of policies and plans to achieve organizational goals, including defining systems that support the operational, administrative, and strategic needs of the organization, its business units, and individual employees. Prerequisites: Professional Component
Prerequisite: CSGR P

ISC 563 IS Database Administration 3 cr
This course will examine the issues and activities associated with the administrator function for organizational databases. Topics include storage and indexing, query evaluation, physical database design, crash recovery, and security. Prerequisite: CIS Graduate Professional Component.
Prerequisite: CSGR P

ISC 565 IS Project-Change Management 3 cr
A study of the concepts and techniques of project management from an information systems perspective. The course provides an overview of project lifecycle activities, and a focus on managerial, behavioral, and process issues that surround the dynamic context of systems development. The issue of managing the change brought about by the introduction or modification of information systems in organizations will be discussed. Students will be instructed in the use of software tools for project management.

ISC 567 IS Function Integration 3 cr
The tactical/operational responsibilities and roles of the CIO. Governance considerations that link the IS-business organizations. Current/emerging issues in creating and coordinating the key activities necessary to manage the day-to-day operations of the IS function. Coordinating skills and organizational IS infrastructure.
Prerequisite: (ISC 501 Minimum Grade of B and ISC 561 Minimum Grade of B)

ISC 568 IS Enterprise Integration 3 cr
Information systems role in transforming organizations and industries. An integrated view of the organization from an external and internal perspective. IS' internal role in integrating the enterprise through a cohesive set of business processes and functional applications to meet business needs. Enterprise resource planning and enterprise functionality. Collaborative systems. Consideration of external relations with suppliers, outsourcers, and customers. Prerequisite: ISC 559.
Prerequisite: ISC 559 Minimum Grade of B

ISC 572 Advanced Data Management 3 cr
The focus here is on the management of data and the technologies which specifically targets mass data storage with a view to online and after-the-fact examination of data to acquire new insights. The major topics include: data warehouse planning, data warehouse models, and supporting software, date mining concepts and tools, creation of data mining models for the tools and matching the tool to the task. Prerequisite: CIS Graduate Professional Component
Prerequisite: CSGR P

ISC 590 IS Sp Top - 3 cr
Advanced selected topics in information systems. Prerequisite: Permission of ISC coordinator.
Prerequisite: CSGR P

ISC 595 IS Project Proposal Develop 1-3 cr
Development of the project proposal for the Information Systems specialization master's project. Prerequisites: CIS 518, Graduate Professional Component, Permission of Director of CIS Graduate Studies.
Prerequisite: CIS 518 Minimum Grade of S

ISC 598 Information Systems Project 1-3 cr
This course may be repeated for a maximum of six (6) credits. A CIS project committee will provide direction during the project. Prerequisite: Approval of project proposal by the student's project committee, and permission by Director of CIS Graduate Studies.
Prerequisite: (ISC 595 Minimum Grade of B and CSIP P)

ISC 629 Comp Ecosystems 3 cr
This course focuses on developing expertise and preparation for independent research in computing ecosystems through an in-depth review of the computing literature. The course will explore concepts and issues associated with large scale parallel data processing, virtualized storage, application, and infrastructure architectures and the attendant security, privacy and legal issues.

ISC 673 Digital Investigations 3 cr
This course focuses on developing expertise and preparation for independent research in Digital Forensics Investigations through an in-depth review of the Digital Forensics literature. The student will be conversant in broad issues and trends in Digital Forensics as defined by skill sets and occupations.

ISC 675 Information Systems 3 cr
This course focuses on developing expertise and preparation for independent research in information systems through an in-depth review of the information systems literature. The course sill explore the current major streams of theory, research, and methodologies in information systems.

ISC 686 Risk Analysis 3 cr
This course focuses on developing expertise and preparation for independent research in risk analysis through an in-depth review of the risk assessment and information assurance literature. The student will be conversant in broad issues and trends in risk analysis as defined by techniques, methodologies, policies, frameworks, and skill sets.

Faculty
Computer Science

Faculty Name	Faculty Department	Faculty Position	Degrees Held
ANDEL, TODD R. (tandel@southalabama.edu)	Computer Sciences	Professor	BS, University of Central Florida MS, Air Force Inst of Technology PHD, Florida State University
BENTON, RYAN G (rbenton@southalabama.edu)	Computer Sciences	Associate Professor	BS, Loyola University-New Orleans MS, University of LA at Lafayette PHD, University of LA at Lafayette
CLARK, GEORGE WINSTON (georgewclark@southalabama.edu)	Computer Sciences	Assistant Professor	BSEE, University of South Alabama MSCIS, University of South Alabama PHD, University of South Alabama
DAVIDSON, CORDELL CLAY (ccdavidson@southalabama.edu)	Computer Sciences	Assistant Professor	BSBA, University of Southern Miss MS, University of South Alabama PHD, University of South Alabama
HUANG, JINGSHAN (huang@southalabama.edu)	Computer Sciences	Professor	BE, Fuzhou University ME, University of SC-Columbia DPHIL, University of SC-Columbia PHD, University of SC-Columbia
JOHNSTEN, TOM (tjohnsten@southalabama.edu)	Computer Sciences	Associate Professor	BS, Oklahoma State University MS, Arizona State University-Main PHD, University of LA at Lafayette
MCDONALD, JEFFREY TODD (jtmcdonald@southalabama.edu)	Computer Sciences	Professor	BS, US Air Force Academy MBA, University of Phoenix MS, Air Force Inst of Technology PHD, Florida State University
SEGEV, AVIV (segev@southalabama.edu)	Computer Sciences	Professor	MS, Tel Aviv University PHD, Tel Aviv University
STACEY, KRISTA JOHNSON (kjstacey@southalabama.edu)	Computer Sciences	Instructor	BA, Troy University-Main MED, University of South Alabama MS, University of South Alabama

Information Systems and Technology

Faculty Name	Faculty Department	Faculty Position	Degrees Held
BLACK, MICHAEL EUGENE (mblack@southalabama.edu)	Information & Systems Tech	Assistant Professor	BS, University of South Alabama MS, University of South Alabama PHD, Capella University
BOURRIE, DAVID M (dbourrie@southalabama.edu)	Information & Systems Tech	Associate Professor	BA, Michigan State University PHD, Auburn University
CAMPBELL, AMY ASHE (amycampbell@southalabama.edu)	Information & Systems Tech	Assistant Professor	BSN, Tennessee Technological U MSN, University of South Alabama DNP, University of South Alabama
CAMPBELL, STEPHEN MATTHEW (mattcampbell@southalabama.edu)	Information & Systems Tech	Associate Professor	BS, Tennessee Technological U MBA, Tennessee Technological U PHD, University of NC- Charlotte
CHAPMAN, DEBRA LAIER (dchapman@southalabama.edu)	Information & Systems Tech	Assistant Professor	BS, University of Southern Miss MS, University of South Alabama PHD, University of Southern Miss
CLARK, ANGELA MONTGOMERY (amclark@southalabama.edu)	Information & Systems Tech	Senior Instructor	BS, University of South Alabama MS, University of South Alabama
COBB, DAVID ANDREW (dacobb@southalabama.edu)	Information & Systems Tech	Instructor	AH, Remington College BS, University of South Alabama MS, University of South Alabama
GREEN, RICKY ELDON (rgreen@southalabama.edu)	Information & Systems Tech	Instructor	BSITE, University of South Alabama MSCIS, University of South Alabama
HOLIFIELD, JEFFREY (jholifield@southalabama.edu)	Information & Systems Tech	Senior Instructor	AAS-AT, Community College Of Air Force BS, Southern Illinois U-Carbondale MA, George Washington University MMOAS, Air University MSCIS, University of South Alabama
KIBBY, HANNAH VICTORIA (kibby@southalabama.edu)	Information & Systems Tech	Assistant Professor	BS, University of South Alabama MS, University of South Alabama PHD, University of South Alabama
LANDRY, JEFFREY P. (jlandry@southalabama.edu)	Information & Systems Tech	Professor	BS, University of New Orleans MBA, University of New Orleans PHD, Florida State University
OVERSTREET, PAUL R. (poverstreet@southalabama.edu)	Information & Systems Tech	Instructor	BS, University of Alabama MS, University of Alabama
ROBINSON, OCLLO PARKS (orobinson@southalabama.edu)	Information & Systems Tech	Instructor	BS, Auburn University MS, University of South Alabama
SHROPSHIRE, JORDAN D. (jshropshire@southalabama.edu)	Information & Systems Tech	Professor	BBA, University of Florida PHD, Mississippi State University
SMITH, MELISSA E. (mesmith@southalabama.edu)	Information & Systems Tech	Senior Instructor	BS, Troy University-Main MS, University of South Alabama
VAN DEVENDER, MAUREEN STAKELUM (mvandevender@southalabama.edu)	Information & Systems Tech	Senior Instructor	BS, University of South Alabama MBA, Spring Hill College PHD, University of South Alabama