COMPUTER AND INFORMATION SCIENCES
CIS 102. MICROCOMPUTER APPLICATIONS (3)
A survey of computer hardware, software, and Internet/Web social and ethical implications of the use and misuse of the computer. Hands-on experiences with software applications such as word processing, spreadsheets, and databases.

CIS 104. INTRODUCTION TO COMPUTER AND INFORMATION SCIENCES (3)
Provides an overview of the wide range of topics in computer and information sciences. Topics include computer number systems and theory of computation, computer hardware and organization, computer languages, programming, compilation, systems analysis and design, decision support, artificial intelligence, as well as ethical, global, and social issues.

CIS 206. INTERNET APPLICATIONS (1)
Students learn the basic skills necessary to access the Internet via the World Wide Web. Students learn basic browser commands and the use of search engines for effective Web-based research. Students learn the basics of e-mail, HTML, and the creation of Web pages.

CIS 211. COMPUTER LANGUAGE CONCEPTS (4)
A first course in the fundamentals of computer programming using an object-oriented programming. Includes basic data types, problem solving and algorithm design methods, program design, coding, testing, and debugging. Students learn the programming characteristics of subprograms, parameter passing, and modularity. Includes formal laboratory session. Prerequisite: CIS 104.

CIS 234. INTRODUCTION TO NETWORKING (3)
Students will learn the fundamental concepts of networking. Case studies and hands-on projects will consider networking topics including hardware, protocols, architecture, media, design, implementation, and troubleshooting, maintaining, and upgrading computer networks. Prerequisite: CIS 104.

CIS 287. SYSTEMS ANALYSIS AND DESIGN (3)
The system life cycle, starting with the requirements statement and ending with system extinction/replacement. Primary emphasis on the logical design phase of an information system. Includes explanations of both the traditional design approach and prototyping. Advantages and disadvantages of both approaches are examined. Prerequisite: CIS 211.

CIS 292. INTERNSHIP IN PROGRAMMING (1-3)
A form of independent study which integrates classroom study with supervised work experiences. Internships generally last no longer than a semester, and interns are not employees of the sponsoring company.

CIS 302. WINDOWS PROGRAMMING (3)
An in-depth study of creating the Windows graphical user interface (GUI). Students create powerful, full-featured applications which utilize the key features of Microsoft Windows, including ActiveX data objects (ADO.NET), Multiple Document Interface (MDI), Dynamic Link Libraries (DLLs), and graphics. Prerequisite CIS 211 or permission of instructor.

CIS 310. INFORMATION SECURITY (3)
Students will be introduced to fundamental concepts of information security including the establishment and implementation of an organization-wide security policy which is designed to protect the information assets of an organization. This course provides the student with the skills necessary to enforce an organization security policy and lays the foundation for continued study in the areas of information security. Prerequisite: CIS 234.
CIS 314. ADVANCED COMPUTER LANGUAGE CONCEPTS (4)
This course examines object-oriented programming and its use in software development. Topics include object-oriented design, classes and objects, code reusability, data hiding, polymorphism and inheritance. Prerequisite: CIS 211.

CIS 321. DATA AND FILE STRUCTURES (4)
The topics in this course include definitions and implementations of basic data structures including linked lists, stacks, queues, trees, and graphs and their applications; recursion as a algorithm design tool; and file organization and access techniques. Prerequisite: CIS 314, MATH 254.

CIS 324. INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3)
An overview of artificial intelligence, its tools and techniques. Includes such subjects as fuzzy logic, nonprocedural programming, basic search techniques, automated reasoning, and expert systems. Programming in Prolog or LISP and the creation of knowledge-based systems using expert system software shells. Emphasis on the application of artificial intelligence techniques to business and industrial problems. Prerequisites: CIS 211, 321.

CIS 331. PROGRAMMING LANGUAGES (3)
The syntax and semantics of programming languages. Topics include formal specification of syntax, declarations, binding, allocation, data structures and data types, control structures, control and data flow, the implementation and execution of programs, functional programming and imperative programming. Other possible topics include nonprocedural and logic programming, object-oriented programming, and program verification. Programming projects will provide experience in a number of languages. Prerequisite: CIS 321.

CIS 332. WEB PROGRAMMING I (3)
Students learn new skills, languages, and concepts required to create applications that use the World Wide Web as the basis for the user’s interaction with the application. This is the first of the two-course sequence on this topic and focuses on client-side application programming (JavaScript, HTML/XML, CSS, DHTML, DOM, and Java). Prerequisite: CIS 211 or permission of instructor.

CIS 334. WEB PROGRAMMING II (3)
This is the second semester of the two-course sequence on Web programming. It focuses on the server-side application programming in general and database in particular. It covers ASP.NET and VBScript as well as advanced topics such as XML Web service, SOAP, cookies, and security. Three-tier architecture of Web-based applications will be discussed. Other server-side programming languages such as PHP may also be covered. Prerequisites: CIS 332 and CIS 302 or permission of the instructor.

CIS 361. E-COMMERCE (3)
This course covers concepts, IT skills and tools, and social and ethical issues encountered performing e-commerce in a contemporary fashion, with focus on technical issues rather than business practices. Also included are topics such as EDI, VAN, ExtraNet, shopping cart, database, and security. Prerequisite: CIS 234 and CIS 332.

CIS 372. INTRODUCTION TO BIOMETRICS (3)
An introduction to the basics of biometrics and investigation of the mainstream biometric technologies being used. This course explains the underlying image processing concepts required to understand biometric techniques. Also included are ethics, privacy concerns, and the future of biometric technologies. Prerequisite: CIS 104.
CIS 386. COMPUTER ORGANIZATION (4)
Students will learn the principles of computer organization. Topics include the functional components of a computer, memory organization, auxiliary storage, system interconnection, digital logic, assembly language programming, and evolution and future trends of computer organization. Weekly laboratories will illustrate computer organization concepts and techniques. Prerequisites: CIS 211 and CIS 234.

CIS 388. DATABASE MANAGEMENT SYSTEMS (4)
The design and maintenance of a computerized database management system. Includes all operations such as design, creation, searching, sorting, and editing that must be performed on both sequential and direct access files and sets of files. Examines advantages and disadvantages of tree, network, and relational data structures. Coverage of query languages, data dictionaries, and security and privacy considerations. Prerequisite: CIS 211.

CIS 390. OPERATING SYSTEMS (3)
An introduction to the fundamentals of operating systems across computing platforms. Topics include process and storage management, protection and security, and distributed systems. Format principles are complemented with surveys of contemporary operating systems (including UNIX). Prerequisite: CIS 386.

CIS 392. COOPERATIVE WORK EXPERIENCE IN PROGRAMMING (1-6)
A supervised work experience in which the student is employed in an area that relates directly to and enhances his/her academic field of study. Prerequisites: 2.5 GPA and 12 credit hours of CIS course work. May be repeated for a maximum of 6 credits.

CIS 418. MANAGEMENT INFORMATION SYSTEMS (3)
An integration of the material covered in previous programming and systems courses. An examination of modern management information systems in a business setting. Topics include structured decision systems, decision support systems, information systems acquisition and management, database management systems, and the role of information processing systems in business decisions. Prerequisite: CIS 287.

CIS 419. DATA COMMUNICATIONS AND LOCAL AREA NETWORKS (3)
An introduction to the role of data communications and local area networks in a business environment. Management of data communications systems and local area networks. Special topics to be covered include fundamental communications concepts, data communications hardware, network configurations, protocols and software, microcomputers and communications, and local area networks (LANs). Prerequisites: CIS 234 and CIS 314.

CIS 421. COMPUTER ARCHITECTURE (3)
Topics include information representation, tags, check bits, floating-point arithmetic, instruction sets, RISC vs CISC, ALU design, bit slicing, microprogrammed control, microinstruction types, microprogram optimization, cache memories, interleaved memories, communication methods, bus control and timing, input-output, programmed I/O, interrupts and DMA, parallel and vector processors, pipelines, shared vs distributed memory, interconnection networks, and hypercube computers. Prerequisites: CIS 385 and CIS 386.

CIS 423. SERVER OPERATING SYSTEMS (3)
Students will learn the principles of current server operating systems. The role of servers in enterprise networks will be considered. Students will study the design of client/server networks, the services provided by server computers, and the management of services. Attention will be given to proper system administration, security, and error recovery. Various operating system configuration options will be studied including Internet access, network protocols, and fault-tolerant options. Prerequisites: CIS 234 or CIS 390 or permission of instructor.
CIS 431. ALGORITHMS AND DATA STRUCTURES (3)
The topics of this course include basic tools for algorithm analysis including asymptotic notations, lower and upper bounds, and recursive relations; advanced data structures; analysis of recursive algorithms; analysis of algorithms for searching and sorting; analysis of graph and geometric algorithms; analysis of numerical algorithms; study of NP-complete problems; and study of parallel algorithms. Prerequisite: CIS 321, MATH 307, and MATH 314.

CIS 434. INTER/INTRA NETWORKING (3)
Students will learn how to design, build, and troubleshoot an inter/intra network. Topics to be considered include LAN/WAN interconnectivity issues, physical transmission options, integration of voice and data, transport methods, and network protocol architectures. Prerequisites: CIS 234 and CIS 332 or permission of instructor.

CIS 441. AUTOMATA THEORY (3)
Topics include regular grammars, finite automata, context-free grammars, pushdown automata, and Turing machines; introductory treatment of computable and non-computable functions; and halting problems. Prerequisite: CIS 331.

CIS 450. WEB DESIGN STUDIO (3)
This course is designed for students to learn through hands-on experience and production. Students will form teams to learn advanced techniques for Web site creations and design, programming, and integration. Languages, tools, and technology for creating advanced Web applications will be covered. Prerequisite: CIS 334.

CIS 481. TOPICS IN COMPUTER AND INFORMATION SCIENCES (3)
Examines various topics in different aspects of computer and information sciences. Such topics may include microprocessor systems, performance analysis of computer systems, computer graphics, compiler design, parallel and distributed processing, computer security, expert systems, natural language processing, neural networks, or intelligent tutoring systems. Prerequisite; Consent of instructor.

CIS 482. REAL TIME AND EMBEDDED SYSTEM DESIGN (3)
A general introduction to real-time operating systems and embedded system design. Prerequisite: CIS 421.

CIS 485. DIRECTED RESEARCH IN COMPUTER AND INFORMATION SCIENCES (3)
Design and development of a project in some area of computer and information sciences. Each student enrolling in this course must select a computer and information sciences faculty advisor who will be responsible for approving, guiding, and evaluating the project. Prerequisite: Consent of instructor.

CIS 486. NETWORK SECURITY (4)
Students will learn how to protect computer networks from internal and external digital threats by studying security concepts and techniques. Topics include fundamental concepts of cryptography, cryptographic key distribution and management, authentication protocols, digital signatures, security policy, virtual private networks (VPNs) and their implications to security, and protection of Internet and Web-based systems and services. Weekly hands-on laboratories will investigate computer network security techniques. Prerequisite: CIS 423 or permission of instructor.

CIS 487. SOFTWARE ENGINEERING (3)
Introduces the Unified Modeling Language (UML) for object-oriented analysis and design, object-oriented life cycle models, testing, maintenance, and performance measurement of object-oriented software projects. Students will work in teams to develop object-oriented software projects. Prerequisite: CIS 321.