

# COMPUTER SCIENCE

## **CSA 098 Understanding Computers**

3 credits

*formerly CMP096 Computer Fundamentals*

The foundations necessary to use the computer as a tool. Topics covered will include an introduction to information representation and its storage, fundamental applications of the computer and fundamentals of programming demonstrated through a high-level programming language. Programming laboratory projects in a closed laboratory environment supervised by the instructor. 2 hours lecture; 2 hours of laboratory.

## **CSA 105 Introduction to Software Applications**

Corequisite: ENG 084 or ESL 142 ; or

Prerequisite: Eligibility for ENG 101. 3 credits

*formerly CMP103 Using Microcomputers and Application Software*

A hands-on course, taught in a computer laboratory, provides an introduction to IBMcompatible microcomputers, basic understanding of Windows and Internet, and indepth coverage of popular word processing, spreadsheet, and presentation tools. The course assumes no prior computing experience and is open to all students at the college except those majoring in computers. Emphasis in this course is on developing practical applications for personal productivity. The specific software used in this course may change from semester to semester based on industry demand. In addition to supervised classroom exercises, weekly computer projects are required. A student who takes CSC 103, CSA 105, or BBG 114 can apply credits from only one of these courses toward graduation.

## **CSA 205 Advanced Applications**

Prerequisite: CSA 105 or CSC 103. 3 credits

*formerly CMP123 Advanced Software Applications*

A continuation of CSA 105, taught in a computer laboratory. Students should be prepared to begin working at the advanced level in each particular software package taught in the prerequisite introductory course. This course presents advanced coverage of Windows, word processing, spreadsheets, graphics, macros, and databases including relations and advanced reporting.

## **CSC 103 Computer Concepts and Applications**

Prerequisite: Eligibility for ENG 101. 4 credits

*formerly CMP101 Computer Concepts with Applications*

An introduction to computer concepts: input, output, processor, hardware and software with emphasis on the information processing cycle, problem solving and algorithm development. A programming language is used to introduce the student to programming and to develop solutions to common computing problems.

Students also learn to use the computer as a tool by gaining experience with popular application software packages and the Internet. 3 hours lecture; 2 hours of laboratory. A student who takes CSC 103, CSA 105, or BBG 114 can apply credits from only one of these courses

toward graduation.

### **CSC 108 Introduction to Programming**

Prerequisite: Placement in MAT 172. 4 credits  
*formerly CMP119 Introduction to Programming*  
Fundamentals of programming and program development techniques. Topics include data types, functions, storage class, selection, repetition, pointers, arrays, and file processing. Programming laboratory projects in a closed laboratory environment are supervised by the instructor. 3 hours lecture; 2 hours of laboratory.

### **CSC 203 Introduction to COBOL**

Prerequisite: CSC 103. 4 credits  
*formerly CMP126 Introduction to COBOL*  
Introducing structured COBOL in the PC environment. Topics include the program development process, testing and debugging, COBOL syntax and logic, documentation, file concepts, calculations, decisions, repetition, and controlbreaks. 3 hours lecture; 2 hours of laboratory.

### **CSC 204 Advanced COBOL**

Prerequisite: CSC 203. 4 credits  
*formerly CMP226 Advanced COBOL*  
Continues to build on the foundations and syntax of CSC 203. Advanced concepts include data validation, table handling, sorting, file access methods, file maintenance, subprograms, and interactive programming. 3 hours lecture; 2 hours of laboratory.

### **CSC 207 Introduction to Visual Basic.NET**

Prerequisite: CSC 103 or knowledge of a programming language and familiarity with Microsoft Windows. 4 credits  
*formerly CMP225 Visual Basic*  
A study of the Visual Basic system comprising visual design tools, event driven programming, object oriented programming, and debugging tools to create applications that take full advantage of the Windows graphic environment. Students will build bars, buttons, boxes and menus. They will use controls, conditional statements and loops, multiple windows, data types, sub/functions procedures, data control, multiple document interface, ado, ole, control arrays, dll, data access object and database interfacing. 3 hours lecture; 2 hours of laboratory.

### **CSC 208 Advanced Visual Basic.NET**

Prerequisites: CSC 207 and CSC 233 or

equivalent SQL experience. 4 credits  
*formerly CMP231 Visual Basic 2*  
Provides the student with advanced programming concepts with desktop and distributed systems. It will extend object-oriented application development utilizing both client-side and server-side technology. The course will focus heavily on database connectivity and management. The RDBMS that will be utilized will be Oracle and SQL-Server. N-Tier applications development will be utilized in the classroom and laboratory assignments. 3 hours lecture; 2 hours of laboratory.

### **CSC 211 VB & ASP.NET Web Based Programming**

Prerequisite: CSC 208 Advanced Visual Basic.NET. 3 credits  
VB.NET provides web-based applications in a new and flexible way by encapsulating commonly used code into object-oriented controls. These controls can be fired by web site events. This course branches out into many other technologies such as Web Services, ADO.NET and advanced database usage, Custom Controls, and Security to provide the student with a complete range of the internet technologies. This course will provide students with the .NET techniques that will enable them to create flexible, secure, and robust web sites that can collect and work with information in a multitude of ways to the benefit of the user.

### **CSC 213 Object Oriented Programming Using C++**

Prerequisite: CSC 108. 4 credits  
*formerly CMP244 Object Oriented Programming Using C++*  
The advanced features of C++ programming and new tools of C++ will be covered in detail. Objects, classes, overloading, inheritance, virtual function, files, streams and class libraries will be discussed. Software design using object-oriented programming techniques and the C++ programming language. Programming laboratory projects in a closed laboratory environment supervised by the instructor. 3 hours lecture; 2 hours of laboratory.

### **CSC 223 Java Programming I**

Prerequisites: CSC 108 or CSC 207 or CSC 234 or CST 252 or permission of instructor. 4 credits  
*formerly CMP246 Java Programming*  
The features and tools of the Java programming language will be covered in detail. Comparison with C/C++ illustrated. JAVA environment, basics, classes, arrays, strings, inheritance, AWT, exceptions, I/O streams, and the Java API will be discussed. Programming laboratory projects in closed laboratory environment, supervised by the instructor. 3 hours lecture; 2 hours of laboratory. This course has been replaced by CSC 226 Object Oriented Programming Using Java (see below).

### **CSC 224 Java Programming II**

Prerequisite: CSC 223. 4 credits  
*formerly CMP247 Java 2*

This course picks up where the first Java Programming course left off, introducing the topics of threading and I/O. The remainder of the course serves to extend the student's knowledge of using Java to build enterprisestrength applications, with exposure to both "fat" and "thin" client structures. The course will cover currently used structures of JBDC connectivity, JavaBeans, servlets, JSP and XML and XHTML. 3 hours lecture; 2 hours of laboratory.

### **CSC 225 Cross Platform Web Services using the J2EE Platform**

Prerequisites: CSC224, CST255, or permission of instructor. 4 credits

The features and tools of Web Services will be covered in detail. This class will introduce the fundamentals of Web Services (XML, SOAP, WSDL, and UDDI) and the underlying theories of how Web Services are required to behave. Further, the class will cover creating and implementing Web Services using the Java 2 Enterprise Edition platform. Comparisons with .NET Web Services will be offered. Programming laboratories, supervised by the instructor, will be given. 3 hours lecture, 2 hours of laboratory.

### **CSC 226 Object Oriented Programming Using Java**

Prerequisites: CSC 108 or CSC 207 or CSC 234 or CST 252 or permission of instructor. 4 credits

The features and tools of the Java programming language will be covered in detail. The Object Oriented model will be used in developing object-based and object-oriented programs. The Java Virtual Machine and environment, classes, arrays, strings, inheritance, graphics, exceptions, I/O streams, and the Java API will be discussed. Programming laboratory projects in closed laboratory environment, supervised by the instructor, will be assigned. 3 hours lecture; 2 hours of laboratory.

### **CSC 233 Database Development I**

Prerequisite: Eligibility for ENG 101; CSC 103 or equivalent recommended. 4 credits  
*formerly CMP212 Relational Database Development*

Relational database development including data modeling, database design and database implementation. The student learns to create and alter tables, retrieve, insert, update, and delete data using a fourth generation language (ORACLE) in a supervised laboratory setting. Uses of database technology, understanding DBMS and RDBMS concepts, normalizing designs, transforming of logical design into physical databases, embedded SQL, and the role of the DBA are also covered. 3 hours lecture; 2 hours of laboratory.

### **CSC 234 Database Development II**

Prerequisite: CSC 233. 4 credits  
*formerly CMP224 Relational Database  
Development II*

Reinforcement of topics covered in CSC 233 as well as introduction of new topics including PL/

SQL; creation of custom forms; functions; reports; additional ORACLE features; advanced calculations and multi-valued dependencies; and some current trends. A case study approach is used to apply concepts, methodologies and the ORACLE tools covered. 3 hours lecture; 2 hours of laboratory.

### **CSC 235 Database Development III**

Prerequisite: CSC 234. 4 credits  
*formerly CMP236 Relational Database  
Development III*

This course will review SQL and will focus on advanced topics within Oracle, including PL/SQL, Procedure Builder, Developer Tools and Integration, SQL tuning, with an emphasis on DBA, and features of new Oracle releases. 3 hours lecture; 2 hours of laboratory.

### **CSC 241 Data Structures and Algorithms**

Prerequisite: CSC 213. 4 credits  
*formerly CMP228 Data Structures*  
Common data structures used to represent information in an object-oriented environment. Topics include stacks, queues, pointers, linked lists, binary trees, and hashing. Efficiencies of algorithms and their relations to data representation will be discussed. Programming laboratory projects in a closed laboratory environment supervised by the instructor. 3 hours lecture; 2 hours of laboratory.

### **CSC 245 Introduction to C#**

Prerequisite: CSC 207 or CSC 108 or CST 252 or CSC 234 or permission of instructor. 4 credits

The features and tools of the C# language will be covered in detail. Comparisons with Java and Visual Basic.Net will be offered. Visual Studio.NET environment, encapsulation, inheritance, polymorphism, exception handling, I/O, and the Common Language Runtime will be discussed. Programming laboratories, supervised by the instructor, will be given. 3 hours lecture, 2 hours of laboratory.

### **CSC 246 Advanced C#**

Prerequisite: CSC 245. 4 credits  
This course picks up where the Introduction to C# course left off. The course serves to extend the student's knowledge of using C# to build enterprise strength applications with exposure to both "fat" and "thin" client structures. The course will cover currently used structures of ADO.NET, ActiveX Component development, ASP.NET, WebForms, XML processing, and Web Services.

### **CSC 248 Cross Platform Web Services using .NET technology**

Prerequisites: CST255 and CSC211 or CSC246, or permission of instructor. 4 credits  
The features and tools of Web Services will be covered in detail. This class will introduce the fundamentals of Web Services (XML, SOAP, WSDL, and UDDI) and the underlying theories of how Web Services are required to behave. Further, the class will cover creating and implementing Web Services using the .NET technology. Comparisons with Java and other web service models such as EDI will be offered. Programming laboratories, supervised by the instructor, will be given. 3 hours lecture, 2 hours of laboratory.

### **CSC 255 Systems Analysis, Design and Development**

Prerequisite: One of the following: CSC 108, CSC 203, CSC 207, or CSC 223. 4 credits  
*formerly CMP 260 Systems Analysis and Design*  
Systems analysis, design concepts and techniques used in the workplace to resolve business problems. The case study approach is used to apply the systems development life cycle. Students, working in teams, analyze a business problem and develop, design and implement an executable business system. Monitoring, evaluation, project management, feasibility analysis and documentation are emphasized. 3 hours lecture; 2 hours of laboratory.

### **CSC 283 Introduction to Assembler**

Prerequisite: CSC 108, CSC 207, or programming experience in a high-level language.  
4 credits  
*Fall semester only. formerly CMP 222 Introduction to Assembler*  
Introduction to Assembler language programming and PC architecture. Topics covered include internal data representation and their conversions, the Assembly process, fixed point arithmetic, addressing modes, procedures, conditional jumps, loops, bit manipulation, external subroutines, stack, macros and conditional assembly, and disk storage. Programming laboratory projects in a closed environment supervised by the instructor. 3 hours lecture; 2 hours of laboratory.

### **CSC 295 Cooperative Education/ Work Experience**

Prerequisites: ENG 101, minimum 2.0 GPA, sophomore status, advanced programming course and approval of the department.  
3 credits  
*formerly CMP 299 Cooperative Education Work Experience*  
This course combines a classroom seminar with on-the-job learning. Students, who meet program eligibility work at an approved Cooperative Education site, attend a regularly scheduled seminar on campus. The seminar

covers the establishment of learning goals for the work assignment, career development and work-related problem solving. Faculty assign a final project designed to elicit on-the-job learning specific to computer security, computer systems technology, information systems, or information technology. Students must satisfactorily complete the seminar, the final project, and the work assignment to receive credit.

### **CST 111 Internet Commerce Technology**

Prerequisite: Eligibility for ENG 101 and one of the following: CSC 103, CSA 105, BBG 114 or equivalent experience with basic desktop applications and Internet search techniques.  
3 credits

*formerly CMP 111 Internet Commerce Technology*

This introductory course covers the current technologies supporting today's Internet commerce initiatives and the business rationales for conducting commerce via electronic rather than traditional means. Some of the technologies explored in the course include payment systems, web server tools, and security systems.

### **CST 121 Operating Systems, an Introduction**

Prerequisite: CST 180 or CSC 108 or any 200 level CST or CSC course with a grade of C or higher. 4 credits

*formerly CMP 230 Operating Systems*

Operating Systems provides an introduction to Unix based operating systems. The course focuses on basic skills in using a command line operating system. Students will learn the characteristics of the common Unix shells, the Unix based file and directory system, file management, permissions, the "vi" editor, and basic computer networking concepts and commands. Graphical user interface environments and PC operating systems will be discussed. 3 hours lecture; 2 hours of laboratory.

### **CST 141 Computer Hardware**

Prerequisite: Eligibility for ENG 101. 4 credits

*formerly CMP 108 Computer Repair*

This course provides hands-on experience and skills development necessary to install, service and support microcomputers. Each section focuses on the key concepts for A+ Certification testing. 3 hours lecture; 2 hours of laboratory.

### **CST 145 Digital Circuits and Logic**

Prerequisite: PHY 114. 4 credits

Fall semester only.

*formerly CMP 218 Digital Logic Design*

The study of number systems, Boolean Algebra, logic gates and circuits provides the basis for investigating the operation and application of multivibrators, counters, registers, memories, D/A and A/D converters and other specialized digital circuits up to digital electronic systems.

Appropriate laboratory exercises provide hands-on experience in digital circuitry. 3 hours

lecture; 2 hours of laboratory.

### **CST 153 Web Development and Design I**

Prerequisite: CSC 103 or CSA 105 or familiarity with PC operating system, file structures, mouse, and basic Word functions.

4 credits

*formerly CMP 116 Web Developer I*

This course provides the entry into the fast moving website development industry. With its heavy hands-on mode of delivery, students will learn XHTML, Cascading Style Sheets, and be exposed to JavaScript. Adhering to standards, specifically from the World Wide Web Consortium (W3C) and the European Computer Manufacturers Association (ECMA), will play a dominant role in the creation of web pages that are both platform and browser independent.

### **CST 180 Networking I**

Prerequisite: Eligibility for ENG 101 and eligibility for MAT 172. 4 credits

*formerly CMP 107 Networking I*

An introduction to computer networking concepts. Topics include the functions of the ISO/OSI reference model; data link and network addresses; the function of a MAC address; data encapsulation; the different classes of IP addresses (and subnetting); the functions of the TCP/IP network-layer protocols. The student learns to plan, design and install an Ethernet LAN using an extended or hierarchical star topology; to select, install, and test cable and determine wiring closet locations; to perform beginning network maintenance, tuning, and troubleshooting along with basic documenting, auditing and monitoring of LANs. This course consists of lecture, and computer based training, as well as hands-on laboratories. 3 hours lecture; 2 hours of laboratory.

### **CST 181 Networking II**

Prerequisite: CST 180. 4 credits

*formerly CMP 117 Networking II*

This is the second in a series of four courses designed to provide students with classroom and laboratory experience in current and emerging networking technology that will empower them to enter employment and/or further education and training in the computer networking field. Instruction includes, but is not limited to, safety, networking, network terminology and protocols, network standards, LANs, WANs, OSI models, Ethernet, Token Ring, Fiber Distributed Data Interface, TCP/IP Addressing Protocol, dynamic routing, routing, and the network administrator's role and function. Particular emphasis is given to the use of decision-making and problem-solving techniques in solving networking problems. 3 hours lecture; 2 hours of laboratory.

### **CST 182 Networking III**

Prerequisite: CST 181. 4 credits

*formerly CMP 127 Networking III*

This is the third course in the four-course series designed to introduce new content and extend previously learned networking skills. Instruction introduces and extends the student's knowledge and practical experience with switches, Local Area Networks (LANs) and Virtual Local Area Networks (VLANs) design, configuration and maintenance. Students develop practical experience in skills related to configuring LANs, WANs, Novell networks, Internetwork Packet Exchange (IPX) routing and Interior Gateway Routing Protocol (IGRP) protocols and network troubleshooting. 3 hours lecture; 2 hours of laboratory.

### **CST 183 Networking IV**

Prerequisite: CST 182. 4 credits

*formerly CMP 137 Networking IV*

This is the fourth course in the four-course series designed to introduce new content and extend previously learned networking skills. Instruction introduces and extends the student's knowledge and practical experience with Wide Area Networks (WANs), Integrated Services Data Networks (ISDN), and Point-to-Point Protocols (PPP) and Frame Relay design, configuration and maintenance. Students develop practical experience in skills related to configuring WANs, ISDN, PPP and Frame Relay protocols and networking troubleshooting. 3 hours lecture; 2 hours of laboratory.

### **CST191 Secure Wireless Networks**

Prerequisite: ENG 101, CST 180 or equivalent.  
3 credits

After an introduction to wireless networking, the course explores the options available for local area and personal area networking. Both design and implementation issues of practical wireless networks will be discussed. Hands-on projects will help reinforce the concepts presented. Wireless network security will be discussed in terms of the risks and the measures needed to secure them. Rogue access points and insecure network configurations will be discussed and students will develop their skills in identifying and mitigating these security threats. External threats such as eavesdropping, identity theft, and other evolving threats will be presented along with methods of making the wireless experiences secure.

### **CST 205 Project Management**

Prerequisites: Sophomore status (30 credits) and completion of one of the following: CST 182 , CSC 234, CSC 208, CSC 213, CSC 223.  
4 credits

*formerly CMP 235 Project Management*

This course covers the multiple facets of project management, from the initial discussions and specification sketches with the client through to implementation and documentation. Development

of project plans, complete with measurable milestones, dependencies and failure points are covered, as are the standard PERT and GANTT charts. A project management software tool is introduced and utilized within the scope of the class project. Each student, whether individually or as part of a team, will be responsible for taking an assigned project through the entire management life cycle 3 hours lecture; 2 hours of laboratory.

### **CST 245 Microprocessors**

Prerequisite: CST 145. 4 credits

*spring semester only. formerly CMP 238*

*Microprocessor Based Systems*

Introduction to basic principles of microprocessor architecture and 8085A/8085 Assembler language. Topics include microprocessor architecture, programming, and interfacing I/Os. These cover the following: overview of computers and microcomputers, 8080/8085 microprocessor architecture, bus architecture, memory (R/W, ROM, EPROM), memory map I/O, interfacing devices and case studies of selected microprocessors. Programming and laboratory work include topics such as 8080/8085 instruction set, loops, indexing, time delays, arithmetic operations, subroutines and interfacing I/O (serial, parallel and interrupts) 3 hours lecture; 2 hours of laboratory.

### **CST 252 Web Development and Design II**

Prerequisite: CST 153. 4 credits

*formerly CMP 216 Web Developer 2*

As a continuation of Web Development and Design I, this course focuses exclusively on JavaScript as the de facto scripting language of the Web. Students will write standards-based scripts that manipulate elements of the browser window. Further, students will use JavaScript to create Active Server Pages (ASP) that execute on a web server. This class prepares students to pass the ASP Certificate test administered by W3Schools.

### **CST 255 XML for the World Wide Web**

Prerequisite: CST 252, CSC 108, or CSC 207.

4 credits

*formerly CMP 225 XML for the World Wide Web*

The course builds on students' knowledge of HTML and JavaScript in the rich world of XML. Topics covered include creating wellformed and valid XML documents, Document Type Definitions (DTDs), namespaces, entities, XML Schemas, formatting using Cascading Style Sheets (CSS) and Extensible Stylesheet Language (XSL) and transformations using XSL Transformations (XSLT). 3 hours lecture; 2 hours of laboratory.

### **CST 272 Operations Security Technology**

Prerequisite: CST 121 or Co-requisite CST182 Networking 3. 3 credits

*formerly CMP 251 Operations Security Technology*

The Operations Security Technology course covers the identification of the controls over hardware and media and the operators with access privileges to any of these resources. A computer security professional is expected to know the resources that must be protected, the privileges that must be restricted, the control mechanisms available, the potential abuse of access, the appropriate controls, and the principles of good practice. All of these topics are addressed in the course.

### **CST 273 Security Management Practices**

Prerequisites: ENG 101, CST 111, and CST 181. 3 credits

*formerly CMP 256 Security Management Practices*

Security Management entails the identification of an organization's information assets and the development, documentation, and implementation of policies, standards, procedures, and guidelines that ensure confidentiality, integrity, and availability. This course will prepare the student to understand the planning, organization, and roles of individuals involved in security, develop security policies, and utilize management tools used to identify threats, classify assets, and rate vulnerabilities.

### **CST 274 Network Security Technology**

Prerequisites: CST272 Operations Security Technology. 3 credits

*formerly CMP 253 Networking Security Technology*

The Network Security domain encompasses the structures, transmission methods, transport formats, and security measures used to provide integrity, availability, authentication, and confidentiality for transmissions over private and public communications networks and media. This course will give the student both the knowledge and hands-on practice in network security software, including preventive, detective, and corrective measures.

### **CST 279 Digital Forensics**

Prerequisites: Eligibility for EN101, or any CST or CSC course with a grade of C or better.

3 credits

This course is an introduction to computer forensics. Topics include discussion of various types of computer crime and computer evidence, computer forensics standards and practices, the preparation of hardware for the acquiring of evidence, image techniques, computer forensics standards and practices. Students will gain a proficiency in using The Ultimate Toolkit from AccessData and ENcase Forensics Software Suite. They will also be learning how to collect, analyze and organize evidence through case studies. These topics will be reinforced through case studies, research and

presentations by experts