# COP: Computer Programming

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### INTRODUCTION TO PROGRAMMING CONCEPTS
A hands-on introduction to analyzing, designing, coding, and testing computer programs. Students will develop algorithms for problem solving with an emphasis on good programming practices. Students will use programming techniques including control structures, arrays, and subprograms to design and code basic programs using a modern computer language. Other topics include working with data, number systems, and an introduction to object-oriented and event-driven programming. This course prepares students for software development courses in programming and web development. Students with a demonstrated background in computer programming (transcript, job experience, or waiver exam) may request to have this course waived as a prerequisite to subsequent courses through the department office. (Special Fee: $41.00).

### VISUAL BASIC PROGRAMMING (FORMER TITLE INTRODUCTION TO VISUAL BASIC)
Prerequisite: Minimum grade of C in COP 1000C Study of the Visual Basic programming language with an emphasis on developing good programming practices. Topics include creating a graphical user interface, working with objects and events, decision and repetition structures, debugging and error handling, using multiple forms, data manipulation techniques, and an introduction to working with databases. Students will construct applications designed to run in a Windows environment. (Special Fee: $68.00).

### XML AND WEB SERVICES
Prerequisite: COP 2282C This course explains and demonstrates Extensible Markup Language (XML). XML-based Web services are also covered. XML is platform independent and versatile. This course teaches how to use XML in data exchange applications on the Web, for e-commerce and in n-tier architectures by explaining XML theory reinforced with practical examples and real-life solutions. (Special Fee: $70.00).

### C PROGRAMMING
Prerequisite: Minimum grade of C in COP 1000C Hands-on study of C Programming language as applied to business and scientific applications. Good programming practices and problem solving with procedural programming will be emphasized. Topics include data types, control structures, arrays, pointers, functions, file I/O operations, structs, and unions. (Special Fee: $41.00).

### ADVANCED C PROGRAMMING
Prerequisite: Minimum grade of C in COP 2220C. Continuation of C programming covering advanced data structures, including arrays, pointers, pointers to pointers, linked lists, binary trees, stacks, and hash tables. Also covers text and binary file I/O. (Special Fee: $95.00).

### C++ PROGRAMMING
Prerequisite: Minimum grade of C in COP 2220C Introduction to Object-Oriented Programming (OOP) using C++ programming language. Covers class hierarchies and single, repeated, and multiple inheritance. Focuses on abstraction and information hiding. Covers in detail polymorphism and dynamic binding. (Special Fee: $70.00).

### LINUX SHELL SCRIPTING
An introduction to the LINUX operating system. Topics include the history and philosophy of the LINUX Operating System, the file system, commands and files processing, multitasking, editors, shells, shell scripting, window systems and utilities. (Special Fee: $41.00).

### C# PROGRAMMING
Prerequisite: Minimum grade of C in COP 1000C A hands-on study of Microsoft Visual C# programming language with emphasis on object-oriented programming. Topics include control structures, arrays, methods, exception handling and inheritance. Students will develop C# programs in both console and windows modes. (Special Fee: $41.00).

### IOS APP DEVELOPMENT
Prerequisite: COP 2224C or COP 2360C or COP 2800C Hands-on application development for iOS devices including the iPhone, iPod Touch and iPad. Apps will be written in Objective C using Xcode, and executed in an emulator. Topics include the application architecture, user interface, data persistence, graphics, multimedia, and location-based services. Advanced apps will communicate with device sensors including the accelerometer, microphone and camera. The business of app development is explored, including distributing and marketing in App Store. Owning an iOS device is not required. Use of a Macintosh computer for development is required. On-campus computers are available for students who do not own a Macintosh. (Special Fee: $41.00).

### ANDROID APP DEVELOPMENT
Prerequisite: Minimum grade of C in COP 2800C Hands-on application development for Android devices. Native Android apps will be written in Java and executed in an emulator. Topics include the application architecture, user interface, data persistence, graphics, multimedia, and location-based services. Advanced apps will communicate with device sensors including the accelerometer, microphone and camera. The business of app development is explored, including distributing in the Android Market. Owning an Android device is not required. (Special Fee: $41.00).
COP 2800C. JAVA PROGRAMMING.  
JAVA PROGRAMMING Prerequisite: Minimum grade of C in COP 1000C or departmental approval. A hands-on course in programming with the Java language for students who have completed a course in programming concepts or have some other programming experience. Students will create Java applications with emphasis on correct object-oriented programming techniques and will become familiar with object-oriented design, including the creation of classes in Java and the use of existing classes as provided in the current version of the Java API. (Special Fee: $41.00).

COP 2805C. ADVANCED JAVA PROGRAMMING.  
ADVANCED JAVA PROGRAMMING Prerequisite: Minimum grade of C in COP 2800C. A continuation of COP 2800. Advanced topics in Java SE (Standard Edition), including Graphical User Interface using Swing, event handling, file input/output, collections, multi-threaded applications, and database connectivity. Object-oriented design and analysis is introduced using the Unified Modeling Language (UML). (Special Fee: $41.00).

COP 2822C. WEB SITE DEVELOPMENT.  
WEB SITE DEVELOPMENT The student will learn to construct Web pages containing animated graphics, forms, frames, style sheets, XML, and Dynamic HTML. The course will also cover the software tools available to create Web pages, as well as the hardware and software requirements for setting up a Web site. (Special Fee: $41.00).

COP 2830C. SCRIPTING LANGUAGES.  
SCRIPTING LANGUAGES Prerequisite: Minimum grade of C in COP 1000C and COP 2822C or departmental approval. The syntax and semantics of scripting programming language will be covered. Covers major scripting languages in current use. Students will learn to write scripting-language code, integrate the scripts into Web pages, and identify different uses and applications of scripts in Web sites and/or other multimedia projects. (Special Fee: $41.00).

COP 2833C. PHP AND MYSQL.  
PHP AND MYSQL Prerequisite: Minimum grade of C in COP 2830C. Students learn to develop data-driven websites using PHP and MySQL. Topics include PHP language features, integrating PHP with HTML forms, sessions, cookies, security, error handling, and database interaction. Administration of MySQL on a web server for use with PHP is covered. Students will develop a website using industry standard techniques for authentication, authorization, and e-commerce. (Special Fee: $70.00).

COP 2930. SELECTED TOPICS IN COMPUTER PROGRAMMING.  
SELECTED TOPICS IN COMPUTER PROGRAMMING Selected topics in computer programming based on the needs and areas of interest of the class and the professor. May include laboratory and/or field work as part of the class. Multiple credit course. May be repeated for credit, but grade forgiveness cannot be applied.

COP 3275C. C/C++ PROGRAMMING FOR ENGINEERING TECHNOLOGY.  
C/C++ PROGRAMMING FOR ENGINEERING TECHNOLOGY Prerequisite: Minimum grade of C in MAC 2312. A comprehensive course in computer programming using the C and C++ programming languages. Structured programming in C, especially for solving numerical problems is covered in detail, and object-oriented programming in C++ is introduced. Computer programming is used to improve quantitative problem solving skills by developing algorithms that apply mathematical techniques. Minimum grade of C required if used to satisfy Electrical and Computer Engineering Technology, B.S. Degree requirement. (Special Fee: $63.00).