

**CMM 460 Advertising Communication Tactics** [3] In-depth analysis and practice in communication tactics employed in creating advertising programs for clients. Principal focus on working on a competitive group project preparing an agency-style presentation for a real or hypothetical client. Prerequisites: CMM 360 plus two CMM electives, or permission of instructor.

**CMM 462 Advertising Competition** [3] This course gives advanced students the opportunity to work on a national student advertising competition conducted by the American Advertising Federation. The corporate client changes annually. Students are provided with a case study of an advertising/communication problem faced by the client. The student team submits to a group of advertising professionals a written advertising and communication plan and makes a formal presentation. The team judged district winner progresses to the national finals. Prerequisite: Permission of instructor.

**CMM 470 Senior Honors Thesis** [3] This course is designed to enable a student to complete an honors thesis under the supervision of a departmental advisor. The honors thesis is completed in partial fulfillment for the designation of departmental honors. Prerequisites: Acceptance into the departmental honors program, senior standing, and completion of CMM 311 (210) and CMM 411 (211).

**CMM 474 Public Relations Cases** [3] The course focuses on intensive analysis of public relations case studies in order to explore the theories and research that inform public relations management and practice. Prerequisites: CMM 270 and CMM 370.

**CMM 481 Advanced Multimedia** [3] This course involves an in-depth examination of multimedia concepts in the professional and educational world. Multimedia projects in mass communication are developed from among advertising, journalism, public relations, radio, and television areas. Theoretical issues surrounding the impact of computer-mediated communication on modern society, including privacy, surveillance, and encryption, are analyzed. Prerequisite: CMM 281.

**CMM 486 Integrated Communication in Practice** [3] Students work in task-oriented teams, developing and implementing integrated communication approaches to communication problems and cases. Students will research the cases, develop analyses of the situations, propose and defend plans for addressing the

situation, actuate their proposals, and assess the outcomes as well as the communication strategies used by participants in the class. Topics/case studies change each time the course is offered. Prerequisite: Permission of instructor.

**CMM 490, 491 Special Topics in Communication** [1–4, 1–4] Topics vary from semester to semester in accordance with timeliness, the needs of the communication curriculum, and the opportunities to explore areas of communication. Prerequisites vary by topic.

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## Computer Science

*Professors* Gray, Noonburg, Russell  
*Associate Professors* Anderson, Kagan (*Chair*), Pollina, Rosiene, Striefler  
*Assistant Professor* Zegarelli

The department offers a program leading to a B.A. and a B.S. in computer science.

In order to provide some consistency for students learning the fundamentals of computer programming, the department has a base language that is used for its introductory computer programming courses, CS 114 and CS 115. The current base language is Java. The term *upper-level courses* used below refers to courses having numbers beginning with 2, 3, or 4.

### Computer Science Honors Program

A candidate for honors in computer science must be a major in computer science who has completed 18 credit hours of upper-level computer science courses, and who has achieved a GPA of at least 3.25 in the major and 3.0 overall. In addition, a candidate must complete the equivalent of a semester course on an approved topic not covered in the existing curriculum. An Honors Committee appointed by the chairman and consisting of at least two faculty members will review the work and administer an oral and/or written examination. The final decision on the granting of honors will rest with this committee.

### Requirements for a Minor in Computer Science

**Requirements for the Minor**  
**20 credits, including**

*Core requirements: 11 credits*

CS 114 Computer Programming I

CS 115 Computer Programming II

CS 220 Data Structures

*Electives: 9 credits*

Three additional upper-level computer science courses.

Transfer students must satisfy the above requirements with a minimum of 6 credits of upper-level computer science courses completed at the University of Hartford.

### Grade Requirements for a Major or Minor

All required courses (including elective and application requirements for a major) must be completed with a minimum overall average of 2.33. Each of these courses must be taken for a letter grade and may not be taken on a Pass/No Pass basis.

### Experiential Education Program

The University's Experiential Education program is open to computer science majors. Students must complete the freshman year with at least a 2.5 GPA and have permission from the department's co-op faculty coordinator to be eligible for the program.

All co-op students work either full or part time during at least two terms, including summer terms. Academic credit is awarded and applied toward degree requirements as unrestricted elective courses. Co-op is graded on a Pass/No Pass basis.

For more information, contact the department's co-op faculty coordinator or the Experiential Education office.

### Certificate in Computer Science (formerly Post-Baccalaureate Minor in Computer Science)

The Department of Mathematics, Physics, and Computer Science makes its Certificate in Computer Science available to college graduates. To enter the program, students must have obtained a baccalaureate degree from an accredited college and successfully completed two semesters of calculus. If students have not had calculus, they may take it at the University of Hartford. All of the courses are offered in the evening, and students may enroll on a part-time basis. For further information, contact the Center for Graduate and Adult Academic Services.

### Bachelor of Science in Computer Science

The Bachelor of Science in Computer Science is designed to prepare students for a career in the computer profession, business, or education. It provides students with a solid foundation in both theoretical and applied computer science while also allowing them to explore other areas of interest. The B.S. degree is recommended for students planning to pursue graduate school.

### Requirements for the Major

#### Required credits: 74–76

#### 1. Computer Science Core

CS 114 Computer Programming I  
 CS 115 Computer Programming  
 CS 211 Architecture and Assembly Language  
 CS 220 Data Structures  
 ECE 231 Digital System Logic  
 ECE 232 Digital Laboratory  
 CS 320 Programming Languages  
 CS 340 Formal Languages and Automata  
 CS 360 Software Development  
 CS 451 Computer Operating Systems

#### 2. Mathematics Core

M 144 Calculus I  
 M 145 Calculus II  
 M 220 Linear Algebra and Matrix Theory  
 M 221 Discrete Mathematics I  
 M 260 Data Analysis

#### 3. Science Core

BIO 122-123 or CH 110-111 or PHY 112-113  
 (also satisfies A&S science requirement)  
 One additional 4-credit lab science course

#### 4. Elective Courses

Three upper-level CS electives and one upper-level M or CS elective

### Bachelor of Arts in Computer Science

#### Requirements for the Major

#### Required credits: 52

#### 1. Computer Science Core

CS 114 Computer Programming I  
 CS 115 Computer Programming II  
 CS 211 Architecture and Assembly Language  
 CS 220 Data Structures  
 ECE 231 Digital System Logic  
 ECE 232 Digital Laboratory  
 CS 320 Programming Languages  
 CS 360 Software Development  
 CS 451 Computer Operating Systems

#### 2. Mathematics Core

M 144 Calculus I  
 M 145 Calculus II  
 M 221 Discrete Mathematics I

#### 3. Elective Courses

Three upper-level CS electives and one upper-level M or CS elective

### Course Descriptions

Students with questions involving prerequisites for the course offering should see the instructor of the course. In most cases, admission to a course by permission of the instructor is possible.

**CS 100, 200, 300, 400, 500 Cooperative Education Program** [variable] These courses are intended for students in the Cooperative Education program. The program is designed to provide the students with an exposure to computer-related problems at commercial computer installations wherein they can apply the skills and concepts they have learned. The courses carry from 1 to 3 credits. The actual number awarded is decided by the faculty coordinator and based upon the level of the students' involvement. Cooperative education courses may not substitute for CS course requirements in the major. All courses must be taken on a Pass/No Pass basis. Prerequisites: Sophomore standing and 2.5 GPA.

**CS 110 Introduction to Computers** [3] Designed for non-science majors, the course emphasizes the computer's capabilities, limits, and its impact on society. Personal computer productivity software is used to demonstrate the influence of computers on society. Students are also provided an introduction to the Internet through the use of a Web browser and an e-mail facility. Not open to students who have completed a higher-level CS course. Laboratory fee.

**CS 111 Programming Foundations** [3] An introductory computer programming course designed for students with no prior programming background. Emphasis will be placed on problem solving and the translation of solutions into a programming language. Topics include data types, input/output, control structures, loop structures, and program modularity. This course may be used to prepare the student with no prior programming experience for CS 114 or as a one-semester exposure to programming. Prerequisites: (1) Two years of high school algebra with an average grade of at least B and (2) a high school computer course *or* CS 110. Not open to students who have completed a higher-level CS course. Laboratory fee.

**CS 114 Computer Programming I** [4] An introductory course, with laboratory, covering the fundamentals of problem solving using a computer. The programming language used is the current base language for the department. Although language-specific, the course emphasizes general programming methodology and concepts common to all programming languages: algorithms, top-down-structured program design, modularity, efficiency, testing and debugging, user friendliness. Topics include organization and hardware; input and output; sub-program units (functions), control structures;

compound data types. By the end of the course, the object-oriented paradigm is introduced. Some programming, in any language, is recommended; familiarity with quantitative reasoning is required. Prerequisite: M 110 or two years of high school algebra. Laboratory fee.

**CS 115 Computer Programming II** [4] A second course, with laboratory, in the fundamentals of problem solving using a computer. The programming language used is the current base language for the department. This course continues to emphasize language-independent programming techniques while building the students' knowledge of the current base language. The ideas of objects, classes, and inheritance, introduced in CS 114, are developed more fully. Pointers, dynamic memory allocation, recursion, and basic data structures are introduced. Prerequisite: CS 114 (minimum grade of C). Laboratory fee.

**CS 175 Introduction to Internet Programming** [3] This course introduces the student to current programming models used to generate and support real-world, Web-based applications. The course focuses on important HTML/XHTML tags and concepts, including tables, frames, forms, and cascading style sheets. The Common Gateway Interface (CGI) is presented as a means of transferring data to and from client-server applications. Coverage includes an in-depth examination of client-side programming using ECMA (European Computer Manufacturers Association) compliant scripting language, such as JavaScript, to create and customize Web pages, generate dynamic pages, and validate the integrity of CGI data. Prerequisite: CS 111 or permission of instructor. Laboratory fee.

**CS 211 Architecture and Assembly Language** [4] Architecture topics to include CPU and ALU design and operation, instruction sets, microcode, cache memory, arithmetic, instruction and data formats. Architectural principles are illustrated with the study of a specific assembly language. Prerequisites: CS 114 and CS 115, or permission of instructor. Laboratory fee.

**CS 220 Data Structures** [3] The study of linear lists (stacks, queues); static versus dynamic allocation; garbage collection; sparse matrices; prefix, postfix, and infix formulas; recursion and recursive algorithms; trees (binary and other representations of trees, traversal of trees); hashing; searching; sorting (bubblesort, quicksort, heapsort, mergesort); analysis of algorithms in terms of time and space complexity;

graphs (representation of graphs, topological sorting, reachability, critical path algorithm). Prerequisite: CS 115 (minimum grade of C). Laboratory fee.

**CS 320 Concepts of Programming Languages** [3] Introduction to programming language paradigms, including imperative, functional, object-oriented, logic, and concurrent. Example languages of each paradigm are compared and contrasted. Abstract programming language description is introduced. Prerequisite: CS 220. Laboratory fee.

**CS 330, 331 Studies in Computer Science** [3, 3] Concentrated studies in areas of computer science, such as design and analysis of algorithms, advanced operating systems, database theory, computer architecture, comparative languages, database management systems, computer networks, Internet programming, and software engineering. Prerequisites: CS 115 and M 221, or permission of instructor. Laboratory fee.

**CS 340 Formal Languages and Automata** [3] This course provides an introduction to theoretical computer science. Languages, grammars, and automata will provide a background for a discussion of parsing. Related areas also include recursive definitions, Turing machines, and decidability. Prerequisites: M 221 and CS 115. Laboratory fee.

**CS 351 Introduction to Artificial Intelligence** [3] This course will introduce the basic principles in artificial intelligence research. It will cover simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Areas of application, such as knowledge representation, natural language processing, expert systems, vision, and robotics, will be explored. The LISP programming language will also be introduced. Prerequisite: CS 220 or permission of instructor. Laboratory fee.

**CS 355 Computer Networks** [3] This course provides a solid foundation in the design of a computer network. Topics will focus on network standards and standardization bodies, a layered network architecture, circuit and packet switching, streams and datagrams, physical media and network access, media access and LAN addressing, Internet working and routing, and transport layer services. Also presented are application layer protocols used on the Web, file transfer, and electronic mail; and network security, including cryptography, encryption, and

authentication protocols. Prerequisites: CS 114, 115, 211, and 220. Laboratory fee.

**CS 360 Software Development** [3] This course focuses on the development of large-scale software that is reliable, understandable, and maintainable. Procedural and object-oriented paradigms are used to illustrate design approaches. Students will work in teams and will develop software on at least two platforms. Abilities and knowledge gained in the other computer science courses will be integrated with a series of comprehensive system development projects. Students will be required to present their project work to the class. Project organization, professional standards, and ethics will also be covered. Prerequisite: CS 220. Laboratory fee.

**CS 362 UNIX Internals** [3] An in-depth study of the UNIX operating system and associated software tools. Topics include UNIX-C interface (standard UNIX subroutines, system calls, C library); writing shell scripts; using UNIX tools (awk, sed, grep, tr, nroff); writing/developing software tools; and system security. It is assumed that the student has a working knowledge of programming in C/C++. Prerequisites: CS 220 or equivalent experience, and permission of instructor. Laboratory fee.

**CS 365 Principles of Database Systems** [3] This course provides a solid background in the theory, design, and programming of database systems, with a focus on relational databases. The relational data model and entity-relationship diagrams will be covered. Other data models, including the object-oriented model, will be presented. The course introduces database query languages, including an in-depth coverage of the Structured Query Language (SQL). Other database topics include storage and indexing techniques, transaction management, and database interface with application programs. Prerequisites: CS 114, 115, and 220; or permission of instructor. Laboratory fee.

**CS 371 Computer Graphics** [3] An introduction to fundamental aspects of three-dimensional computer graphics, including the implementation of basic graphics algorithms, geometrical transformations and projections, representations of curves and surfaces, lighting models, and graphical interaction. Theory is applied via the development of programs using a graphics package, such as OpenGL or DirectX. Prerequisite: CS 220. Laboratory fee.

**CS 375 Internet Programming Concepts** [3]

This course is an in-depth exploration of current client-/server-side programming paradigms for creating World Wide Web-aware programs. The development of client-side Web pages, using the current version of HTML/XHTML and a Web-scripting language, is addressed. The Document Object Model (DOM) and its role in dynamic HTML (DHTML) are presented. The Common Gateway Interface (CGI), as a vehicle to transfer client-server data, is examined. Server-side programming focuses on the Java Servlets API for the development of dynamic Web pages, the creation and processing of HTML forms and general client-server communications. Servlet filters and security are discussed, and the development of applications using reusable software programs is presented. Prerequisite: CS 220 or permission of instructor. Laboratory fee.

**CS 451 Computer Operating Systems** [3]

Characteristics and design of objectives of operating systems. Serial and parallel processes. Deadlock detection, prevention, and avoidance. Scheduling, long and short term. Memory management. Executive multiprogramming and multiprocessor systems. A comparison of major operating systems. Prerequisites: CS 211 or ECE 332, CS 220, and CS 360. Laboratory fee.

**CS 480, 481 Independent Study in Computer Science** [1–3] The study of more advanced computer science topics under the direction of a faculty member. Prerequisites: Advanced standing and approval of the department.

**CS 190, 191, 290, 291, 390, 391, 490, 491 Special Topics in Computer Science** [1–4]

Possible topics include those within computer graphics, data communications, formal theory of languages, computer architecture, theory of automata, modeling, simulation, artificial intelligence, and algorithm analysis. Prerequisite: Permission of instructor.

**Criminal Justice**

*Professors* Hardesty (*Sociology*), Norland (*Sociology*)

*Associate Professors* Aliotta (*Politics and Government*); Brayer (*Psychology*); DiChiara, *Director of Criminal Justice* (*Sociology*); Markson (*Sociology*); Schloss (*Psychology*); Stewart (*Sociology*)

*Assistant Professor* Beaulieu (*Sociology*)

*Adjunct Professors* Calvi (Superior Court), Hansen (*Simsbury Police Dept.*), Thermer (*Conn. State Police*)

**Undergraduate Major (B.A.)**

The criminal justice major is an interdisciplinary program of study stressing knowledge of theory and practice. It emphasizes a comprehensive understanding of both criminal behavior and the criminal justice system as basic preparation for careers in such fields as corrections, human services, research and planning, and law enforcement. An internship in a criminal justice agency is an integral part of the major, which enables students to add practical experience to their academic programs.

The Criminal Justice program is available to students matriculated in the College of Arts and Sciences, the Barney School of Business, or the College of Education, Nursing and Health Professions. Majors in criminal justice will be assigned an advisor in the college of their matriculation who assists in selecting a sequence of courses that corresponds to students' academic interests and career objectives. In addition to meeting the general education or distribution requirements of their colleges, students complete the following requirements for the criminal justice major:

**Requirements for the Major****Required credits: 40****Required courses** (six courses, 19 credits)

SOC 170 Social Responses to Crime

SOC 242 Methods of Social Research  
(4 credits)

POL 250 Law and the Justice System

SOC 271 Deviance

SOC 470 Criminology

SOC 473/POL 453 Crime, Law, and the  
Administration of Justice

**Internship** (two courses, 6 credits)

*The program requires a 6-credit, off-campus internship program of fieldwork in an area appropriate to the student's interests and career plans.*

SOC 318 Internship

SOC 319 Internship

**Electives****Group A: Perspectives on Human Behavior**

(two courses, 6 credits)

SOC 273 International Organized Crime

SOC 376 Juvenile Delinquency

SOC 372 Women and Crime

SOC 382 Race and Ethnic Relations

POL 421 Political Violence

PSY 242 Adolescent Psychology

PSY 262 Abnormal Psychology

PHI 233 Organizational Ethics

EDP 132 Human Development