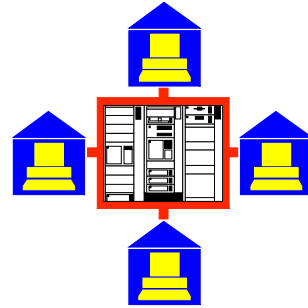


# Computer Science

## Department of Computer Science



### Faculty

Elena Braynova, Assistant Professor (2003)  
M.S., SUNY, Buffalo, NY; M.S., Ph.D., Moscow St. University, Russia

Dale Fish, Instructor (2000)  
B.S., M.S., University of Connecticut

Aparna Mahadev, Professor (1999)  
B.Sc., University of Madras, India; M. Sc., University of Madras, India; M.S., Indian Institute of Technology, India; Ph.D University of Waterloo, Canada

Hemant Pendharkar, Assistant Professor (2001)  
B.S., M.S., University of Bombay, India; M.S., Ph.D., University of New Hampshire

Andre Varpahovsky, Instructor (2005)  
M.S.E.E., M.S., Moscow Power Institute; Post Graduate Diploma, Institute of Mathematical Machines

Karl R. Wurst, Associate Professor (1999), Department Chair  
B.S., Central Connecticut State University; M.S., Ph.D., University of Connecticut

The Computer Science program offers education in the field for those who wish to pursue careers as software engineers, software developers, programmers, database designers and in other related areas.

It is highly recommended that entering students have four years of high school mathematics including the equivalent of pre-calculus. The following ancillary and distribution requirements cannot be taken on a pass/fail basis.

#### Ancillary Requirements for the Computer Science Major: (30 credits)

|  |                               |
|--|-------------------------------|
| MA 200 & MA 201  | Calculus I and II             |
| MA 220 & MA 290  | Discrete Mathematics I and II |
| MA 302   | Probability and Statistics    |
| 12 Credits in Lab Science, including a two-semester sequence.        |                               |
| All courses must be chosen from department-approved list of courses. |                               |

#### Additionally, students majoring in Computer Science must complete the following courses towards distribution requirements:

|        |   |
|--------|---|
| CM 110 | Public Speaking                           |
| EN 252 | Technical Writing                         |
| UR 230 | Technology, Public Policy & Urban Society |

## Computer Science

### Requirements for a Major in Computer Science: 45 Credits

#### Required Courses: 33 Credits

|        |   |
|--------|---|
| CS 140 | Computer Science I                                  |
| CS 145 | Computer Science II                                 |
| CS 242 | Data Structures                                     |
| CS 253 | Digital Computer Organization and Assembly Language |
| CS 282 | UNIX Systems Programming                            |
| CS 352 | Digital Computer Architecture                       |
| CS 371 | Computability Theory                                |
| CS 373 | Operating Systems                                   |
| CS 401 | Object Oriented Software Development                |
| CS 442 | Algorithm Analysis                                  |

**Elective Courses:** 12 Credits in Computer Science courses at the 300 level or above. Up to 3 credits of internship (CS 498) and up to 3 credits of Independent Study (CS 499) may be used to satisfy the major elective requirements.

#### Requirements for a Minor in Computer Science: (Minimum of 20 credits)

|   |                                     |
|---|-------------------------------------|
| CS 140  | Computer Science I                  |
| CS 145  | Computer Science II                 |
| CS 242  | Data Structures                     |
| CS 282  | UNIX Systems Programming            |
| CS 372  | Principles of Programming Languages |
| Plus one more Computer Science course above 200 level |                                     |

#### Requirements for a Minor in Web Development: (19 Credits)

|  |   |
|--|---|
| CS 140   | Computer Science I                            |
| CS 161   | Basics of Web Design                          |
| CS 261   | Advanced Web Design Using Scripting Languages |
| CS 265   | Database Applications                         |
| CS 365   | Client Server Computing Using the Internet    |
| Plus one more elective in consultation with the department |   |

#### Requirements for a Minor in Information Technology: (18+ credits)

##### Required Courses:

|        |  |
|--------|--|
| CS 130 | Fundamentals of Information Technology           |
| CS 235 | Data Communication and Networking for Non-Majors |
| CS 257 | Information Storage and Retrieval                |

##### Courses may be taken from the following to complete the remaining credits:

|           |   |
|-----------|---|
| BA 351    | Managing e-Business                         |
| BT/NS 378 | Bioinformatics                              |
| EN 281    | Web Authoring and Publication               |
| UR 230    | Technology, Public Policy and Urban Society |

**Note:** All computer science courses must be taken in sequence, i.e., CS 100 level courses must be completed before CS 200 level courses are begun. In turn, all lower division course requirements must be completed before upper division courses are begun. **Due to the changing nature of the program, students are strongly advised to meet with their advisor before registering for classes.**

## Computer Science Courses

### CS 120 Microcomputer Applications in Business I

Learning state-of-the-art application packages including but not limited to word processing, spreadsheets and presentation software.

*Offered every year. 3 credits.*

### CS 121 Microcomputer Applications in Business II

*Prerequisite: CS 120*

Advanced features of application packages including but not limited to spreadsheets, database management systems, graphics and integration.

*Offered every year. 3 credits.*

### CS 130 Fundamentals of Information Technology

Theory and concepts behind information technology; algorithmic thinking and common logic styles prevalent in today's computer systems and applications.

*Offered every year. 3 credits.*

### CS 140 Computer Science I

*Prerequisite: Familiarity with basic computer operations or CS 120*

Introduction to fundamental structures and concepts of Computer Science including object-oriented programming; three lectures and one two-hour laboratory.

*Offered every year. 4 credits.*

### CS 145 Computer Science II

*Prerequisites: CS 140*

Continuation of material from CS 140; file processing, GUIs, advanced concepts and data structures; three lectures and one two-hour laboratory.

*Offered every year. 4 credits.*

### CS 161 Basics of Web Design

*Prerequisites: CS 140*

Introduces concepts needed for creation, design and implementation of effective web pages. Latest versions of mark-up language(s) will be used.

*Offered every year. 3 credits.*

### CS 235 Data Communication and Networking for Non-Majors

*Prerequisites: CS 130*

This course covers the basic of computer networking and communications. It emphasizes both the Internet and business computer networking.

*Offered every year. 3 credits.*

### CS 240 Application Development using Visual BASIC

*Prerequisites: CS 140*

Using the Visual Programming System to create robust and useful applications that make use of the graphical user interface.

*Offered every 2 years. 3 credits.*

### CS 242 Data Structures

*Prerequisites: CS 145, MA 290*

Introduces time complexity and covers fundamental data structures: lists, stacks, queues, search trees, dictionaries, priority queues, B-trees and inverted files.

*Offered every year. 3 credits.*

### CS 253 Digital Computer Organization and Assembly Language

*Prerequisites: CS 145, EN 252, MA 290*

Design and analysis of combinational and sequential circuits; Assembly language programming, Digital computer organization. Three lectures and one two hour laboratory.

*Offered every year. 4 credits.*

### CS 257 Information Storage and Retrieval

*Prerequisites: CS 130*

This course provides a sound, real world understanding of Data Storage and retrieval as it relates to business and industry.

*Offered every year. 3 credits.*

## Computer Science

### **CS 261 Advanced Web Design Using Scripting Languages**

*Prerequisites: CS 161*

This course covers scripting languages and teaches how to make the web pages interactive by embedding executable scripts into them.

*Offered every 2 years. 3 credits.*

### **CS 265 Database Applications**

*Prerequisites: CS 140*

This course introduces basic database concepts and teaches how to create a database; use SQL; and create database applications.

*Offered every 2 years. 3 credits.*

### **CS 282 UNIX Systems Programming**

*Prerequisites: CS 242*

Problem solving and software design using C; introduction to UNIX programming utilities and text manipulation; low-level system programming in UNIX and C.

*Offered every year. 3 credits.*

### **CS 297 Selected Topics in Computer Science**

Topics of mutual interest to students and faculty.

*Offered every 3 years. 1-4 credits.*

### **CS 335 Networking and Web Security**

*Prerequisites: CS 140, CS 265, or CS 282*

This course covers web and security problems, solutions, and techniques. Encryption, worms, viruses, firewall, safer practices, etc. are covered.

*Offered every 2 years. 3 credits.*

### **CS 341 Advanced Assembly Language Programming**

*Prerequisites: CS 253*

Builds on the assembler knowledge from CS 253. Assembly Language topics covered are MACROS, subprograms, ISRs, debugging, and special purpose instructions.

*Offered every 2 years. 3 credits.*

### **CS 345 Object Oriented Programming with C++**

*Prerequisites: CS 282*

Introduction to the fundamentals of C++; Topics include objects/classes, single/multiple inheritance, friend functions, operator overloading, polymorphism and streams.

*Offered every 2 years. 3 credits.*

### **CS 352 Digital Computer Architecture**

*Prerequisites: CS 253*

A study of the internal structure of a typical digital computer from both a logical and a hardware viewpoint; memory devices, arithmetic, and control circuits including LSI and MSI components.

*Offered every year. 3 credits.*

### **CS 365 Client Server Computing Using the Internet**

*Prerequisites: CS 242 or CS 265*

This course covers what client/server is and covers various client/server models and explores the Internet from a client/server perspective.

*Offered every 2 years. 3 credits.*

### **CS 371 Computability Theory**

*Prerequisites: CS 145, MA 201, MA 290, EN 252*

This course provides an introduction to theoretical computer science. Covers the fundamentals of automata theory, formal languages, and computability theory.

*Offered every year. 3 credits.*

### **CS 372 Principles of Programming Languages**

*Prerequisites: CS 282*

Topics include comparison of syntax and semantic descriptions, data types and control, operations and sequencing, ease of use, applicability, generality, non-procedurality, and efficiency.

*Offered every 2 years. 3 credits.*

### **CS 373 Operating Systems**

*Prerequisites: CS 352, CS282, EN252*

Hardware and software as an integrated system; development of system software for process management, resource allocation, memory management and I/O processing.

*Offered every year. 3 credits.*

### **CS 375 Software Analysis and Design**

*Prerequisites: CS 282, CM 110, EN 252*

This course deals with software as an engineered product that requires planning, analysis, design, implementation, testing and maintenance.

*Offered every 2 years. 3 credits.*

### **CS 380 System Programming**

*Prerequisites: CS 282*

The design and implementation of assemblers, linkers, loaders, editors, and high-level translation software. Algorithms solving specific problems of a system program are investigated.

*Offered every 2 years. 3 credits.*

### **CS 400 Database Design**

*Prerequisites: CS 242, EN 252, CM 110*

Introduces database models with emphasis on relational model; ER diagrams, relational calculus, relational algebra and SQL, normalization, transaction processing and recovery.

*Offered every other year. 3 credits.*

### **CS 401 Object Oriented Software Development**

*Prerequisites: CS 242, EN 252, CM 110*

This course introduces object-oriented software development concepts as a new way of thinking about problems using models organized around real-world concepts.

*Offered every year. 3 credits.*

### **CS 403 Compiler Design**

*Prerequisites: CS 371, CS 282*

This course covers basic concepts involved in the design of compilers such as language definition, lexical, syntactic and semantic analysis, and code generation.

*Offered every 3 years. 3 credits.*

### **CS 405 Data Communications and Networking**

*Prerequisite: CS 373, EN 252, CM 110*

Data transmission, encoding, interfacing, synchronization, data-link control, multiplexing, networking, circuit switching, packet switching, radio and satellite, local area networks, network access protocols.

*Offered every year. 3 credits.*

### **CS 442 Algorithm Analysis**

*Prerequisite: CS 282, CS 371, MA 302*

Various complexity classes; algorithmic strategies, graph algorithms, pattern matching, cryptographic and geographic algorithms; NP-complete problems.

*Offered every year. 3 credits.*

### **CS 471 Artificial Intelligence**

*Prerequisites: CS 371, CS 242, EN 252*

Introduction to central issues of constructing intelligence systems. Examines historical and future trends of AI research.

*Offered every 2 years. 3 credits.*

### **CS 497 Selected Topics in Computer Science**

*Prerequisite: CS 282*

Selection of topics of mutual interest to students and faculty.

*Offered every 3 years. 1-6 credits.*

### **CS 498 Internship**

*Prerequisites: Approval by vote of Computer Science faculty; 21 credit hours in Computer Science courses including CS 282.*

Working in and for an organization where skills can be tested in real situations in order to gain experience, increase knowledge in various functional areas, and establish important contacts with an organization.

*Offered every year. 3 credits.*

### **CS 499 Independent Study**

*Prerequisites: 18 credit hours in Computer Science including CS 282 and approval by vote of Computer Science faculty.*

An opportunity for advanced students to examine topics not normally taught in other computer science courses. Geared to interests of both the student and the instructor.

*Offered every year. 1-6 credits.*