

# COMPUTER SCIENCE

THE JESS AND MILDRED FISHER COLLEGE OF SCIENCE AND MATHEMATICS



## WHY STUDY COMPUTER SCIENCE?

The field of computer science continues to be one of the most dynamic and relevant disciplines. Students entering the field are faced with the challenge of ever-changing technologies, and the demand for computer scientists will continue to increase.

The Department of Computer and Information Sciences faculty members are devoted to their teaching, as well as to maintaining ongoing research efforts with many top institutions including NASA, the National Security Agency (NSA) and the Naval Research Lab. Involvement with outside research allows faculty members to provide firsthand experiences in addition to theoretical knowledge in the field.

The programs of study in the Department of Computer and Information Sciences at Towson University provide students with a rigorous study of the principles of the field. Such a foundation provides students the necessary understanding to continue their professional growth as new technologies emerge.

## CAREERS IN COMPUTER SCIENCE

The programs offered by the Department of Computer and Information Sciences provide solid preparation for employment in a variety of settings, as well as for pursuing graduate studies in computing-related areas. Department graduates are pursued for employment by:

- Scientific research organizations
- Software development companies
- Business and banking operations
- Government agencies
- Educational institutions
- Computer manufacturers

Jobs held by recent graduates include systems programmer, computer programmer/analyst, computer specialist, systems analyst/designer, software engineer and software or management information systems specialist. Graduates are employed at companies such as:

- Lockheed Martin
- McCabe and Associates
- National Security Agency
- Becton Dickinson
- UPS
- IBM
- Black & Decker

Many jobs in the computing field require knowledge in an application area and skills in management. Computer science majors are encouraged to acquire knowledge in at least one other discipline or area while at Towson University.

## CURRICULUM AND COURSE OFFERINGS

The Department of Computer and Information Sciences offers several programs of study leading to the baccalaureate, Master of Science and Doctor of Science degrees. The undergraduate programs in computer science include: a major in computer science, a major in computer science with a track in computer security, a combined major in computer science and mathematics, a combined major in computer science and mathematics with a track in computer security, and a minor in computer science.

The major in computer science and the combined major in computer science and mathematics are accredited by the Computing Accreditation Commission of ABET, Inc. Students in any of the department's undergraduate programs are prepared with a broad foundation in the principles and concepts of computing including problem solving, computer organization and architecture, data and file structures, and database design and management. Elective courses may be selected from a variety of topic areas including human computer interaction, information system security, artificial intelligence, decision support systems and software engineering.

The department also offers undergraduate programs in computer information systems. For more information about this major, see the computer information systems brochure.

Every undergraduate major must complete the following courses, depending on the program of study, with a grade equivalent of 2.00 or higher in each course.

## MAJOR IN COMPUTER SCIENCE (CAC/ABET ACCREDITED)

### Required Computer Science Courses (29 units)

COSC 236	Introduction to Computer Science I (4)
COSC 237	Introduction to Computer Science II (4)
COSC 280	Assembly Language and Computer Architecture (3)
COSC 336	Data Structures and Algorithm Analysis (4)
COSC 338	Computer Organization and Architecture (4)
COSC 439	Operating Systems (3)
COSC 455	Programming Languages: Design and Implementation (3)
COSC 457	Database Management Systems (3)
COSC 480	Senior Seminar (1) (COSC 418 may be selected as a substitute for COSC 480)

### Required Mathematics Courses (18-19 units)

MATH 263	Discrete Mathematics (3)
MATH 273	Calculus I (4)
MATH 274	Calculus II (4)
MATH 330	Introduction to Statistical Methods (4)
MATH xxx	Elective (3-4)

(See *Undergraduate Catalog* for approved courses.)

### Computer Science Electives (12-14 units)

Twelve to 14 units of upper-level computer science courses are required. (See *Undergraduate Catalog* for approved courses.)

### Science Requirement (12-14 units)

A sequence of two lab courses taken from physics, biology or chemistry, which must be accepted in that major. One additional 4-unit course or two additional 3-unit courses from physics, biology or chemistry, also accepted in that major (except PHYS 244, 303 and 337), with the requirement that 12 units of science be met.

### General Education (GenEd) Requirement (3 units)

COMM 131 Fundamentals of Speech Communication is required, which can also count for GenEd II.B.3.

## MAJOR IN COMPUTER SCIENCE WITH A TRACK IN COMPUTER SECURITY

### Required Courses (28 units)

COSC 236	Introduction to Computer Science I (4)
COSC 237	Introduction to Computer Science II (4)
COSC 280	Assembly Language and Computer Architecture (3)
COSC 336	Data Structures and Algorithm Analysis (4)
COSC 338	Computer Organization and Architecture (4)
COSC 439	Operating Systems (3)
COSC 455	Programming Languages: Design and Implementation (3)
COSC 457	Database Management Systems (3)

### Required Mathematics Courses (18 units)

MATH 263	Discrete Mathematics (3)
MATH 273	Calculus I (4)
MATH 274	Calculus II (4)
MATH 314	Introduction to Cryptography (3)
MATH 330	Introduction to Statistical Methods (4)

### Required Computer Security Track Courses (18 units)

COSC 350	Data Communications and Networking (3)
COSC 440	Operating System Security (3)
COSC 450	Network Security (3)
COSC 458	Application Software Security (3)
CIS 377	Information Systems Security (3)
COSC 481	Case Studies (3)

### Science Requirement (12-14 units)

A sequence of two lab courses taken from physics, biology or chemistry, which must be accepted in that major. One additional 4-unit course or two additional 3-unit courses from physics, biology or chemistry, also accepted in that major (except PHYS 244, 303 and 337), with the requirement that 12 units of science be met.

### General Education (GenEd) Requirement (6 units)

COMM 131 Fundamentals of Speech Communication and COSC 418 Ethical and Societal Concerns of Computer Scientists are required. COMM 131 can count for GenEd Category II.B.3 and COSC 418 can count for GenEd Category II.A.

## COMBINED MAJOR IN COMPUTER SCIENCE AND MATHEMATICS (CAC/ABET ACCREDITED)

### Required Courses (61 units)

COSC 236	Introduction to Computer Science I (4)
COSC 237	Introduction to Computer Science II (4)
COSC 280	Assembly Language and Computer Architecture (3)
COSC 336	Data Structures and Algorithm Analysis (4)
COSC 338	Computer Organization and Architecture (4)
COSC 439	Operating Systems (3)
COSC 455	Programming Languages: Design and Implementation (3)
COSC 457	Database Management Systems (3)
COSC 480	Senior Seminar (1) (COSC 418 may be selected as a substitute for COSC 480)
MATH 265	Elementary Linear Algebra (4)
MATH 267	Introduction to Abstract Mathematics (4)
MATH 273	Calculus I (4)

MATH 274	Calculus II (4)
MATH 275	Calculus III (4)
MATH 330	Introduction to Statistical Methods (4)
MATH 369	Introduction to Algebra (3)
MATH 435	Numerical Analysis I (3)
MATH 490	Senior Seminar in Mathematics (2)

### Computer Science and Mathematics Electives (15–18 units)

In addition, 9–10 units of upper-level computer science courses and 6–8 units of upper-level mathematics courses are required. (See *Undergraduate Catalog* for approved courses.)

### Science Requirements (12–14 units)

A sequence of two lab courses taken from physics, biology or chemistry, which must be accepted in that major. One additional 4-unit course or two additional 3-unit courses from physics, biology or chemistry, also accepted in that major (except PHYS 244, 303 and 337), with the requirement that 12 units of science be met.

### General Education (GenEd) Requirement (3 units)

COMM 131 Fundamentals of Speech Communication is required, which can also count for GenEd category II.B.3.

### COMBINED MAJOR IN COMPUTER SCIENCE AND MATHEMATICS WITH A TRACK IN COMPUTER SECURITY

#### Required Core Courses (67 units)

COSC 236	Introduction to Computer Science I (4)
COSC 237	Introduction to Computer Science II (4)
COSC 280	Assembly Language and Computer Architecture (3)
COSC 336	Data and File Structures (4)
COSC 338	Computer Organization and Architecture (4)
COSC 418	Ethical and Societal Concerns of Computer Scientists (3)
COSC 439	Operating Systems (3)
COSC 455	Programming Languages: Design and Implementation (3)
COSC 457	Database Management Systems (3)
MATH 265	Elementary Linear Algebra (4)
MATH 267	Introduction to Abstract Mathematics (4)
MATH 273	Calculus I (4)
MATH 274	Calculus II (4)
MATH 275	Calculus III (4)
MATH 314	Cryptography (3)
MATH 330	Introduction to Statistical Methods (4)
MATH 369	Introduction to Abstract Algebra (3)
MATH 465	Number Theory (3)
MATH 490	Senior Seminar (3)

#### Security Track Courses (18 units)

CIS 377	Introduction to Information Assurance (3)
COSC 350	Data Communications and Networking (3)
COSC 440	Operating Systems Security (3)
COSC 450	Network Security (3)
COSC 458	Application Software Security (3)
COSC 481	Case Studies in Computer Security (3)

#### Elective Math Course (3–4 units)

Select one of the following:

MATH 331	Probability (4)
MATH 378	Scientific Modeling and Simulation (3)
MATH 451	Graph Theory (3)
MATH 467	Algebraic Structures (3)

### Science Requirements (12–14 units)

A sequence of two lab science courses taken from physics, biology or chemistry, which must be accepted in that major. One additional (4-unit) course or two additional (3-unit) courses from physics, biology or chemistry, also accepted in that major (except PHYS 244, 303 and 337), with the requirement that 12 units of science courses be met.

### GenEd Requirement (3 units)

COMM 131	Fundamentals of Speech and Communication (3) (completed with a grade equivalent of 2.00 or higher). This course can count for GenEd II.B.3.
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### MINOR IN COMPUTER SCIENCE

#### Required Computer Science Courses (12 units)

COSC 236	Introduction to Computer Science I (4)
COSC 237	Introduction to Computer Science II (4)
COSC 336	Data Structures and Algorithm Analysis (4)

#### Electives (9 units)

Must include 9 units of COSC upper-division courses, and may include one approved upper-division computer-related course from outside the department.

### TRANSFER STUDENTS

Articulation agreements exist between the University System of Maryland (USM) and Maryland community colleges. Students planning to transfer are advised to see a counselor at their community college or the student services director in the Department of Computer and Information Sciences to establish the most appropriate course of study.

### MASTER OF SCIENCE DEGREE PROGRAM

The department also offers a Master of Science degree program in computer science. The minimum requirement for full admission to the program is the completion of the requirements for a baccalaureate degree from an accredited university or college with a GPA of 3.00 or higher.

Conditional or provisional admission may be granted to those completing the requirements for a baccalaureate degree with an overall GPA of 2.50 or higher. Preparatory courses are available for those with a B.S. degree in a field other than computer science.

For further information on admission and degree requirements, call or write: Graduate Program Director, Department of Computer and Information Sciences, Towson University, 8000 York Road, Towson, MD 21252-0001; 410-704-2633 or fax 410-704-3868.

### INTERNSHIPS

Internships in the computer science field exist for undergraduate majors. Both paid and unpaid internships are available, and are an excellent way for students to gain valuable experience. Juniors and seniors with a 3.00 overall grade point average are eligible. Companies and organizations in which students have had internships include:

- IBM
- National Security Agency
- The Space Telescope Institute
- Aberdeen Proving Ground
- McCabe and Associates
- Black & Decker

Many computer science students have the opportunity to work as staff members in computer science laboratories or as tutors for various computer science courses. Juniors and seniors may qualify for a computer science internship. A faculty member will monitor their work in the field. Co-op programs are also available in which students alternate terms of full-time work and full-time study.

### STUDENT OPPORTUNITIES

To recognize outstanding talent in the field of computer science, TU is home to the Beta chapter of Upsilon Pi Epsilon (UPE), the first and only international honor society for the computing and information disciplines. Membership is offered to outstanding undergraduate and graduate students in computer science and computer

information systems. Each year, the Upsilon Pi Epsilon Award for Excellence in Computer Science is awarded to two outstanding computer science majors; one award to a non-UPE computer science major, and the other to a UPE member in good standing.

The Computer Club, a student chapter of the Association of Computing Machinery (ACM), is open to all students interested in computer and information sciences. The club sponsors tours of area businesses, lectures and formal and informal discussions with department faculty throughout the academic year.

Each year, the department awards the COSC/NECC Scholarship to an outstanding senior majoring in computer science or computer information systems. This scholarship was established to recognize exemplary contributions to the Department of Computer and Information Sciences and its student computing organizations.

Also, every year the Mary Hudson Scarborough Award is given to the student selected by the faculty as the outstanding computer science graduate.

### RESOURCES

7800 York Road is home to the Department of Computer and Information Sciences, with the department office located in room 406. Departmental computer laboratories, which support the curriculum, are also located in the building.

### FACULTY

The department has 37 full-time faculty members and a number of part-time faculty. Research specialties include artificial intelligence, database languages, decision support systems, networks, numerical and linear analysis, operating systems, robotics, simulation, software engineering, and system analysis and design.

#### Chao Lu

*Professor and Chair*

Ph.D., The City University of New York  
Digital Signal Processing, Algorithm Design and Implementation, FFTs, Parallel and Vector Computing, Computer Vision and Image Processing

#### John R. Alexander Jr.

*Professor Emeritus*

Ph.D., University of Maryland, Baltimore  
Artificial Intelligence, Expert Systems, Neural Networks, Machine Intelligence, Operating Systems, Computer Center Management, Computer Performance Evaluation

#### Nadim W. Alkharouf

*Assistant Professor*

Ph.D., George Mason University  
Bioinformatics, specifically the design and development of database management systems and data mining tools for high-throughput biological experiments

#### Shiva Azadegan

*Professor*

Ph.D., University of Minnesota  
Database Systems, Programming Languages, Parallel and Distributed Systems, Computer Security

#### Ali Behforouz

*Professor*

Ph.D., Michigan State University  
Software Engineering, Compiler Design and Programming Languages

#### James P. Clements

*Professor*

Ph.D., University of Maryland, Baltimore  
Decision Technology, Human-Computer Interaction, Project Management, Systems Analysis and Design

**John D'Arcy***Assistant Professor*

Ph.D., Temple University

Information Assurance, Information Systems Security, Computer Ethics, System Analysis and Design, Computer Mediated Communication

**Darush Davani***Professor*

D.Sc., George Washington University

Mathematical Modeling, Computer Simulation, Applied Statistics, Earthquake Engineering

**Charles Dierbach***Associate Professor*

Ph.D., University of Delaware

Artificial Intelligence (Analogical Reasoning), Object-Oriented Design and Development, Computer Music, Computer Education

**Alfreda Dudley Sponaugle***Lecturer*

M.G.A., University of Maryland

Information Technology, Management Information Systems, Systems Analysis, Databases, Ethics, Public Policy in Computer Technology

**Jinjuan Heidi Feng***Assistant Professor*

Ph.D., University of Maryland, Baltimore

Assistive Technology, Interface Design, Speech-Based Interaction, Trust and Privacy, Online Communities

**John Grant***Professor*

Ph.D., New York University

Database Systems and Logic Programming

**Dennis F. Hamilton***Lecturer*

M.S., Johns Hopkins University

Programming Languages, Computer Graphics

**Robert Hammell***Assistant Professor*

Ph.D., Wright State University

Fuzzy Logic, Machine Learning, Artificial Intelligence, Computer Networks

**Scott Hilberg***Lecturer*

M.S., Johns Hopkins University

Software Development, System Analysis and Design, Client/Server Databases

**Harry Hochheiser***Assistant Professor*

Ph.D., University of Maryland

Human-Computer Interaction, Information Visualization, Bioinformatics, Universal Usability, Social and Political Implications of Computing

**Sungchul Hong***Assistant Professor*

Ph.D., University of Texas, Dallas

Auction Market Mechanism, e-Commerce, Intelligent Agent, Data Classification

**Ramesh Karne***Professor*

Ph.D., George Mason University

Multidatabase Systems, Network Management System, Intelligent Manufacturing, Object-Oriented Metrics, Object-Oriented Technology and Intelligent Networks

**Yanggon Kim***Associate Professor*

Ph.D., Pennsylvania State University

Computer Architecture, Computer Networks, Communications, Computer Graphics, High-Performance Computing System

**Jonathan Lazar***Associate Professor*

Ph.D., University of Maryland, Baltimore

Interface Design, Web Usability and Design, User Error and Frustration, Service Learning, User-centered Design Processes, Universal Usability, Human-Computer Interaction, Assistive Technology, Online Communities

**Doris K. Lidtke***Professor Emeritus*

Ph.D., University of Oregon

Programming Languages, Software Engineering, Social and Ethical Issues, Computer Science Education

**Joyce Currie Little***Professor*

Ph.D., University of Maryland, College Park; CCP, CDP

Structured Analysis and Design, Software Engineering, Computer Personnel Research, Societal Impact and Ethical Issues, Computer Science Education

**Gabrielle Meiselwitz***Assistant Professor*

Ed.D., Towson University

Distance Learning, Multimedia, Animation, Computer Networking

**Micheal O'Leary***Associate Professor*

Ph.D., Johns Hopkins University

Partial Differential Equations, Fluid Dynamics

**Theodor Richardson***Assistant Professor*

Ph.D., University of South Carolina

Information System Security, Multimedia/Graphic Design, Image Steganography and Logic Puzzles

**Jorge Romero***Assistant Professor*

Ph.D., University of Texas, Dallas

Business Value of IT, e-Commerce, ERP Systems, Management of Software Development and Maintenance

**Charles J. Schmitt***Assistant Professor*

M.S., Vanderbilt University, CDP, CCP

Computer Graphics, Programming Languages, Computer Networks

**Cheryl Schroeder-Thomas***Lecturer*

M.S., Johns Hopkins University

Sociological Effects of Computerization, Management/End-User Liaison, Systems Analysis, Database Management and Operating Systems

**Yeong-Tae Song***Associate Professor*

Ph.D., University of Texas, Dallas

Program Slicing, Software Architecture, e-Commerce, Software Engineering, Distributed Systems

**Rajeshwar Srivastava***Professor*

Ph.D., University of Idaho

Data Communications, Neural Nets, Microcomputer Interfacing, Process Control, Artificial Intelligence

**Barbara Taylor***Lecturer*

M.S., Johns Hopkins University

Programming Languages, Software Engineering, Distance Learning, Computer Science Education

**Goran Trajkovski***Assistant Professor*

Ph.D., Ss Cyril and Methodius University,

Shopje, Macedonia

Multiagent Systems, Developmental Robotics, Theories of Agency and Learning, Fuzzy Mathematics

**Yuanqiong Wang***Assistant Professor*

Ph.D., New Jersey Institute of Technology

Group Decision Support System, Human-Computer Interaction, Computer Supported Cooperative Work, Knowledge Management, System Analysis and Design, Software Engineering, Asynchronous Learning Networks, e-Commerce

**Alexander L. Wijesinha***Associate Professor*

Ph.D., University of Florida;

Ph.D., University of Maryland, Baltimore County  
Computer Networks, Operating Systems, Distributed Databases**H. Harry Zhou***Professor*

Ph.D., Vanderbilt University

Artificial Intelligence, Machine Learning, Expert Systems, Software Engineering, Decision Systems, Case-Based Reasoning

**Iliana Zimand***Lecturer*

M.S., Georgia Southeastern State University

Programming Languages, Algorithms, Databases

**Marius Zimand***Associate Professor*

Ph.D., University of Bucharest;

Ph.D., University of Rochester  
Computational Complexity, Algorithms, Cryptography**FOR MORE INFORMATION**

Please contact:

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office: 7800 York Rd., Suite 406

**Office of Admissions**

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[www.towson.edu/discover](http://www.towson.edu/discover)

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biology computer information  
systems earth-space science chemistry physics geology  
biology **computer science** mathematics environmental  
science molecular biology, biochemistry and bioinformatics



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