COMPUTING SCIENCES

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ATU offers computing degrees in Computer Science, Computer Science Education, Cybersecurity, and Information Technology. All of the bachelor's degrees have an associate's degree built in to provide the students with two degrees. The program leading to the Bachelor of Science in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET, Inc., the national accrediting board for engineering and technology (www.abet.org (https://www.abet.org/))

The programs are designed to provide students with the fundamental knowledge and skills required to initiate and maintain a successful career in the computer and information science fields. All students are exposed to a variety of hardware platforms and programming languages. Hands-on experience in the design and implementation of a complete technology project is attained in the student's senior year.

Our Programs

- BS in Computer Science
- BS in Computer Science for Teacher Licensure
- BS in Cybersecurity
- BS in Information Technology
- AAS in Cybersecurity
- AAS in Information Technology
- CP in Computer Programming
- CP in Computer Networking

In order to ensure continued program quality, the department strives to achieve the following objectives for its graduates and alumni:

- Communicate effectively using terminology and processes that are appropriate for the field
- Work efficiently and effectively in a team environment to develop support tools and systems to satisfy stated requirements
- Solve complex computational problems using appropriate models, techniques, and abstractions
- Conduct themselves in a professional and ethically responsible manner
- Learn new trends and technology and willingly adapt to new systems and software environments

For more information, please visit www.atu.edu/cis/ *(*https://www.atu.edu/cis/*)*

Programs

- Computer Networking, Certificate of Proficiency (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/computer-networking-cp/)
- Computer Programming, Certificate of Proficiency (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/computer-programming-cp/)
- Computer Science, Bachelor of Science (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/computer-science-bs/)
- Cybersecurity, Associate of Applied Science (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/cybersecurity-aas/)
- Cybersecurity, Bachelor of Science (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/cybersecurity-bs/)
- Information Technology, Associate of Applied Science (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/it-aas/)
- Information Technology, Bachelor of Science (https://catalog.atu.edu/undergraduate/programs/stem/engineering-computing-sciences/computing-sciences/it-bs/)

Courses

COMS 1003 Introduction to Computer Based Systems
ACTS Common Course - CPSI 1003.
Provides students with both computer concepts and hands-on applications. Although little or no prior computer experience is required for this course, keyboarding proficiency is assumed. Topics include PC basics, file maintenance, and hardware and software components. Students will gain experience in the use of Windows, e-mail, the Internet, word processing, spreadsheets, databases, and presentation packages. The integration of software packages will also be covered.
Note: This course may not be taken for credit after completion of COMS 2003 or BUAD 2003.

COMS 1011 Programming Foundations I Lab
Offered: Fall, Spring, Summer.
Laboratory for COMS 1013 Programming I course. This course is graded pass/fail.
Note: Previously offered as lab portion of COMS 2104.

COMS 1013 Programming Foundations I
Offered: Fall, Spring, Summer.
Co-requisite: COMS 1011.
Prerequisite: MATH 1113 or higher.
An introduction to the foundational concepts of programming using structured programming concepts of C++ as an implementation tool. Topics include sequential, selection, and iterative control structures, functions, strings, and arrays.
Note: Previously offered as COMS 2104.

COMS 1333 Web and Mobile Technologies
Offered: Fall, Spring, Summer.
An introduction to planning, designing, and maintaining effective web sites on desktop and mobile devices. Topics include how to implement web pages by writing HTML and CSS code; format web pages using text, images, multimedia, and page layout techniques; design responsive sites for mobile technologies; and publish the sites to a web server.

COMS 1403 Orientation to Computing, Information, and Technology
An overview of hardware, software, technology, and information systems concepts and terms as well as ethics and opportunities within the three fields.
Note: Required of all students who have declared a major in Computer Science, Information Systems, or Information Technology.

COMS 1411 Computer and Information Science Lab
An introduction to the computing resources of the department and the university.

COMS 1921 Microsoft Excel
Preparation to pass the Microsoft Office Specialist: Excel Associate Certification exam. Topics covered include creating and managing worksheets and workbooks, creating cells and ranges, creating tables, applying formulas and functions and creating charts and objects. Credit for this course may be awarded to any student who has already obtained the MOS: Excel Associate certification.

COMS 2003 Microcomputer Applications
Offered: Fall.
Prerequisite: COMS 1003 or BUAD 2003.
This course provides hands-on experience with several software applications. Topics include intermediate and advanced word processing; spreadsheet design, formulas, and charts; database design principles and implementation; presentation design and techniques; and integration among these applications. Students will be required to apply each package on a semester project related to their major.

COMS 2163 Scripting Languages
Offered: Fall, Spring.
Prerequisite: COMS 1333 and COMS 2203.
An introduction to web program development using modern scripting languages.

COMS 2203 Programming Foundations II
Offered: Fall, Spring.
Prerequisite: COMS 1013 with a grade of "C" or better.
A continuation of Programming I which introduces object-oriented programming as well as other topics, including multi-dimensional arrays, functions, string processing, pointers, structs, and records.

COMS 2213 Data Structures
Offered: Fall, Spring.
Prerequisite: COMS 2203 with a grade of "C" or better, and MATH 2703.
A study of abstract data structures and the implementation of these abstract concepts as computer algorithms. Topics include recursion, linked lists, stacks, queues, searching and sorting algorithms, binary trees, and graphs.

COMS 2223 Computer Organization and Programming
Offered: Fall, Spring.
Prerequisite: COMS 2203 and MATH 2703.
Introduction to organizing and structuring hardware components of computers. Topics include internal data representation, data transfer and control, I/O, memory hierarchy, and programming in assembly.

COMS 2233 Introduction to Databases
This course develops a detailed understanding of a database software package developed for microcomputer applications. Topics include how to design, implement, and access a personal database. Entity relationship diagrams are emphasized in design. The use of macros, data conversion operations, linking, and complex selection operations are used in implementation. Advanced report generation mechanisms are covered along with custom-designed menus and user interfaces.

COMS 2323 Programming in Python
Prerequisite: COMS 2203.
Introduction to the Python programming language where students will learn the basics through advanced concepts including basic data types, control structures, regular expressions, input/output, and textual analysis.

COMS 2333 Web Publishing II
Prerequisite: COMS 1333 or consent of instructor.
This course is a continuation of COMS 1333. Students are introduced to multimedia design concepts and software. Multimedia applications and design tools are used to create and maintain multimedia products such as dynamic graphics, animation, interactive websites, and video.

COMS 2701 Computer Architecture and Networks Laboratory
Laboratory exercises repairing and networking computers.

COMS 2703 Computer Hardware and Architecture
Offered: Fall, Spring.
An introduction to modern computer hardware and architecture. Students receive hands-on experience in building a PC, as well as computer maintenance and troubleshooting skills. $20 course fee.

COMS 2713 Survey of Operating Systems
Offered: Spring.
Definition and brief history of computer operating systems, processes and their structure, CPU scheduling, process synchronization, deadlocks, swapping, memory management, paging and virtual memory, storage, secondary storage structure, and basic utility programs.

COMS 2733 Introduction to Computer Forensics and Security
An introduction to the fundamentals of computer forensic technology. The course emphasizes techniques for identifying and minimizing the threats to, and vulnerabilities of computer systems. These techniques include methods and tools for tracking suspicious activity, for recovering and preserving digital media, and for doing post-mortem analysis.

COMS 2803 Programming in C
Prerequisite: MATH 1113 or higher.
For non-computing majors. This course involves the design, coding, debugging, and implementation of programs using the C language. The UNIX operating system is introduced.
Note: May not be taken for credit after the successful completion of COMS 1013.

COMS 2903 Discrete Structures for Technical Majors
Prerequisite: MATH 1113 and a C or better In COMS 2104 or equivalent.
Fundamental mathematical concepts related to computing, including logic and proof techniques; sets, sequences, relations, and functions; combinatorics; algebraic structures and Boolean algebra ; trees and graphs.

COMS 2981 Special Topics
Prerequisite: Permission of the department.
This course will be offered on an "as-needed" basis to cover those topics and subject areas in computing that are emerging in a technological sense, but that do not yet warrant the addition of a new course to the curriculum.
Note: This course may be repeated for credit if course content differs.

COMS 2982 Special Topics
Prerequisite: Permission of the department.
This course will be offered on an "as-needed" basis to cover those topics and subject areas in computing that are emerging in a technological sense, but that do not yet warrant the addition of a new course to the curriculum.
Note: This course may be repeated for credit if course content differs.

COMS 2983 Special Topics
Prerequisite: Permission of the department.
This course will be offered on an "as-needed" basis to cover those topics and subject areas in computing that are emerging in a technological sense, but that do not yet warrant the addition of a new course to the curriculum.
Note: This course may be repeated for credit if course content differs.

COMS 2984 Special Topics
Prerequisite: Permission of the department.
This course will be offered on an "as-needed" basis to cover those topics and subject areas in computing that are emerging in a technological sense, but that do not yet warrant the addition of a new course to the curriculum.
Note: This course may be repeated for credit if course content differs.

COMS 3053 Ethical Issues in Technology
Prerequisite: Junior standing in a computing or related degree.
Ethical issues faced by members of a complex technological society and by professionals in a technology-related field. Topics covered include professional ethics and ethical decision making, as well as issues related to privacy, intellectual property, software development, productivity, and computer crime.

COMS 3163 Web Programming
Offered: Spring.
Prerequisite: COMS 1333, COMS 2213 and COMS 3233.
How to create a dynamic user experience based on the data available on the web application. Topics include database interactions with web-based scripting languages, logic-driven content, data manipulation, form validation, session and cookie management, security, and other concepts.

COMS 3213 Algorithm Design and Analysis
Offered: Fall.
Prerequisite: COMS 2213.
Concepts, implementation, and application of trees, hashing, graphs, and other advanced data structures will be studied.

COMS 3233 Database Design and Implementation
Prerequisite: COMS 2203.
The design and implementation of relational database systems, including conceptual design and normalization. Students will also gain experience in database and query implementation using a DBMS and SQL.

COMS 3243 Data Mining
Offered: Spring.
Prerequisite: COMS 3233 and 3 hours statistics.
Introduction to knowledge discovery from large databases: terminology, algorithms, methodologies, software, limitations, implications, and current trends. Students will implement and evaluate data mining techniques.

COMS 3313 Software Engineering
Offered: Spring.
Prerequisite: COMS 3213.
Software engineering fundamentals. Topics include analyzing system requirements, applicable methods of design, verification and validation, team software development, software project management, and building large, and reliable software systems.
Note: Course previously offered as COMS 4163.

COMS 3363 Server Administration
Offered: Fall.
Prerequisite: COMS 2703 and 2713.
The tools and techniques needed to administer a server, including installation, configuration, and administration of a variety of servers on different platforms.
Note: Course previously offered as COMS 4313.

COMS 3373 Data Center Operations
Offered: Spring.
Prerequisite: CSEC 2223 and COMS 3363.
An overview of the construction, design, and utilization of a data center, for IT professionals. The course will start with physical realities of data center design and construction, and proceed to discussion on data center level networking, storage requirements, server utilization, and common administrative tasks in a data center environment.

COMS 3413 App Development
Offered: Fall.
Prerequisite: COMS 1333 and COMS 2213.
Development of native and web applications for mobile devices with an emphasis on security.

COMS 3503 Visual Programming
Offered: Spring of even years.
Prerequisite: COMS 2213.
The design and development of event-driven programs using an object-oriented visual programming language.

COMS 3513 Administering and Using the IBM Platform
Prerequisite: COMS 1013.
This course is an introduction to the operations of the IBM midrange computer system. Topics include architecture, system security, user interface, and work management. Coverage will also extend to applications and programming using an introduction to DB2 and RPG.

COMS 3523 Human Factors in Information Technology
Prerequisite: Junior standing in a computing or related degree.
A study of the major factors involved in Human-Computer Interaction. A system- oriented, multi-disciplinary approach to understanding the human considerations in the design, testing, implementation, and administration of computer-based systems and information technology.

COMS 3703 Advanced Operating Systems
Offered: Fall, Spring Prerequisites: COMS 2213 and COMS 2223.
Basic operating system concepts and structures, CPU management, sharing resources (disks, networks, and processors), process management, threads, CPU scheduling, synchronization, deadlocks, memory management, segmentation, paging, swapping, file/device management, protection mechanisms, distributed systems, Unix/Linux environments and kernel internals, shell script programming, Unix/Linux file system, and case studies.

COMS 3903 Systems Software and Architecture
Prerequisite: COMS 1013.
This course covers the implementation of production operating systems, the fundamentals of digital logic, and machine architecture.
Note: This course does not count as credit toward a degree in Computer Science.

COMS 3913 Advanced Discrete Structures
Prerequisite: COMS 2203, COMS 2903 and MATH 2914.
Advanced topics in discrete mathematics applicable to modeling, analysis, and computer theory. Topics include relations, graphs, analysis of algorithms, and computability.

Faculty

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Associate Professors

- Jerry Wood (https://www.atu.edu/cis/profiles/jwood.php)

Assistant Professors

- Weiru Chen (https://www.atu.edu/cis/profiles/wchen7.php)
- Becky Cunningham (https://www.atu.edu/cis/profiles/rcunningham.php)
- Indira Dutta (https://www.atu.edu/cis/profiles/idutta.php)
- Tolga Ensari (https://www.atu.edu/cis/profiles/tensari.php)
- Bhaskar Ghosh (https://www.atu.edu/cis/profiles/bghosh.php)
- Robin Ghosh (https://www.atu.edu/cis/profiles/rghosh.php)
- Md Abdus Salam Siddique

Instructors

- Susie Capehart (https://www.atu.edu/cis/profiles/dcapehart.php)
- Lucas Moody (https://www.atu.edu/cis/profiles/lmoody.php)