APPALACHIAN STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

Computer Science

Undergraduate Program

Professor Joel Swanson

Today’s presentation

- What is Computer Science?
- What can you do with a Bachelor’s in Computer Science?
- Requirements for the Bachelor’s degree
- Transferring in courses
- AP courses
- Why CS at App State?

What is Computer Science?

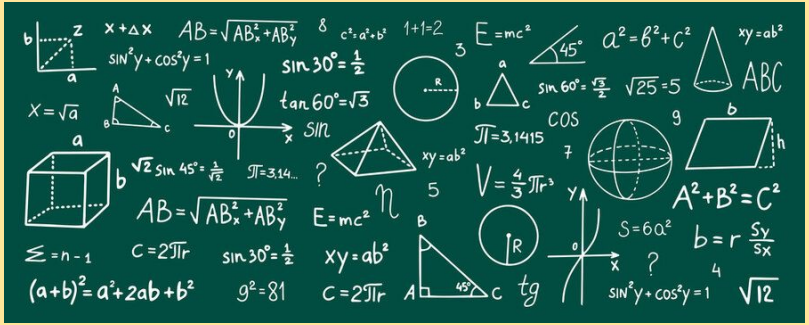
- Computer Science is the study of computers and computing
  - Theory - mathematical foundations of computing
  - Systems - hardware and systems software (compilers, operating systems)
  - Software Engineering - design, development, testing, and maintenance of software
- Computer Science is not Computer Programming
  - Programming is a tool
  - Computer Scientists use their knowledge of theory, systems, and software engineering to design secure, high performance software systems

What do you do with a Bachelor's in Computer Science?

- **The majority of Computer Science graduates will work in software development positions**
  - However, some take positions with less software development requirements (network administrators, database administrators, security officers, system administrators, …)
- **Job titles include:** software engineering, system analyst, computer programmer, cloud engineer, data scientist, full stack software engineer, …
- **Computer Scientists are hired by a myriad of different businesses** (banks, high tech, health care, engineering, medicine, research …)
- In 2022, Bureau of Labor and Statistics reported the **median salary** for Computer and Information Technology occupations to be **$100,530**

Is Computer Science for me?

- Do you enjoy technology?
- Do you love solving puzzles?
- Are you interested in figuring out how things work?
- Do you like math?



Requirements for the Bachelor’s degree

- **Computer Science, BS (Total of 120 hours)**
  - 44 hours of General Education
  - 41 hours of required Computer Science courses
    - theory, systems, programming, writing in the discipline, capstone course or honors thesis
  - 12 hours of Computer Science electives
  - 18 hours of Mathematics
    - discrete mathematics, calculus 1 and 2, linear algebra, statistics
  - 8-10 hours of a science sequence
    - astronomy, biology, chemistry, geology, or physics
      - two physics sequences - one algebra based and one calculus based

Computer Science Electives

- Mobile Device Programming
- Server and Client Side Web Programming
- System Administration and Security
- Artificial Intelligence
- Data Communication and Networking
- Human Computer Interfaces
- Embedded Systems
- Machine Learning
- Neural Networks
- Computer Graphics
- Digital Image Processing
- Operating Systems
- Advanced Theory
- Algorithms
- Special topics courses; recently:
  - Cybersecurity
  - Parallel Computing
  - GPU programming
  - Digital forensics
  - Problem Based AI
  - Functional Programming
  - Modern Data Structures
  - Discrete Structures and Reasoning
  - Cloud Computing
  - Visual Analytics

Capstone course

- Students complete a capstone project of their choice
- Recent projects have included:
  - **Camp.io** - camp site discovery, tracking, and rating website/mobile app
  - **MuscleUp** - iOS workout app
  - **Broyhill Wind Turbine Kiosk** - reactive website providing information and data visualizations in near real time
  - **Career Passport** - Mobile app version of a paper-based student engagement tool used by the Career Center
  - **Equation Maker** - math game for elementary school students

Checkout the bulletin board in the hallway to see the capstone projects being completed this semester.

Transferring in courses?

- CS degree requirements include math courses that can be taken at most community colleges in North Carolina
  - Calculus I, Calculus II, Linear Algebra
- CS degree requirements include a science sequence that can be taken at most community colleges in North Carolina
  - Astronomy, Chemistry, Physics, Biology, Geology
- Check to see how a course will transfer (transfer services)
  - https://transfer.appstate.edu/transferadvising
- Check CS degree requirements (undergraduate bulletin)
  - https://bulletin.appstate.edu/preview_program.php?catoid=30&poid=13438
- CS courses at community colleges do not transfer in as CS courses at App State, in general
  - But they can contribute to the 120 hours needed to graduate
  - You can petition for them to transfer in as CS (transfer services)

AP Computer Science courses

- Computer Science A
  - Score of 3 transfers in as CS 1425: Overview of Computer Science
    - Not required for CS degree, but contributes to the 120 hours needed to graduate
  - Score of 4 or 5 transfers in as CS 1440: Computer Science I
    - Is required for CS degree
- Computer Science Principles
  - Score of 3, 4, 5 transfers as elective credit
    - Not required for CS degree, but contributes to the 120 hours needed to graduate

Why CS at App State?

- Department is large enough to offer a **wide and varied set of electives**
- Although we have 600 undergraduate students, we're **committed to keeping class sizes relatively small**
  - Largest classes have about 40 students
- We are **committed to the success of our students**
  - In turn, our graduates make us look good!

It’s a hard major, but you can do it if you ...

Get Engaged & Stay Engaged:

- CS Clubs
- AppHack
- Research
- Become a tutor or teaching assistant

Commit to:

- doing your own work
- asking for help when you need it
  - Instructors, teaching assistants, tutors, …
- mastering the material in each course (each course builds upon the previous one, often more so than in other majors)

Questions?

- Also don’t forget to visit these rooms:
  - **Beyond the Bachelor’s in room 318**
    - Earn a Master’s degree with just one extra year of study!
  - **Reaching Higher in room 325**
    - Earn an extra, highly marketable, credential
    - Take graduate courses that can count toward the Master’s degree and graduating with honors
  - **Clubs, research, internships in room 327**
    - Extra curricular activities help our students succeed!
  - **Student Research Lab in room 312-W**
    - See what research some of our students are working on!

Department Fast Facts

- Academic Programs
  - Bachelor’s of Science, ABET accredited, 600 students, 110 graduates/yr
  - Master’s of Science, 25 students, 10 graduates/yr
  - Data Science Certificate, 30 students
- Engaged Faculty
  - 19 funded grants, > $5 million over last 7 years
  - 20 faculty members
- Program began in mid 1970s, became department in 1998