Presentation of the CompSci Major

Spring 2020 Courses
# of Graduating Computer Science Majors
(updated Oct 2019)

<table>
<thead>
<tr>
<th>Graduating Year</th>
<th># of Computer Science Majors</th>
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<td>2020</td>
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Major Requirements and Minors
Requirements
At least 11 full-semester graded courses or the equivalent, including:

- **Introductory** (1 or 2 semester courses; see notes below):
  - [Optional] 1 full-semester course or the equivalent chosen from CSC 102, 103, 105, 106, 107, 109, 151, SDS 192, or FYS 164. *(If taken, these credits count in lieu of the one additional course under Intermediate, below)*
  - Restrictions:
    - CSC 102 may not count after taking CSC 249
    - CSC 103 may not count after taking CSC 231
    - CSC 106 may not count after taking CSC 260
  - CSC 111, *Introduction to Computer Science Through Programming*

- **Core** (3 courses):
  - CSC 212, *Programming with Data Structures*
  - CSC 231, *Microprocessors and Assembly Language*
  - CSC 250, *Theoretical Foundations of Computer Science*

- **Mathematics** (2 courses)
  - MTH 111, *Calculus*, or another math course that requires MTH 111; or LOG 100
  - MTH 153, *Discrete Mathematics* or another math course that requires MTH 153

- **Intermediate** (3 or 4 courses; see course area designations below):
  - One CSC or SDS **Theory**;
  - One CSC or SDS **Programming**;
  - One CSC **Systems**;
  - One additional CSC or MTH course at the 200 level or above (waived if student has satisfied the Optional semester course under Introductory, above.)

- **Seminar** (1 course):
  - One CSC 300-level course (not including CSC 324) beyond those satisfying the requirements above
CSC 103/102
Sahar Al Seesi - MWF: 1:20 – 2:35

CSC 103: How Computers Work
First half of the semester
2 Credits
❖ Digital circuits that make up the computer
❖ Everything is 0’s and 1’s
❖ How does the computer understand programs?
❖ What does an OS do?

CSC 103: How the Internet Works
Second half of the semester
2 Credits
❖ What’s a communication protocol?
❖ IP address
❖ HTTP
❖ HTML
❖ Create Web pages
CSC/SDS 109: Communicating with Data
Katherine Kinnaird
MW 8:00-9:15am
Focus on Climate Change
CSC 151: Introduction to Programming Language Concepts

Nicholas Howe

TTh 9:25-10:40am

*pass by reference*

\[
\text{cup = } \quad \text{fillCup()} \\
\text{fillCup()} \\
\]

*pass by value*

\[
\text{cup = } \\
\text{fillCup()} \\
\]

MTH 205
Modeling in the Sciences

- Prof. Ileana Streinu  istreinu@smith.edu

- Integrates the use of mathematics and computers for **modeling phenomena** drawn from natural sciences.
  - Scientific topics organized as case studies
  - Special emphasis on physical and life sciences
  - Project-based final

- **Mathematical tools**: discrete and continuous dynamical systems & simulations, elementary data analysis, discrete geometry, cellular automata, random walks.

- **Software**: Mathematica. Both as a programming language and for its extensive library of mathematical tools and visualizations.

- **Topics**: (un)constrained growth (population models); competition (predator-prey); physical simulations (planetary motion); data-driven models; Monte Carlo simulations: Brownian motion; random walks; diffusion; spread of fire; crystal growth; movement of ants; modeling polymers; spread of diseases; fish schooling; etc.

- **Prerequisites**: Calculus (MTH 112 or MTH 114); CSC 111 or some Intro to Programming (AP) recommended but not required.

- **Enrollment**: limited to 20.

- **When**: TTh2:45PM-4:00PM
CSC 220: Advanced Programming Techniques

Sahar Al Seesi - MWF: 1:20 – 2:35
Prerequisite: CSC 212
Programming

Client/Server applications

JavaScript / Node.js / mongoDB

Emmely Rogers
Mae Wegbreit
Audrey Dawson
CSC262: Operating Systems

- (Programming || Systems) & Reading
  - Instr. John Foley
  - CSC231 Pre-Req.
  - Tues-Thurs: 1:20-2:35 - Lecture
  - Wed 2:35-4:35 - Lab

- Linux, Java, & C Programming
- Time Sharing
  - Scheduling
  - Multi-Threaded Programming
    - Mutex, Semaphore, etc.
- Space Sharing
  - Memory Management
  - File Systems

Sharing is caring
CSC 266: Introduction to Compiler Design

Sahar Al Seesi   -   T Th: 10:50 – 12:05
Prerequisites: CSC 231 and CSC 250
Theory and Programming

Learn how the code you write becomes machine code

Use your CSC 250 knowledge of grammars
CSC270: Circuits and Systems

Lecture: T Th 9:25-10:40
Lab:       Th 2:45-4:00
Credits: 5
Prerequisite: CSC231
CSC 274 Discrete & Computational Geometry

Joseph O’Rourke --- WF 9:25-10:20 --- Counts as Theory or Programming. Assignments include programming (CSC) or proofs (MTH 2 crs). Any language: Java, Python, Javascript, Mathematica, Matlab, …

Prereqs:
- For CSC:111
- For MTH:153

Emmely Rogers

Zoe Riell  
Jessica Tin  
Julie Kim & Risa Yamada
CSC 356: Topics in HCI (Natural User Interfaces)

R. Jordan Crouser
T 1:20-4:00PM

...what is “natural”?
CSC 370: Computer Vision and Image Processing

Nicholas Howe
MW 2:45-4:00 PM
Students
Hafsah Hanif
Senior
hhanif@smith.edu

Asmita Gautam
Senior
agautam@smith.edu

Mayeline Peña
Junior
mpena@smith.edu

Ratie Vushe
Junior
rvushe87@smith.edu
Research
The summer of 2020 will be the 52nd year that Smith has had a formal student summer research program! Hands-on research collaboration between faculty and students is a cornerstone of the science education at Smith, so the summer program has always been very important to us. We invite you to join the students who will receive stipends to support their independent research during the summer of 2020.

- Application – The link to the application
- For SURF Participants – Eligibility Requirements and Information for SURF applicants and participants
- For SURF Faculty Advisors – Information for SURF advisors

SURF is the centerpiece of our undergraduate research program. Smith and some of its liberal arts peer institutions have collaborated to describe key elements of successful undergraduate research opportunities (“Grow an Undergraduate Research Program”).

General SURF Info session: November 15 at 12:10pm in McConnell 103.
<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Research Areas</th>
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<tbody>
<tr>
<td>Joseph O'Rourke</td>
<td>CSC/MTH</td>
<td>Computational geometry. Philosophy of Artificial Intelligence. Primarily academic-year research.</td>
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<tr>
<td>Nick Howe</td>
<td>CSC</td>
<td>Handwriting recognition, document analysis, computer vision, machine learning, digital humanities</td>
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<tr>
<td>Ileana Streinu</td>
<td>CSC/MTH</td>
<td>Computational Geometry, Algorithms, Rigidity Theory, Kinematics and Robotics with applications in Computational Biology (biomolecular/protein flexibility and motion), Materials (metamaterials), and Crystallography</td>
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<tr>
<td>Alicia M. Grubb</td>
<td>CSC</td>
<td>Requirements and Software Engineering, Ethics, Decision Support</td>
</tr>
<tr>
<td>Katherine M. Kinnaird</td>
<td>CSC/SDS</td>
<td>Music Information Retrieval, Machine Learning, Cultural Analytics, Data Science Education</td>
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</tbody>
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Other ways to get involved in research:

- Academic year positions are often available in professors’ research labs
- Propose a special studies on a topic you’d like to explore
- Write an honors thesis (for seniors pursuing independent research with faculty supervision)