Computer Science

Revised Curriculum

October 20, 2010
Why are we changing the curriculum?

- Curriculum needs to be refreshed every so often
- Seriously considered student feedback about current curriculum
- Continuation of modifications starting with COMP 140/160
- Improve cohesiveness of freshmen and sophomore years
- Reduce programming language overload
Some courses are still in transition, so the final semester breakdown is subject to change.

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NOTES: †BS only, ‡New course, *Different semesters

All of the Math and Physics requirements have several alternatives.
Freshman Year

- Coherent sequence of courses in computational and algorithmic thinking.
  - COMP 140: Computational Thinking
  - COMP 182: Algorithmic Thinking

- Both courses will use Python to minimize difficulties with language syntax.

- Focus will be on applications of computer science to real world problems.
  - How do you think about computational problem solving, not how do you program a computer.
  - How do you conceive, design, and analyze algorithms.

- In many ways, COMP 182 will be modeled after COMP 140.
Freshman Year (cont.)

- COMP 160 is still an optional alternative to COMP 140
  - Typically taken by students entering with significant programming experience.
  - Introduces computer science via computer games.
- Calculus
  - MATH 101
  - MATH 102
- ELEC 220: Fundamentals of Computer Engineering
  - Basics of how computers work.
  - Broad, high-level introduction to computer engineering.
Sophomore Year

- Deeper introduction to computer programming.
  - COMP 215: Introduction to Program Design in Java
  - COMP 322: Principles of Parallel Programming
- Both courses will use the Java programming language to minimize language disruption.
  - Depending on your perspective, it’s currently the most popular programming language.
  - Clearly very widely used.
  - Has a rich set of features enabling us to cover a wide cross-section of concepts.
- Focus will be on core computer science concepts.
  - Functional programming.
  - Object-oriented programming.
  - Parallel programming.
  - Abstraction, modularity, test-driven development, ...
Sophomore Year (cont.)

- COMP 221: Introduction to Computer Systems
  - Provides a deeper understanding of how a computer system works underneath the programming language.
  - Covers the underlying aspects of computer systems that have an impact on application programming.
  - Also introduces C programming.

- MATH 211/212 (or equivalent)
Junior Year

- COMP 310: Advanced Object-Oriented Programming
  - More in-depth treatment of object-oriented programming.
  - Focus on how to design and implement larger programs.

- Programming Languages
  - COMP 411: Programming Languages
  - COMP 412: Compiler Construction

- Mathematics for Computer Science
  - STAT 310 or equivalent
  - MATH 355 or equivalent
Computer Science Requirements

- One of:
  - COMP 140: Computational Thinking
  - COMP 160: Introduction to Computer Gaming
- COMP 182: Algorithmic Thinking
- COMP 215: Introduction to Program Design in Java
- ELEC 220: Fundamentals of Computer Engineering
- COMP 221: Introduction to Computer Systems
- COMP 310: Advanced Object-Oriented Programming
- COMP 322: Principles of Parallel Programming
- One of:
  - COMP 411: Programming Languages
  - COMP 412: Compiler Construction
- COMP 421: Operating Systems and Concurrent Programming
- One of:
  - COMP 481: Automata, Formal Languages, and Computability
  - COMP 482: Design and Analysis of Algorithms
Mathematics Requirements

- MATH 101: Single Variable Calculus I
- MATH 102: Single Variable Calculus II
- One of:
  - MATH 211: Ordinary Differential Equations and Linear Algebra
  - MATH 212: Multivariable Calculus
  - MATH 221: Honors Calculus III
  - MATH 222: Honors Calculus IV
  - By permission: PHIL 305: Mathematical Logic
- One of:
  - STAT 310: Probability and Statistics
  - STAT 331: Applied Probability
- One of:
  - MATH 355: Linear Algebra
  - MATH 354: Honors Linear Algebra
  - CAAM 335: Matrix Analysis
B.S. Requirements

The additional requirements for a B.S. remain the same.

- PHYS 101/111/125
- PHYS 102/112/126
- Capstone sequence: A coherent set of courses in some computer science specialization that include a design component. (At least 4 courses for a total of 15 hours.)
What should I take next Spring?

Any of you (except those graduating this academic year) can graduate under either the new or the old requirements.

Accepted replacements between new and old requirements:

- COMP 182 ⇔ COMP 280
- COMP 215 ⇔ COMP 211
- COMP 310 ⇔ COMP 314

*These equivalences are for graduation requirements only. While the objectives and goals of these courses are similar, the content and delivery is very different!*
Current Freshmen taking COMP 140 or COMP 160

We recommend continuing with the new requirements:

- COMP 182
- ELEC 220
- Mathematics (MATH 102)
Current Sophomores taking COMP 140 or COMP 160

- If you intend to pursue a BA
  - Option 1: COMP 182 and ELEC 220 (COMP 215 Jr. Fall)
  - Option 2: COMP 211 and ELEC 220 (COMP 310 Jr. Fall)

- If you intend to pursue a BS
  - COMP 211 and ELEC 220
  - Probably should also take COMP 182

Taking COMP 211 next semester ensures that you can take COMP 410 your senior year. If you prefer COMP 460 or are pursuing a BA, it is not as critical that you take COMP 211.
Current Sophomores taking COMP 310

- COMP 182
- COMP 221
- COMP 322 (this can be delayed, if necessary)
Current Juniors and Seniors

You should be largely unaffected by all of this.

If you think you are affected or if you have questions, talk with your major advisor.
Computer Science Major Advisors

- Scott Rixner
- John Greiner
- Luay Nakhleh
- Stephen Wong

Everyone will be accommodated. If you are in an exceptional situation and the changes create a problem for you, the major advisors will work with you to make sure that you can graduate.
New Curriculum

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