

Dickinson

Curricular Innovations for Computing Education in the Liberal Arts

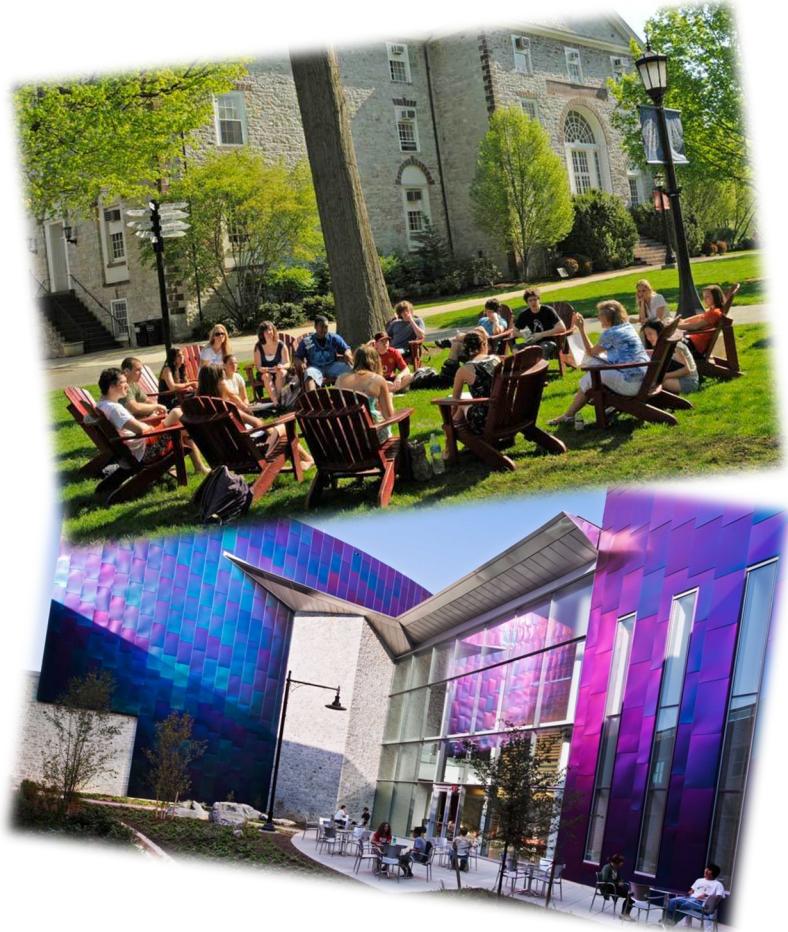
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SIGCSE Affiliated Event
March 8, 2021

— Useful education for the common good since 1783 —

Dickinson Context

- Dickinson College was chartered in 1783, just days after the conclusion of the American Revolution, explicitly to prepare young people, by means of a **useful education in the liberal arts and sciences, for engaged lives of citizenship and leadership in the service of society.**
 - Carlisle, Pennsylvania USA
 - 2345 full-time students
 - 3.66 full-time Computer Science faculty
 - ~15-20 Computer Science majors / year
 - ~20-24 Typical class size



Dickinson

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- **Challenge:**
 - **Limited ability to offer courses in essential areas.**
 - Frustration that not all students have the opportunity to take courses in areas such as networking, operating systems, databases, web systems
- **Innovation:**
 - **Replaced 2nd-year Computer Organization with Computing Abstractions**
 - “Breadth Second” with abstractions as the unifying theme
 - Retain “bare minimum” essentials of organization
 - Circuits , data representation, machine organization, assembly language
 - Add networking, operating systems, web systems (including DB)
 - “Narrow depth” in each area highlighting abstractions they present

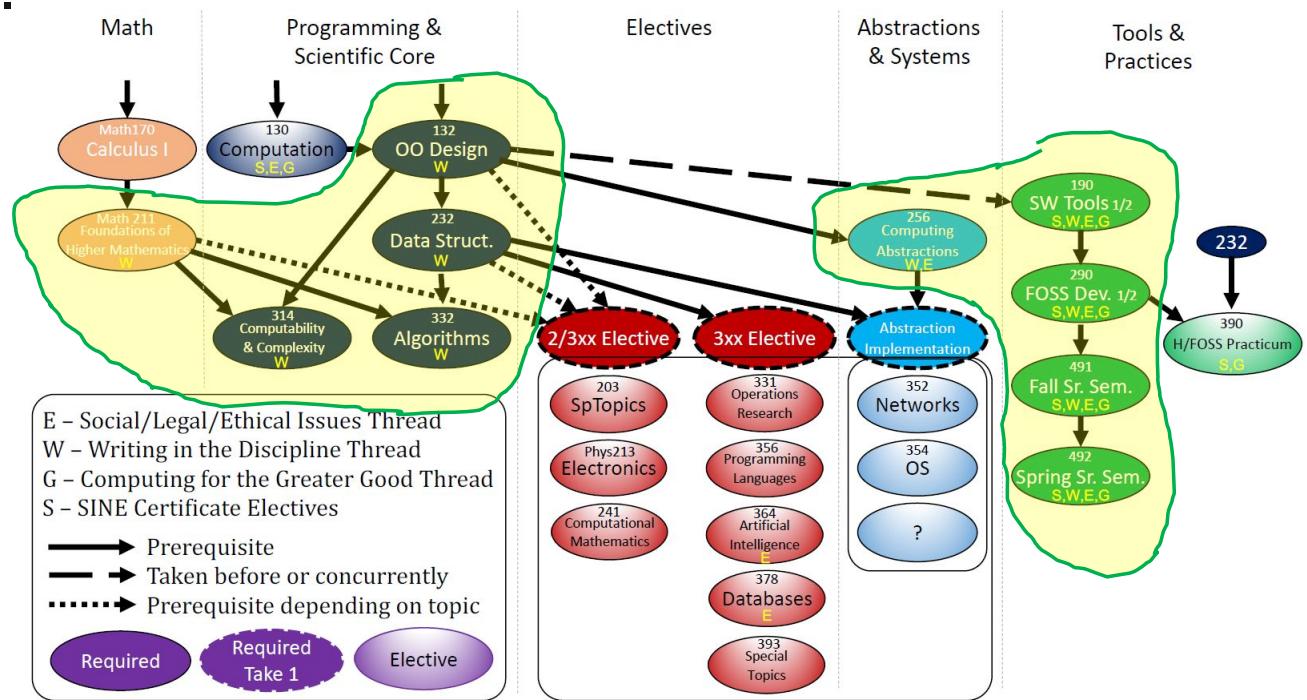
- **Challenge:**
 - **Balancing CS foundations with software development**
 - We want to embrace computer science as a liberal arts discipline but recognize the pragmatic need to provide students employable software development skills.
- **Innovation:**
 - **Two required 1/2 courses in 2nd-year that engage students in Humanitarian Free and Open Source Software (HFOSS) projects.**
 - Practical skill set early
 - command line, version control, soft skills GitHub contributions,
 - Made programming language structures an elective.
 - Meaningful connection to institutional mission through HFOSS

- Challenge:

- Meeting institutional priorities for WiD, ethics across the curriculum and overall mission.

- Innovation:

- Define WiD,
Social/Legal/Ethical
& Computing for
the Greater Good
Threads
 - Context sensitive
 - Repeated exposure

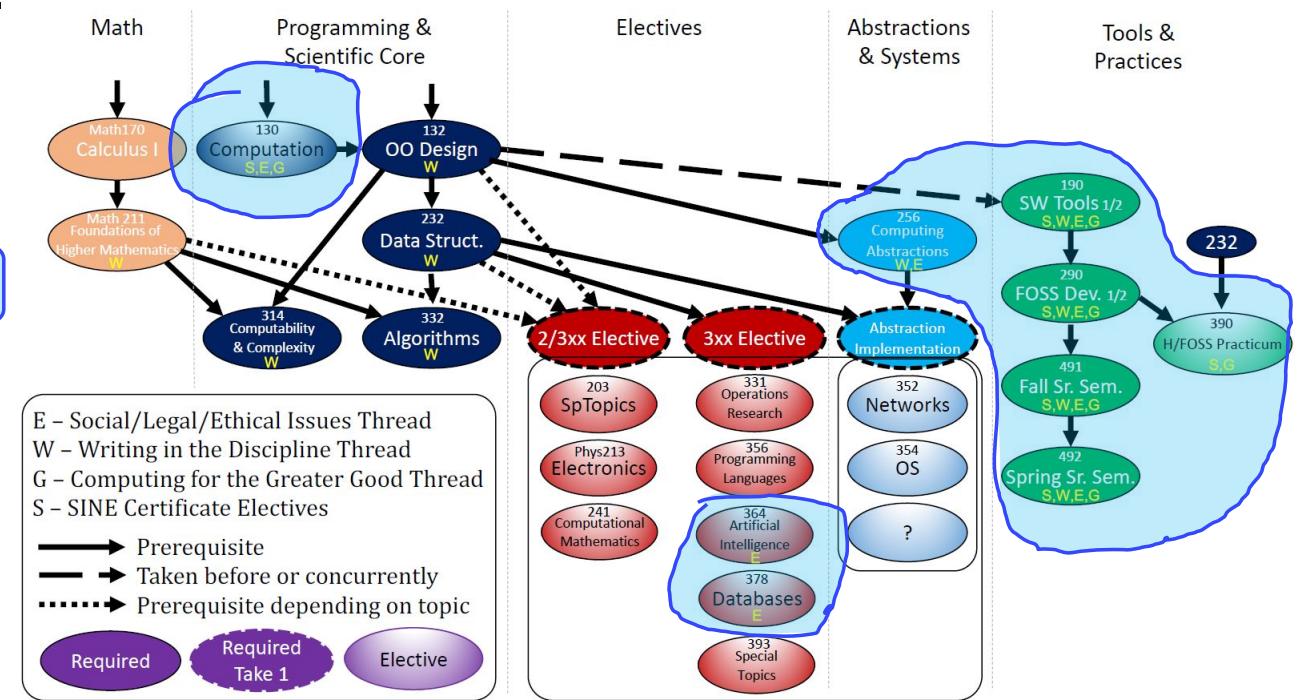


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