

Dickinson

Curricular Innovations for Computing Education in the Liberal Arts

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SIGCSE Affiliated Event
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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**



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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

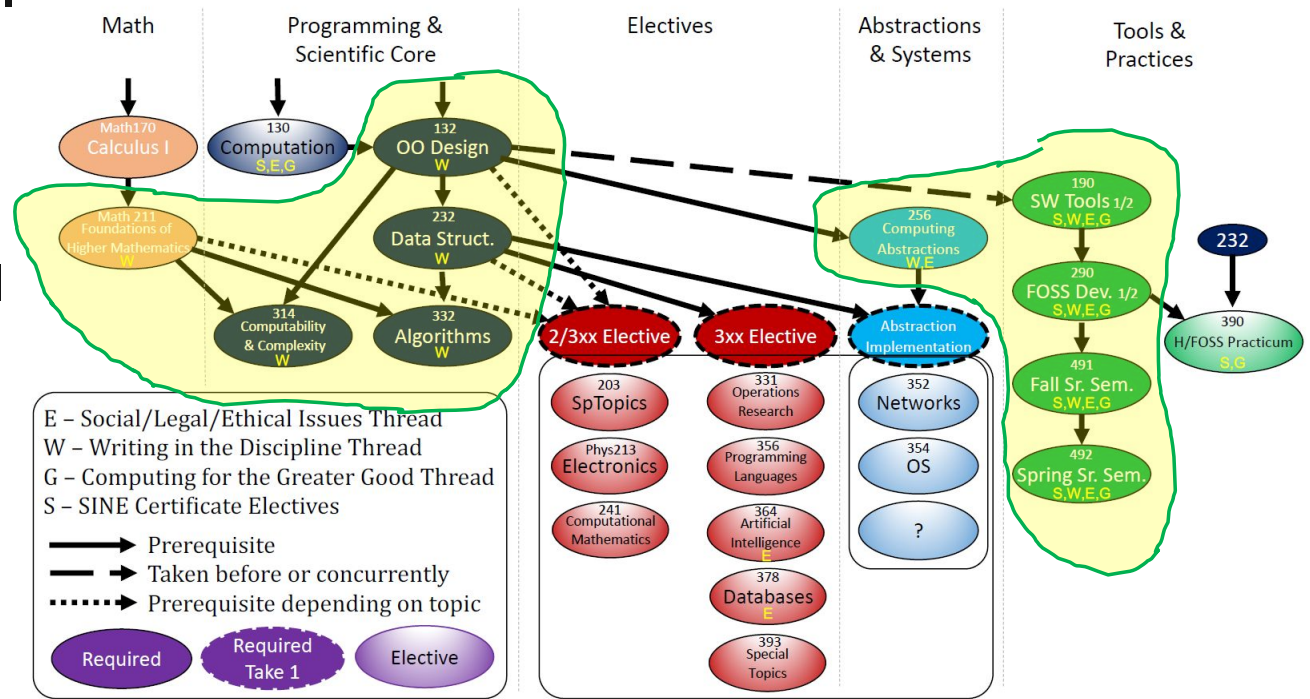
○ **Challenge:**

- 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



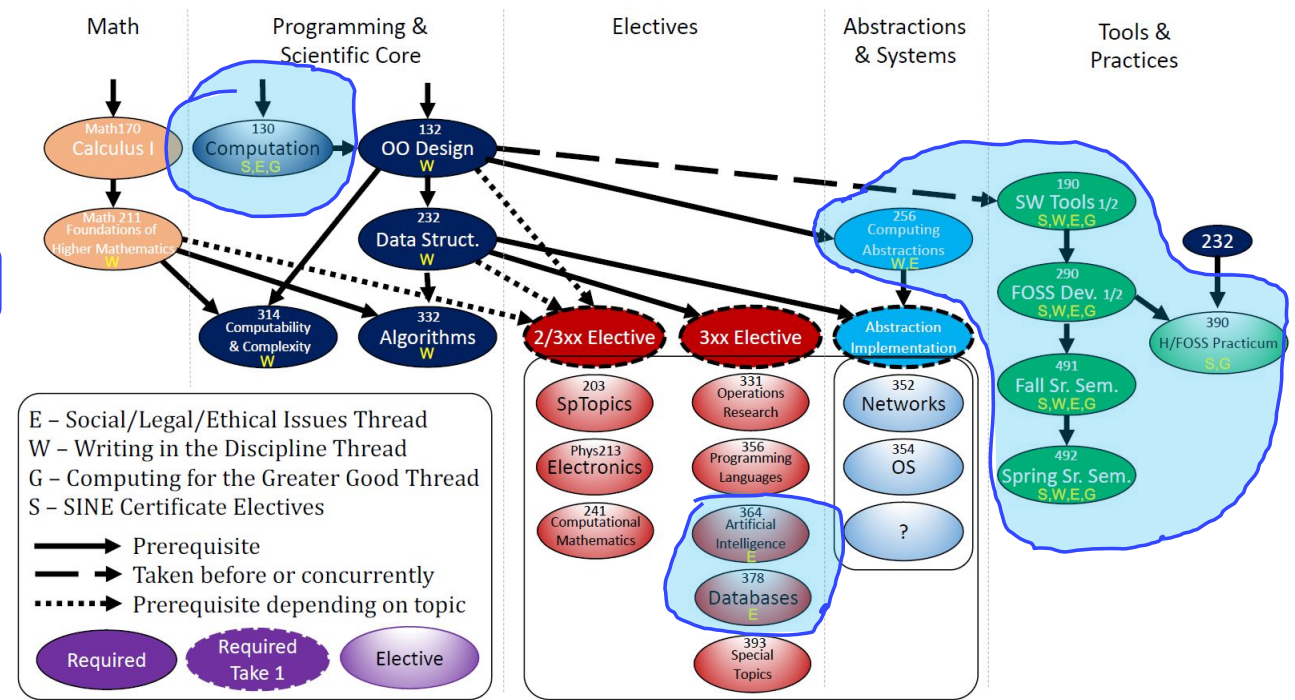
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