

Strategic Entry Points for Sustainability in University Engineering and Construction Curricula

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Overview

- Essential Sustainability Skills
- Overall Philosophies
- Tactics for Greening a Curriculum
- Questions to Consider

Essential Sustainability Skills

- Cross-functional team building/maintenance
- Ability to...
 - Reframe problems and consider multiple solutions
 - Filter and process both quantitative and qualitative information
 - Identify and account for contextual factors
 - Articulate costs and benefits from multiple perspectives
 - Challenge dominant ideologies
- Professional communication skills
- Experience in interacting with real world stakeholders, and sensitivity to their needs

Two Main Philosophies:

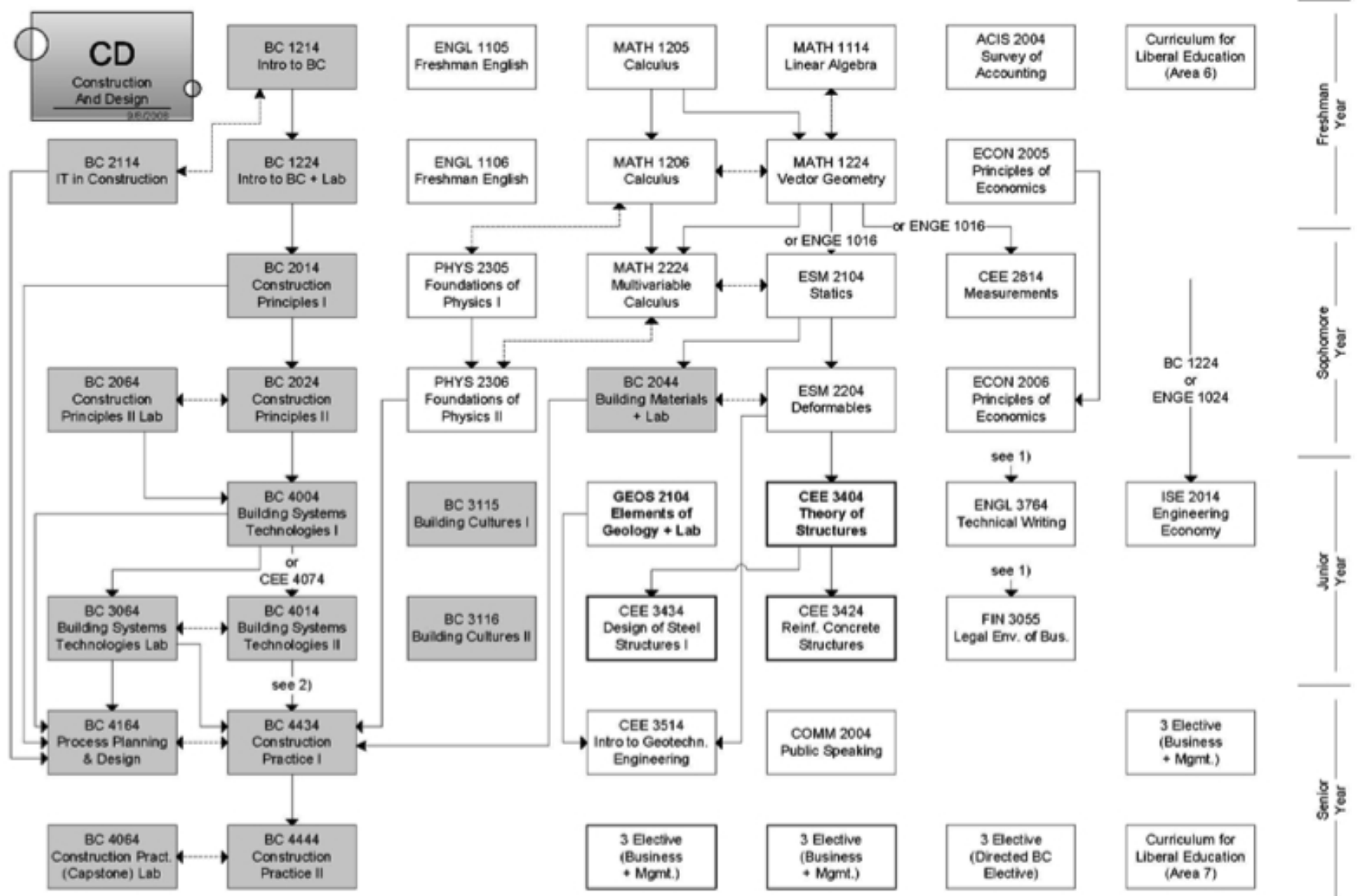


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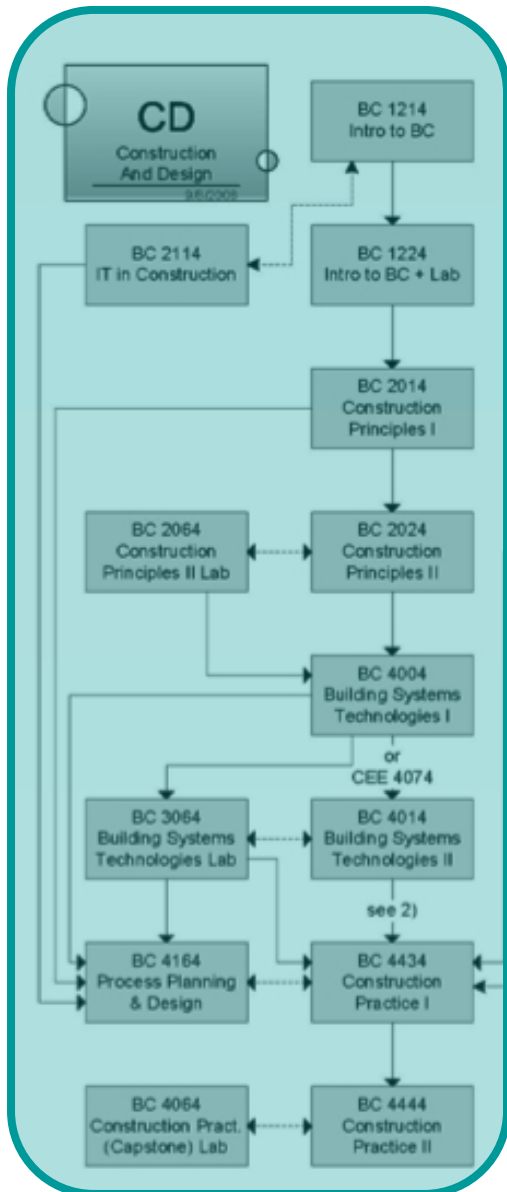


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Example Curriculum



Tactic 1: Infiltrate the Core



The WHAT:

- Hit all the major core classes with a relevant guest lecture
- Add sustainability components to all major projects
- Reinforce key skills in greater detail over time

The WHO:

- All core faculty have to be on board
- Need at least one specialist
- Coordination is really useful

Example: Building Construction Core

- 1st year: Intro to sustainability
- 2nd year: Intro to LEED; Environmental performance of materials
- 3rd year: Building systems performance
- 4th year: Integrated design-build



Tactic 2: Add Electives

The WHAT:

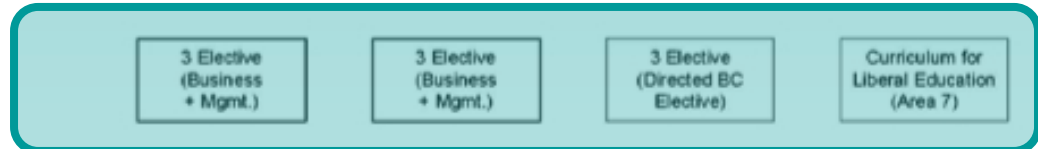
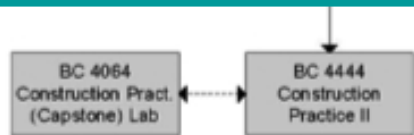
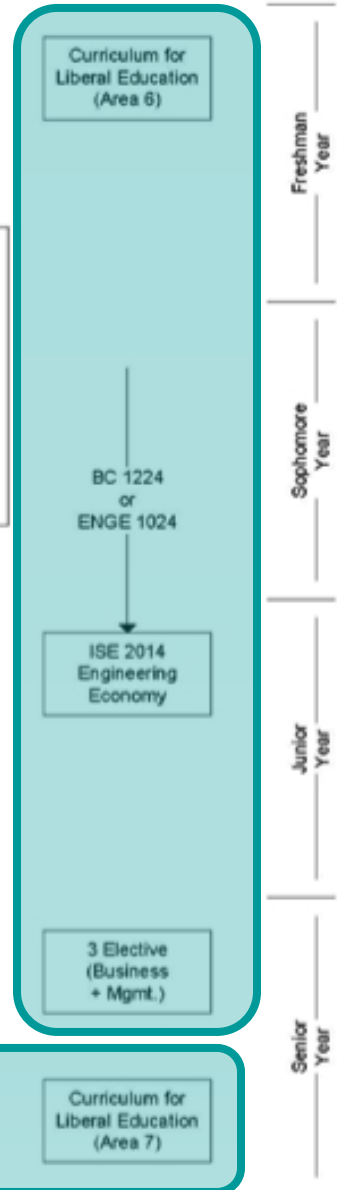
- Develop technical or general electives on sustainability-related topics
- Can focus on discipline-specific aspects of sustainability

The WHO:

- Requires only interested faculty

Barriers:

- Not much room for new electives!
- They may compete with other faculty's classes/add to teaching load



Example: Sustainable Facilities & Infrastructure Series

- Two graduate/senior courses:
 - BC 5134: Sustainable Facility Systems
 - BC 5144: Sustainable Civil Infrastructure Systems
- Systems-based analysis
- Hands-on student-driven labs



Tactic 3: Coordinate Existing Courses

The WHAT:

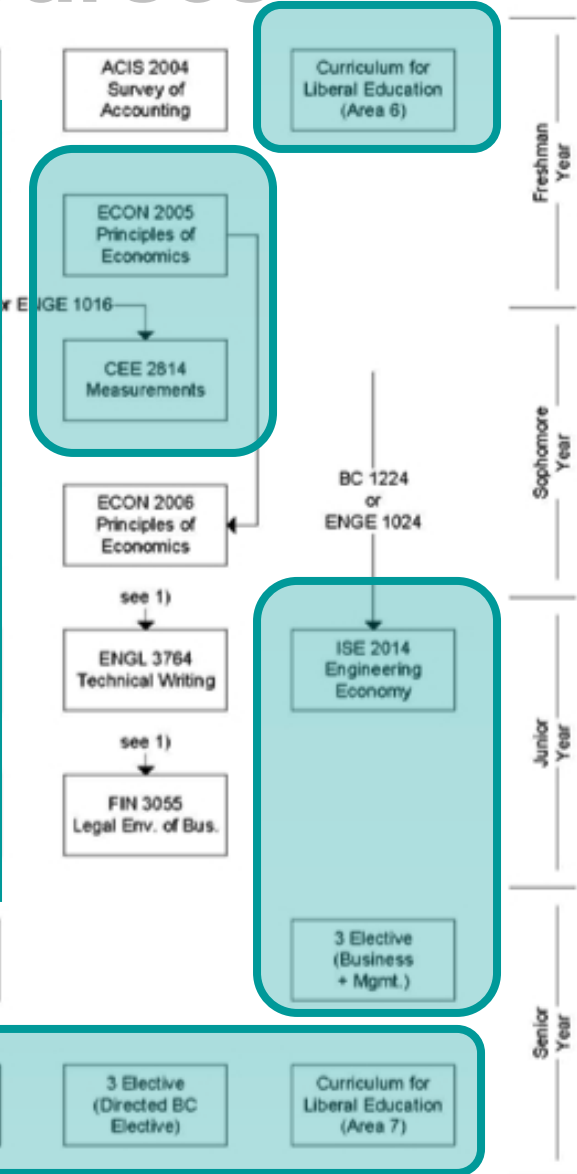
- String together complementary courses into larger programs

The WHO:

- Requires a group of faculty and college or university-level approval

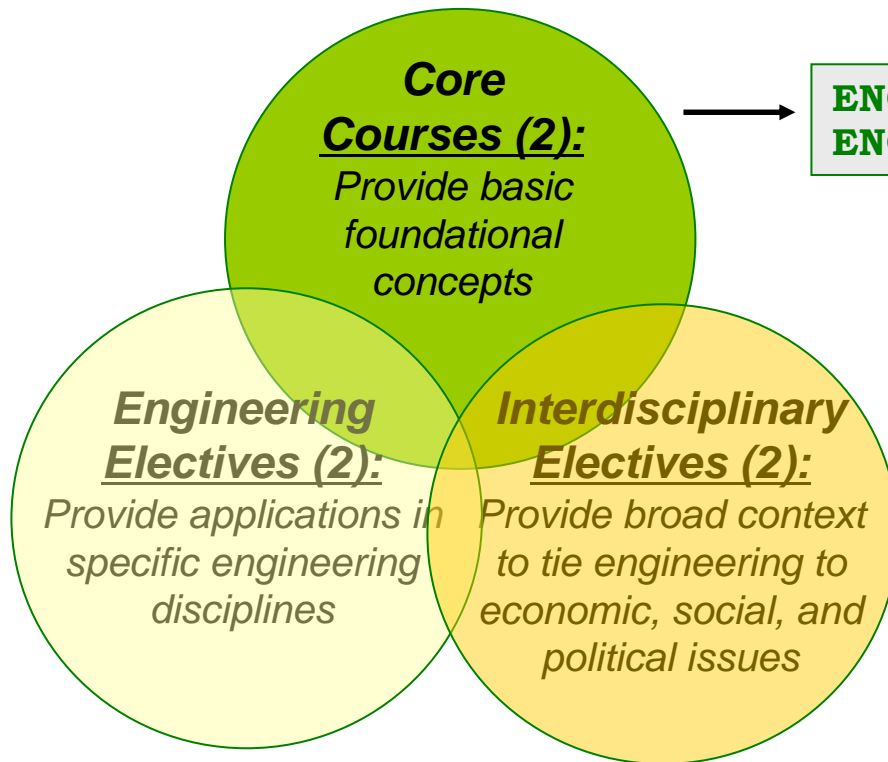
Barriers:

- Requires crossing discipline and departmental boundaries

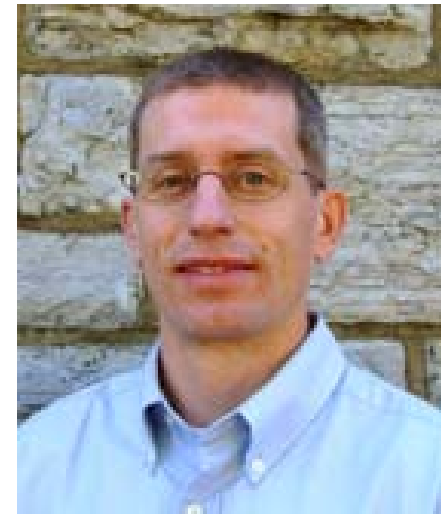


Example: Green Engineering Minor

- A Green Engineering Minor is available to students completing 18 credit hours (6 courses):

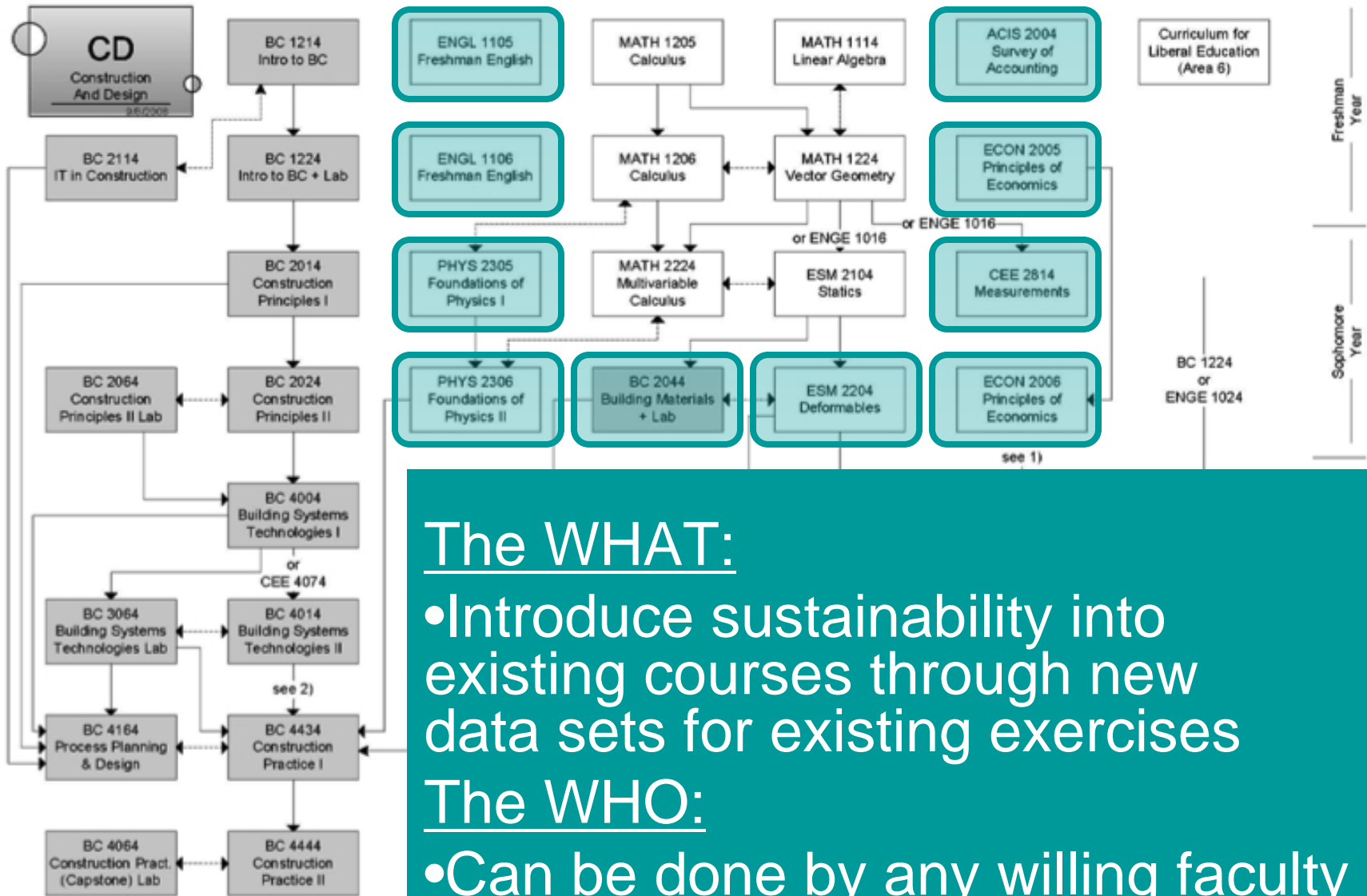


→ **ENGR 3124** – Intro to Green Engineering
ENGR 3134 – Environmental Life Cycle Analysis



<http://www.eng.vt.edu/green/>

Tactic 4: Sprinkle Sustainability Throughout



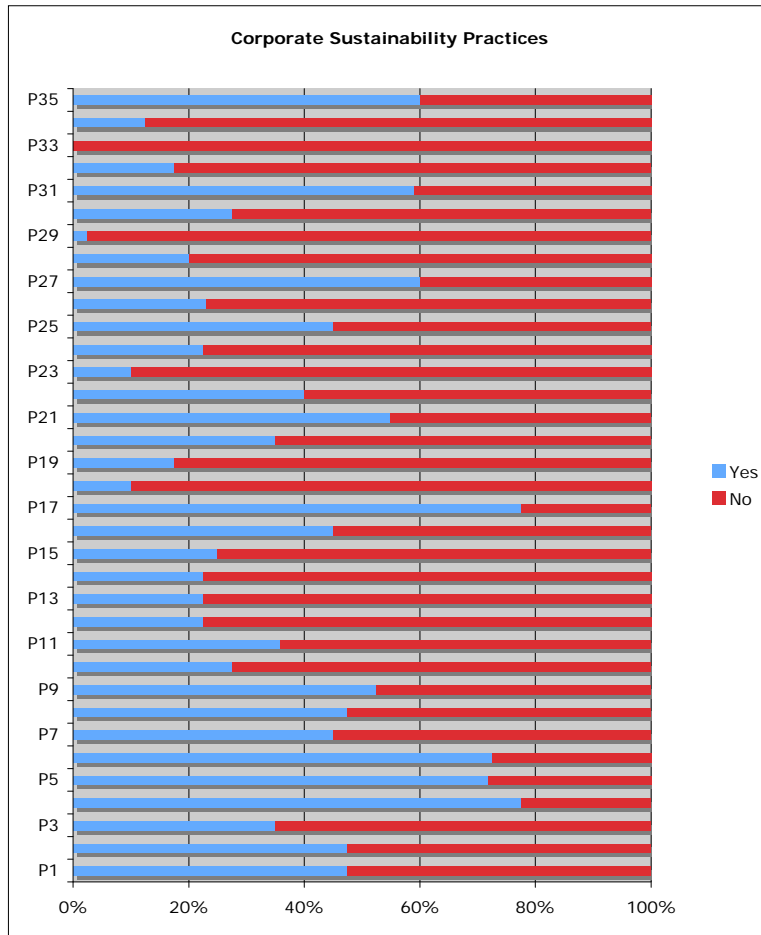
The WHAT:

- Introduce sustainability into existing courses through new data sets for existing exercises

The WHO:

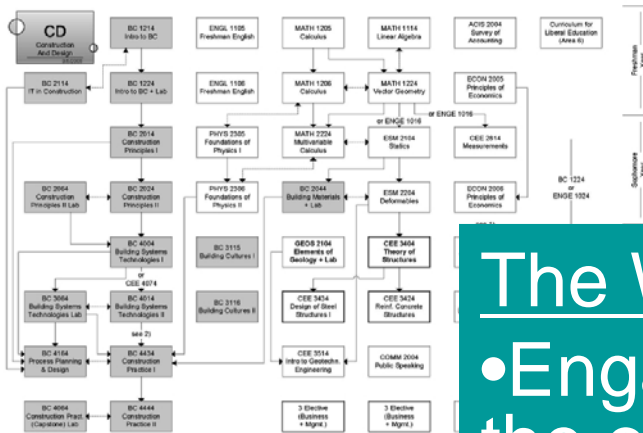
- Can be done by any willing faculty

BC 4574: Construction Internship



- Summer 2007
- 40 internship students
- 36 companies
- Benchmark survey of sustainability practices in employer companies

Tactic 5: Provide Opportunities Outside the Classroom



The WHAT:

- Engage in projects that benefit the community or world at large

The WHO:

- Any enthusiastic faculty member

Barriers:

- Requires coordination and possibly a need to leverage external resources

Example: Solar Decathlon

- Interdisciplinary team
- Competition with other universities
- Interaction with corporate participants
- Fame and fortune as housing for Senator Wagner



<http://vtsolar.arch.vt.edu/>

Tactic 6: Integrate Campus Operations

The WHAT:

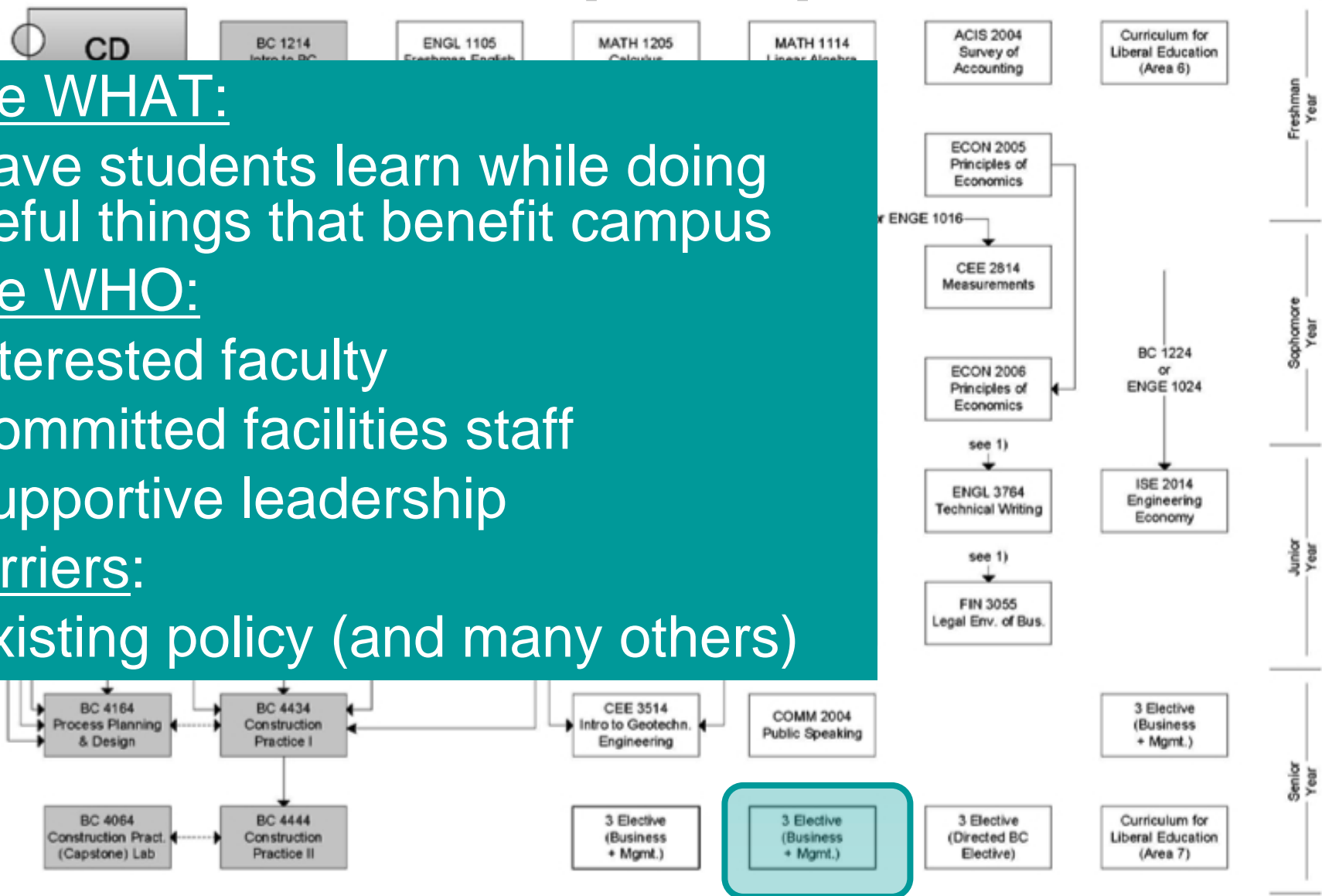
- Have students learn while doing useful things that benefit campus

The WHO:

- Interested faculty
- Committed facilities staff
- Supportive leadership

Barriers:

- Existing policy (and many others)



Example: Sustainable Facilities Fellowship

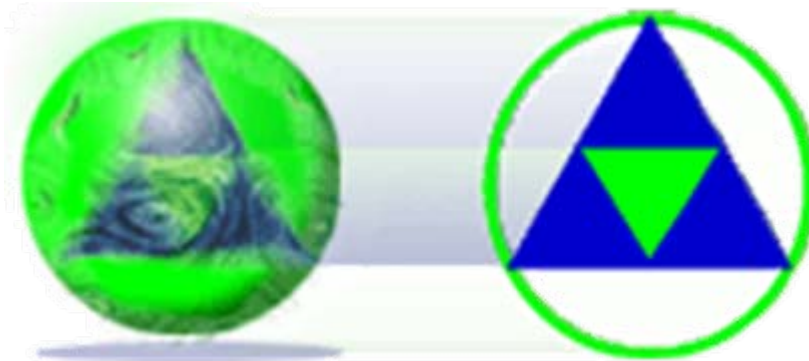
- Ongoing graduate fellowship
- Graduate fellow teaches a regular special studies course
- Undergrads learn about sustainable project evaluation
- Facilities gets internal verification of LEED claims



Questions to Consider

- **Where** can sustainability be inserted?
- **Why** are we undertaking the initiative?
What's the driver behind it?
- **Who** can be counted on as a change agent? Who will potentially get in the way?
- **What** other initiatives can be harnessed or leveraged? What resources can be tapped?
- **When** do we need to be finished? What's the timeline?

Thank you for your attention!



Any questions?

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<http://www.sustainablefacilities.com>

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