Computer Engineering

Proposed Changes for 2002-2004 and beyond
The Committee

- Committee Membership – Adnan Aziz, Yale Patt, Dewayne Perry, Nur Touba and Craig Chase
- Charter – Recommend Changes to the CE Curriculum.
Problems To Address

- Too many required courses, too few electives.
- Ineffective programming sequence.
- No (credible) area option for Software Engineering.
Software Engineering Curriculum

- Software Engineering is an important field of study and should be given thorough treatment within the departmental curriculum.
- A new committee should be formed to recommend a SE curriculum.
- In the interim, SE will be addressed as a specialty within the CE curriculum.
Basic Science and Math

• Math and Physics are essential for Engineering, including Computer Engineering.
  – One full year of calculus, one semester of discrete mathematics.
  – One full year of physics, including statics, electrostatics and electromagnetism.

• No direct justification for chemistry and differential equations.
Core Engineering

• Freshmen courses
  – Intro to EE (EE302) and Into to CE (EE306)

• Circuits, Signals and Systems are essential.
  – EE411, EE313, EE438.

• Probability and Statistics
  – EE351K
Programming Sequence

• We Need a Philosophical Shift
  – Teach underlying technology
  – “Bottom-Up” approach, analysis (and experience) before design.

• EE306 – Basic Principles of Computation
• EE312 – Basic Principles of Programming
• EE322 – Programming with Abstraction
How Does EE312 Change?

• Course content should emphasize how things work at the machine level (not on an abstract mathematical level).
  – Memory management and parameter passing.
• Students should learn to debug/analyze programs.
• Internalizing is the key to understanding, Understanding is the key to retention.
How Does EE360C Change?

• EE360C serves two masters
  – Teaching C++
  – Data structures and analysis of algorithms.
• EE322 Would address teaching C++
  – Common algorithms and data structures would be covered (e.g., C++ STL).
• EE360C Would be elective and advanced.
Computer Design Sequence

• Improve a good thing.
• EE306 – Basic Principles of Computation
• EE316 – Digital Design
• EE319K – Introduction to Microcontrollers
• EE345L – Microcontroller Applications and Computer Organization
Changes to the Major Sequence

• Eliminate 4 EE courses (325, 321, 338K, 339) and Modern Physics (PHY355).

• Make 360P and 360N area courses (not required).

• Require EE345L as substitute for EE321K

• Require two areas (six courses). EE345L is not an area course.

• Add a laboratory to EE338 (becomes 448).
Technical Areas

• Students must choose at least one CE area, and one (either CE or EE) other area.
• Areas are defined by the area committee.
  – Computer Design (360N, 345M + one more)
  – VLSI Design (339, 360S, 360R)
  – Software Development (360P, 360C, 360F)
  – Software Systems (Databases, Compilers, Networking)
Curriculum Changes Summary

• Total of 123 credit hours (down from 128)
• Two technical electives (up from one)
• Students must choose two technical areas (EE345L advanced lab is not an area course).
Differences With Proposed EE

• First two years virtually identical
  – EE316 (CE) instead of EE325 (EE)
  – M325K (CE) instead of M340L(EE)
• CE requires EE316 and EE345L, EE requires EE325, EE339 and EE362K
• EE requires EE366, CE requires an “Engineering Science Elective”.
• EE has 1 free, 2 tech electives, CE has 2 free and 2 tech electives.