Today’s Theme

Engineering the Future:
Spotlight on current and potential ECE students
Agenda

• Introduction
• Department Update
• Breakout Session
• Break
• Breakout Review
• Industry Spotlight
Agenda (cont’d)

• IAB Elections
• Lunch (Students join meeting)
• Breakout Session
• Breakout Review
• IAB Marketing Initiatives
• Closing Thoughts/Next Steps
Engineering the Future:
Spotlight on current and potential ECE students
ECE Department Update

• Andrea Leland Joins ECE
• Enrollments Still Up:
  ➢ Undergraduate – 360
  ➢ Graduate – 174
• CSU Signs Collaborative PhD Program Agreement with UPRM
• Three CIT Grants Awarded:
  ➢ $2M Equipment Gift for COGrid Initiative
  ➢ $250K Grant to Study Robustness in Computing Systems
  ➢ $221K Grant for Integrative K-12 College Training Program for Computer and Semiconductor Industry in the Rocky Mountain Region
Enrollment Trends

- Undergraduate
- Masters
- PhD
- Total

Enrollment

Proposal Activity in Terms of Dollars

![Proposal Activity in Terms of Dollars](image-url)
A Glimpse at the Funding Challenge for Colorado Higher Education

• By FY 2009, there could, conceivably, not be enough General Fund revenues available to fund higher education.

• Higher education has sustained a disproportionately larger General Fund reduction because:
  
  ➢ It is considered a balancing mechanism of the budget
  
  ➢ It is perceived that public higher education has the ability to generate new revenue through tuition increases
The Funding Challenge

Higher Education - Share of General Fund

Data Source: State of Colorado Joint Budget Committee Appropriations Reports FY 1990-FY 2004
Impact on CSU Revenue to Support Academic Programs
More high school graduates means more Colorado students will look to pursue a degree in higher education.
The Funding Challenge – A Comparative Analysis

CSU Peer Institutions: FY 2002-03 Tuition and State General Fund Comparison

- Michigan
- Maryland
- Wisconsin-Madison
- Illinois-UC
- Washington
- Pittsburgh
- Virginia
- Wisc. State U.
- Iowa State
- Ohio State
- Penn State
- Nebraska
- Texas A&M
- Oregon State U
- U of Texas
- U of Mississippi
- Colorado State

Comparative analysis of tuition and state general fund for CSU peer institutions.
Breakout Session

**TOPIC:** Focusing on students at the high school level, how can we collaborate to increase interest and involvement in engineering, math, and science?
Why do we need to foster student interest in engineering?

The Problem: Over the last ten years there has been:

- 50% decline in student interest in engineering
- 14% decline in engineering degrees awarded to US students

*Source: National Science Board: Science and Engineering Indicators 2002*
Without new engineers we will continue to face a perpetual shortage

- To meet current job forecasts, we need to add 100,000 engineers every year for a decade.
- The U.S. currently graduates 60,000 engineers per year.

*Source: Bureau of Labor Statistics, 2001*
The rest of the world recognizes the value of engineering

The Startling Facts:

- Europe graduates 3 times as many engineers as the US, Asia graduates 5 times
- 46% of the degrees awarded in China are engineering degrees
- Only 5% of US college degrees are in engineering

*Source: Institute for Engineering Education*
The Bottom Line:

The Future of Engineers are Scarce

- Likelihood that a high school graduate obtains an engineering degree:
  - All students: 2.1%
  - Women: 0.9%
  - Minorities: 0.8%

- In a typical high school graduating class of 400 students:
  - There will be 8 engineers
  - 5 will be white males, 2 women, 1 a minority

*Source: Institute for Engineering Education
Some considerations for your discussions:

- Possible causes for lack of interest in engineering:
  - Lack of Preparation: “Engineering is all numbers and I’m not good at math.”
  - Lack of Exposure: “What is Engineering?”
  - Lack of Interest: “Engineering is boring and geeky.”

- Current high school preparation is lagging:
  - Less than 10% of high school students take math through calculus, and science through physics
  - Only 6% of minority high school students meet this level of preparedness
  - Today, almost no high school student has any meaningful K-12 engineering classroom experience to motivate them further.
One Possible Solution

The Infinity Project℠

• Award winning K-12 and early college engineering education program based in The Institute for Engineering Education

• Created by nationally recognized engineering and educational leaders from across the country

• Supplies schools with everything they need to be successful

• Working with classrooms in 20 states today
The Infinity Project℠

Two Key Elements for the Program’s Success:

1. Award winning, high quality program
2. Easy for schools to implement

Added benefits:
- low cost
- works with existing teacher base
- significant classroom support
- high impact
The Infinity Project℠

Typical Program Costs

Professional Development for Teachers
  – $495/teacher plus travel expenses

Classroom Technology Acquisition
  – $350/kit – typically 10 kits per school

Course Textbook
  – Prentice Hall – approx $50 per book

University Involvement

Universities teach the college version of the course to their freshman engineering students

• Increases the retention rate of freshman
• Offers students cutting edge, hands-on engineering experiences created by national team of experts

Universities serve as Infinity Professional Development Sites for schools across the country

• Teachers attend professional development at partnering universities in their region
Engineering the Future:
Spotlight on current and potential ECE students
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Ed Hulls
Engineering the Future:
Spotlight on current and potential ECE students
<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman Year</strong></td>
<td></td>
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<tr>
<td>COCC150 College Composition</td>
<td>EE102 Digital Circuit Logic</td>
</tr>
<tr>
<td>CSCC153 Java Programming</td>
<td>M CC161 Calculus for Physical Scientists II</td>
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<tr>
<td>EECC192 Elec Eng Fundamentals</td>
<td>PHCC141 Physics for Scientists and Engineers I</td>
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<td>M CC160 Calculus for Physical Scientists I</td>
<td>SPC200 Speech</td>
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<tr>
<td>Science/Engineering Elective*</td>
<td><strong>EE 103 DC Circuit Analysis (1)</strong></td>
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<td><strong>Sophomore Year</strong></td>
<td><strong>EE 201 Circuit Theory</strong></td>
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<tr>
<td>M 261 Calculus for Physical Scientists III</td>
<td>C CC111 General Chemistry I</td>
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<tr>
<td>PHCC142 Physics for Scientists and Engineers</td>
<td>EE202 Circuit Theory Application</td>
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<tr>
<td>Science/Engineering Elective*</td>
<td>EE255 Introduction to Microprocessors</td>
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<tr>
<td><strong>Junior Year</strong> (COCC150 must be passed before the Junior Year)</td>
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<tr>
<td>EE/ST303 Intro to Communications Principles</td>
<td>M 340 Intro to Ordinary Differential Equations</td>
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<tr>
<td>EE311 Linear Systems Analysis I</td>
<td>or</td>
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<tr>
<td>EE331 Electronics Principles I</td>
<td>M 345 Differential Equations **</td>
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<tr>
<td>EE341 Electromagnetics</td>
<td><strong>Sci/Engr. Elective (3)</strong></td>
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<tr>
<td>Univ Core (Historical Perspectives)</td>
<td><strong>15</strong></td>
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<tr>
<td><strong>Senior Year</strong> (EE312, 332, and 342 must be completed before starting EE401)</td>
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<td>EE401 Senior Design Project I</td>
<td><strong>EE 201 Circuit Theory</strong></td>
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<tr>
<td>Senior Technical Electives</td>
<td><strong>EE 342 Electromagnetic Fields and Devices</strong></td>
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<tr>
<td>Univ Core (Arts &amp; Humanities)</td>
<td><strong>EE362 Electromechanical Devices</strong></td>
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<tr>
<td>Univ Core (Public Values)</td>
<td><strong>EE 372 Physical Electronics</strong></td>
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<tr>
<td><strong>EE 471 Semiconductor Devices</strong></td>
<td><strong>Univ Core (Global &amp; Cultural Awareness)</strong></td>
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<tr>
<td><strong>Candidate Total: 129 Credits</strong></td>
<td><strong>Grand Total: 129 Credits</strong></td>
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Prepared by the Undergraduate Curriculum Committee; approved by the ECE faculty 1/18/00.

*See page 3 for explanation of this requirement.

**Students taking M 345 MUST take the prerequisite, M 229. M 229 may be counted as 2 credits towards the Science/Engineering elective requirement.

REVISED FALL 2003
## Changes to Computer Engineering Course Work

### Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COCC150</td>
<td>College Composition</td>
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<tr>
<td>CS200</td>
<td>Algorithms &amp; Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>EE203</td>
<td>Circuit Theory</td>
<td>3</td>
</tr>
<tr>
<td>M 261</td>
<td>Calculus for Physical Scientists II</td>
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<tr>
<td>PHCC142</td>
<td>Physics for Scientists and Engineers</td>
<td>5</td>
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<tr>
<td>University Core (Health &amp; Wellness)</td>
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<td>2</td>
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<td><strong>Total</strong></td>
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### Spring Semester

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<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
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<tr>
<td>EE102</td>
<td>Digital Circuit Logic</td>
<td>4</td>
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<tr>
<td>MCC161</td>
<td>Calculus for Physical Scientists II</td>
<td>4</td>
</tr>
<tr>
<td>PHCC141</td>
<td>Physics for Scientists and Engineers</td>
<td>5</td>
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<tr>
<td>M 340</td>
<td>Differential Equations I</td>
<td>4</td>
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<tr>
<td>University Core (Hist. Perspectives)</td>
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<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>19</strong></td>
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</table>

### Notes

1. Students taking M 345 MUST take the prerequisite, M 229.
2. CS301 (followed by CS453 in the Senior Year) is recommended for students interested in specializing in computer system design.
3. EE332 is recommended for students interested in specializing in VLSI.
4. CS453, Intro to Compiler Construction, is recommended as one of the electives for students interested in specializing in computer system design.
5. Allowable technical electives are listed on page 2.

**Prepared by the CPE faculty, approved by Undergraduate Curriculum Committee and the ECE faculty 9/20/02.**

**Effective Fall 2003**
TOPIC: Working in technical focus groups (i.e. CE, EE), discuss how we can work together to improve the student’s educational experience.
Considerations for your discussions

- If you could design the curriculum, what changes would you recommend?

- How can industry become more involved in the Senior Design Program?

- As an industry professional, would you be interested in teaching a course here at CSU? If so, what subject?

- Do you have any innovative suggestions for improving the existing curriculum?
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IAB Marketing Initiatives

Marketing objectives link to IAB mission:

• Assist IAB with recruiting of students at both the undergraduate and graduate levels

• Increase communication and foster opportunities for interaction between students, faculty, and industry (internships, projects, research)

• Serve as a Department liaison for increasing exposure of students to real industry "life"
Communication is Key

New tools available to you:

• IAB Bulletin Board Displayed in Prominent Location

• ECE Website Revamp Underway
  – New site to include dedicated pages for IAB
A Call to Action

Contact me with your ideas, updates, suggestions, open positions, and news:

Andrea Leland
ECE Development Coordinator
Ph. 970/491-1033
email: lelandam@engr.colostate.edu
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Closing Thoughts
Tony Maciejewski