1. **Introduction and Welcome (Tony Maciejewski, ECE Department Head)**
   Tony opened the meeting, welcomed new members and visitors, explained the meeting theme, and reviewed the agenda.

2. **ECE Department Update (Tony Maciejewski)**
   The presentation included the following topics:
   a. Randy Bartels earns three top honors
   b. Louis Scharf receives prestigious Signal Processing Society Award
   c. Professor Gary Robinson retires after more than 20 years of service
   d. ECE hosted first-ever IS&T Colloquium
   e. Final four candidates named for Engineering Dean Search
   f. Current enrollment: undergraduate 297; graduate 150
   g. Quarterly e-newsletter launched in February
   h. Spring newsletter released in March
   i. Upcoming department events:
      - Fall Student Advising Day
      - Graduate Study in ECE
      - Reception to honor Dr. Aram Budak
      - IS&T Day for High School Students and Counselors: 10/7/05
      - Future Vision 2010: 9/9/05
   j. Senior Design projects available for industry clients
   k. Enrollment trends
   l. Undergraduate degrees awarded
   m. Retention rates
   n. Graduate degrees awarded
   o. Proposal activity in terms of dollars
   p. Research expenditures

3. **Update on Action Items from Fall Meeting (Tony Maciejewski)**
   Tony’s presentation provided an update on the following action items:
   - **Action item**: Create opportunities for collaborations with other CSU departments to offer more interdisciplinary projects for students.
Status: Unique examples of cross-functional collaborations with other departments:
  - RAMBox with CSU Theatre Department
  - RAMEye Mouse with CSU Occupational Therapy Department
  - RoboCup Competition with Mechanical Engineering

  o Action item: Consider partnering with a foreign department or company on an upcoming Senior Design project.
    Status: Future proposal to the National Science Foundation.

  o Action item: Emphasize the importance of internships and work with industry to increase the opportunities available to ECE students.
    Status: New web page created; mechanism in place for informing students of internship opportunities.
    http://www.engr.colostate.edu/ece/ind_relations/internships.shtml

  o Action item: Consider revising the curriculum to include the option of a minor in business, international studies, or a related field.
    Status: Flyer created to help students understand their options.

  o Action item: Encourage students to create their resumes in HTML format for posting to the ECE web site. This allows employers to search and download resumes online.
    Status: One possible solution: CSU’s CareerRAM tool, which can be linked directly from the ECE web site.

  o Action item: Follow up with interested board members regarding their involvement in the department’s graduate recruiting event.
    Status: Event planned for fall and industry participation is encouraged.

  o Action item: Tony/Andrea will draft a position statement on behalf of the IAB, asking CSU to waive out-of-state tuition fees for international students employed as research assistants.
    Status: No longer necessary due to changes in upper administration; new management understand the impact of this issue.

  o Action item: Make industry publications available in the student common areas, e.g., EETimes.
    Status: Department subscribed to EETimes. Open to suggestions regarding other valuable publications.

4. **Fall Meeting Recap (Tony Maciejewski)**

   Tony briefly reviewed the following key points from last fall’s IAB presentation:
   a. Leading factors impacting higher education: 1) increased homeland security; and 2) increased quality in graduate programs abroad
   b. Impact of trends on ECE at CSU
   c. Percentage of graduate degrees awarded to international students
   d. Ramifications for ECE in the long-term and how ECE is working to address these issues.


    Tony provided an overview of the NSB report (8/14/03), which addressed the United State’s long-term challenge to sustain its global advantages in science and technology. He covered findings and recommendations based on national workforce policies in five major areas:
    I. Undergraduate education in science and engineering
    II. Advanced education in science and engineering
    III. Knowledge base on the science and engineering workforce
IV. Pre-college teaching workforce for math, science, and technology (these findings were not covered, however, Tony discussed how the issue is being addressed at CSU)

V. US engagement in the international science and engineering workforce
   a. Update on Visas Mantis processing: the Government Accountability Office is reporting that processing times have improved since October 2003

6. **Industry Spotlight: Avaya (Deborah Goldman)**
   Deborah presented an interesting and informative overview of Avaya, including the company’s history and several product examples.

7. **University Update (Dr. Tony Frank, CSU Interim Provost)**
   Dr. Frank gave an update on the state funding situation and an overview of the University's vision, including his view and input on the research mission.

8. **Curriculum Overview (Tony Maciejewski)**
   Tony presented a high-level overview of the electrical engineering curriculum. This included all EE core requirements, the breakdown of math and science requirements, and the percentage of university core and miscellaneous courses that are required by EE majors.

9. **Roundtable Discussion (Susan Hunter, IAB President, facilitated the discussion):**
   Questions posed:
   1. As a department that is focused on cutting-edge research and innovation, how can ECE further integrate into its program the project management and design for reliability skills that employers are seeking?
      a. What courses or curricula changes would give students the necessary experience for product development?
      b. Are there tools or processes that would be useful to students, e.g., Six Sigma?
   2. Are there other curricula changes that would help the department produce the best engineers who are competitive upon graduation and poised for future success as technology leaders?

**Key points discussed by the board:**
- In preparation for the IAB meeting, Dave Henderson polled his co-workers at Northrop Grumman to see what skills they look for in recent graduates. Based on their responses, Dave asked Tony if ECE students are required to work with real budgets and do they have real deadlines to which they must adhere. Dave and his colleagues believe that project and budget management is important for graduates entering the workforce. Tony indicated that the Senior Design class is required to meet project milestones and each student receives $50 per semester for their project.
- H.J. Siegel suggested having industry representatives talk to the senior design class about project and budget management and/or other pertinent topics. Tony recommended sending the board a list of available speaking dates and possible topics, asking them to either sign up for a talk or forward to the appropriate individual within their organization for possible consideration.
Susan Hunter mentioned the need for students to have an understanding of FPGA-based design. She also said that Six Sigma is huge in the industry and students who understand the process will likely have a competitive advantage.

Cliff Pacaro said that recent studies have shown that technical communication is an issue for recent grads. While they may be able to speak technical jargon and understand technical issues, they often have problems translating and communicating their knowledge in a manner that is clear and easy to understand.

The board stressed the importance of writing skills in today’s business environment, especially with email, the internet, and increasing correspondence with the international community.

The IAB discussed several ideas that might help students improve their verbal and written communication skills. These ideas include:
1. Have someone from the industry give a talk to the senior design class about the importance of effective communication skills.
2. Have students present their senior design projects to lower-level ECE students. Limit the length of the presentations, which would require the student to deliver the information in a brief yet concise manner. This would also give underclassmen exposure to the various projects available to them their senior year.
3. Require students to present their projects to students who don’t have an engineering background, e.g., students in the business school.
4. Require more written communications, e.g., essay style writing or spec sheets for lab work. Tony expressed concerns about the process for reviewing these papers and ensuring consistent grading.
5. Tony suggested the idea of having students work in teams of two and limit the number of emails they are allowed to send related to their project (for example, maybe they could only send each other five emails over the course of a semester). The emails could be used to explain the project, ask questions, and solve problems. The goal of the exercise is to help students learn the importance of concise written communications and understand the challenges of working with remote colleagues.
6. HJ Siegel suggested creating a speech course specifically for ECE students. Board members argued that ECE students benefit from classes that involve students outside the ECE major.
7. Susan Hunter recommended an exercise that would involve senior design students working in teams of two. “Student 1” would be required to write a paper about their senior design project. “Student 2” would evaluate Student 1’s paper and deliver a presentation on Student 1’s project. This means Student 1 would have to put together a clear and concise paper. Meanwhile, it would be the responsibility of Student 2 to make sure they understand the message and then effectively present it to a group of students.
8. The board suggested including a best paper award as part of the E Days awards process. This would encourage students to focus on the written communications aspect of the senior design experience. They recommended having companies sponsor the award and offer a cash prize as the incentive.

Tony posed the question: After ECE students graduate, how do we evaluate their performance and determine whether their communication skills are improving? Ideas suggested by the board include:
1. Have the journalism department, for example, do a sampling of student papers each year and compare the results.
2. Create a form for employers to fill out after interviewing ECE students, asking them to provide ratings in certain categories. This data could be analyzed and
compared year after year. The Career Center may have a template that could be modified for this purpose.

- HJ Siegel suggested offering mock interviews as a way to help students prepare for “real” interviews and gain input on improving their communication skills.

- John Nichols asked if the department has a process for polling new freshmen when they enter the program to see why they decided to pursue ECE. Tony said the department does not have a process in place, but it might be worth implementing in the future to better understand retention rates.

- Warner Andrews suggested incorporating Six Sigma into the entire curriculum and teach the process rather than a separate class on the topic. The board agreed that incorporating Six Sigma into the ECE statistics class would be useful, in addition to having someone from the industry speak to the senior design class on Six Sigma.

- John Nichols brought up the idea of a certificate program to help give students a competitive advantage. For example, it could be called an “Applied Engineering Certificate” or a “Systems Engineering Certificate.” It wouldn’t require much additional course work by the student, but it might make them more marketable. However, the department would have to do a good job of promoting the certificate so that employers buy into the program and see the value in it.

**ACTION ITEMS:**

- Send the board a list of available speaking dates and possible topics, asking them to either sign up for a talk or forward to the appropriate person within their company for possible consideration.

- Consider revising the Senior Design course to include an exercise that will help students improve and enhance their communication skills (this may involve students outside the department, perhaps from the business school).

- Bring in a senior design speaker to talk to the class about the importance of effective communications in a professional environment.

- Look into adding a “Best Paper Award” to the E Days awards ceremony. Encourage companies to sponsor the award and offer a cash prize to the winner(s).

- Andrea will work with the Career Center to create a form that employers can complete after they interview an ECE graduate. This tool can be used to begin evaluating and measuring the strengths and weaknesses of our graduates.

- Consider incorporating mock interviews into Student Advising Day.

- Begin polling incoming freshmen to see why they decided to go into ECE; continue to track their progress to better understand retention rates.

- Encourage ECE professors to begin teaching the process and language associated with Six Sigma. Try to get an industry representative to give a talk to the senior design class on the topic of Six Sigma.
• Present to the faculty and undergraduate curriculum committee the idea of establishing some kind of certificate that could give students a competitive advantage and additional credibility.

9. **IAB Elections (led by Susan Hunter)**
   The board unanimously voted in favor of Deborah Goldman as the new IAB vice president. Tim Ash becomes IAB president.

**OTHER ACTION ITEMS:** The following items were discussed throughout the meeting and require follow up:

• At the board’s request, Andrea will ask the Career Center to present the CareerRAM tool at the fall IAB meeting.

• Andrea will contact the board about their involvement in the fall Student Advising Day and Graduate Study in ECE event.

• Andrea will work with the board to gauge their interest in an advising day for graduate students.

• Andrea will try to gather information on ECE’s foreign MS and PhD graduates – are they staying and working in the U.S. or are they going back to their homelands?

10. Tony wrapped up the meeting and thanked everyone for their participation.

The next IAB meeting will be held in October on the Friday before Dr. Aram Budak’s reception. The final date will be communicated in the coming weeks.