What Is This Animal……
General Engineering

Benjamin S. Kelley, Ph.D., P.E.
ME Professor & Director of General Engineering

ECS Board of Advocates
October 5, 2012

It’s A New Day!
• And things are great!
• Things have changed!
• And things are busy!

B.S.E. … General Engineering
• BU ABET Engineering Accreditation
  – 1988….one program….BSE
  – 1994….one program….BSE
  – 2000….three programs….BSE, BSECE, BSME
  – 2006….three programs….using assessment
  – 2012….three programs….have graduate programs
    • First time with BoA breakout session….Thanks!

So….What is it….BSE/EGR?
• You can call it....
  – Our legacy program
  – Jim Farison’s baby
  – The program time forgot
    • and some faculty members too
• You will call it in the future....
  – The best of engineering education
  – ECS’s hallmark program
  – The quintessential Baylor engineering program
  – The launching pad

What it Is Today?
Curriculum & Structure Perspective
• Meticulously documented (the ABET effect)
• Two options
  – Flexible Option….with seven possible stems
    • Biomechanics, Biomedical Signals, Computer Systems,
      Electronics, Fluids and Thermal Energy, Mechanical
      Design, Signal Processing
    • With prescribed stem courses plus stem and
      concentration electives
  – Biomedical Option
• Both paths are sound….½ students in BME track

What it Is Today?
Organization & Administration Perspective
• Division of General Engineering (in one’s mind)
  – Director of General Engineering (unauthorized volunteer)
  – 100% of courses offered by ECE, ME & CS (no problem)
  – A cadre of faculty who support and get it
  – A new BSE faculty committee (Thomas & Newberry invited)
  – Administrative support by committee (↑X-mas presents)
  – 47 sophomore-senior students
What Will it Be Tomorrow?

• 100 students...then beyond
• Deeper general engineering
• Fewer micro stems...more major options
  – ?? Petroleum, Industrial, Aero, Energy, Mechanical, Computer, Electrical....
  – Those that are needed...make sense...that fit...
• The cream of ECS students
• Talented...cut from a different mold...creative

First Things First

• Get Operational
  – Tend to ABET findings (...six years or bust!)
  – Get familiar
  – Student Advising
  – Efficient forms and systems
  – Become official.....whatever that means

Second Things Next

• Build student enrollment...we can do that!
• Win over the faculty...and staff
  – And the Dean....and he's pretty sharp
• Become “Official”
• Organize winning “options” or minors or certificates or useful value-added that fit.

The Form 1

High Resolution Desktop 3D Printer

• [http://formlabs.com/](http://formlabs.com/)

• David Cranor...
  – A Baylor BSE/EGR graduate

Pseudo Random Quotes...

• John Calabrese....GM VP of Global Engineering
  – 21-Sept-2012
• “Colleges need to create multidisciplinary engineering departments to give students a variety of skills.”
• “Universities are very silo-structured,”... they need to take that to the next step to have interdisciplinary curriculum.”

Now back to ABET...

• What the Dean said....
• The evaluators also found some issues...the program needing the most work was BSE
  – It was considered “deficient” with respect to evaluating student outcomes
• “Deficient” means the program doesn’t meet one of the ABET Criteria
This Means….

- BSE/EGR students were not separately evaluated in classes...and were the minority
  - This includes Junior and Senior Design
  - ECE and ME also cited
- Not enough feedback on FE exam and Senior Exit Interview
  - Not the situation for ECE and ME

The ABET Lingo

- ABET accredits engineering and related programs
- Volunteer organization
  - O’Neal, Jordan, and Kelley are Program Evaluators
- Set of Criteria
- Institution prepares self-study report

Criterion

1. Students
2. Program Educational Objectives
3. Student Outcomes
4. Continuous Improvement
5. Curriculum
6. Faculty
7. Facilities
8. Institutional Support

Now…We concentrate on ABET
Six years or bust!

- Junior and Senior Design course evaluations will be identified by major
  - beginning immediately
  - Including senior exit survey
- ECE and ME use FE exam results for a) and e)
  - EGR will require all students to submit a junior and senior a) & e) portfolio
  - Gives two data points for assessment

3. Student Outcomes (pg 3)
A-K......the ability to....

- Apply stem knowledge
- Interpret experiments
- Design systems...
- Function on teams
- Solve engr problems
- Professional & ethical responsibility
- Communicate effectively
- Global, economic, environmental context
- Life-long learning
- Contemporary issues
- Modern engineering tools

2. Program Educational Objectives

- Broad statements that describe what graduates are expected to attain within a few years of graduation.
- Some were more “attitudes” than “attain”
- Survey to alumni asked to comment on “department’s” achievement rather than their achievement.
PEO Examples

- Graduates have the knowledge and skills necessary for success in a professional environment
- Should be...for example
- Graduates will succeed in entering engineering practice
  - As measure by the % employed in the profession

How Did We Get Here?

- Dean didn’t ride herd on departments
  - Can we blame this on Dean O’Neal?
- Single part-time BSE/EGR volunteer administrator
- Bad timing of transition...and health
- Assessment (not grading) in background
- Creates Lemon-to-Lemon Aid opportunity

What We Need To Do...for ABET

- Get the assessment issues worked out
  - Junior and Senior Design onboard
  - Those two courses are a good chunk of assessment
- Get the jr / sr portfolio details worked out...now
  - Through the new BSE committee
- Revise the BSE Program Educational Objectives
  - Advocate Board, Faculty, Students....
  - Alumni survey

for ABET..... Con’t

- Get Official
  - Job description, duties, responsibilities, organization
- BSK will work on details
  - In concert with new BSE Committee
  - Input and approval from Dean O’Neal

What We Need to Do for...Advising

- Locate student advising information
- Learn and process needed forms, etc.
- Find/update/modify BSE documentation
  - For efficiency
  - On the internet
- Ad hoc from ABET reviewer
  - BSE advising needs improving

What We Need to Do for Tomorrow

- Streamline the curriculum
  - Greater engineering depth and commonality
- Opportunities for value-added stems
- Opportunities for other value-added programs (minors, certificates, etc.)
- Be responsive and proactive to the needs of students and ECS
Other “Things”

- Pre-Engineering
- ECS LLC Residential College
- Technical Entrepreneurship
- Faculty Appointments
- Development

Feedback, Observations, Suggestions
Let’s get to work