Electrical and Computer Engineering Session

AGENDA
October 5, 2007

Introduction of Faculty......................................................Kwang Lee
Overview of the Department.............................................Kwang Lee
ABET Report................................................................Jim Farison
Missions Project.................................................................Brian Thomas
Internship Program............................................................Randall Jean
Graduate Program...............................................................Mike Thompson
Strategic Planning..............................................................Steve Eisenbarth

Introduction of Faculty

Kwang Lee, Chairman
Russ Duren
Steve Eisenbarth
Jim Farison
Don Farris
Ian Gravagne
Randall Jean
Bob Marks
Brian Thomas
Mike Thompson
Overview of the Department

Kwang Lee

- Recruitment
  Students at Fall Premiere
  Faculty
- Course pre-fixes and re-numbering
- New Departmental Website

Report on BS-ECE Program
ABET Accreditation Cycle

2006
July 1 Submission of self-study report
October 8-10 ABET team campus visit
October 10 Exit interview
Seven-day response
Draft report
Due process (30 day) review
Due process response

2007
July 20-21 ABET EAC final action
Final statement
Report on BS-ECE Program
ABET Accreditation Cycle

Accreditation "Shortcomings" Terminology

<table>
<thead>
<tr>
<th>Weakness</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacks strength of compliance (2V/2R)</td>
<td>Criterion satisfied, but future (?)</td>
</tr>
</tbody>
</table>

Report on BS-ECE Program
ABET Accreditation Cycle

Our results

- None

Weaknesses

- None

Concerns

- Ageing faculty: retirement replacements?
- Limited space: new space for growing activity?
- Student equipment: not equivalent to industry?
Assessment Overview

- Objectives
- Outcomes
- Process
- Measures

ECE Objectives

The objectives of the B.S. in Electrical and Computer Engineering program, delivered in an educational environment shaped by Christian ideals, are that:

1. graduates have the technical maturity necessary to be productive and successful engineers.
2. graduates have the professional skills necessary for interacting effectively with society.
3. graduates have the capacity for the thoughtful integration of work and life and to view the engineering profession as a lifelong commitment to serve others.
### ECE Outcomes (a-k)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>an ability to apply knowledge of mathematics, science, and engineering</td>
</tr>
<tr>
<td>b)</td>
<td>an ability to design and conduct experiments, as well as to analyze and interpret data</td>
</tr>
<tr>
<td>c)</td>
<td>an ability to design a system, component, or process to meet desired needs</td>
</tr>
<tr>
<td>d)</td>
<td>an ability to function on multi-disciplinary teams</td>
</tr>
<tr>
<td>e)</td>
<td>an ability to identify, formulate, and solve engineering problems</td>
</tr>
</tbody>
</table>

### ECE Outcomes (a-k)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>f)</td>
<td>an understanding of professional and ethical responsibility</td>
</tr>
<tr>
<td>g)</td>
<td>an ability to communicate effectively</td>
</tr>
<tr>
<td>h)</td>
<td>the broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
</tr>
<tr>
<td>i)</td>
<td>a recognition of the need for, and an ability to engage in life-long learning</td>
</tr>
<tr>
<td>j)</td>
<td>a knowledge of contemporary issues</td>
</tr>
<tr>
<td>k)</td>
<td>an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
</tr>
</tbody>
</table>
Assessment Process

- Implement Changes
- 3-yr cycle
- Assess Outcomes
- 1-yr cycle
- Update Objectives
- ECE Faculty Evaluation

Assessment Measures

- ABET Assessment Forms for Courses
- FE Exam Scores
- Exit Survey for Graduating Seniors
- Grades in Selected Courses (secondary)
- Employer Feedback – Not yet a formal part of the process. We would like to find a way to make this happen.
# FE Results from the AM Session

<table>
<thead>
<tr>
<th>AM Subject</th>
<th># Exam Questions</th>
<th>Institution AVG % Correct</th>
<th>National AVG % Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>19</td>
<td>78</td>
<td>74</td>
</tr>
<tr>
<td>Engineering Probability and Statistics</td>
<td>8</td>
<td>77</td>
<td>65</td>
</tr>
<tr>
<td>Chemistry</td>
<td>11</td>
<td>79</td>
<td>67</td>
</tr>
<tr>
<td>Computers</td>
<td>8</td>
<td>92</td>
<td>82</td>
</tr>
<tr>
<td>Ethics and Business Practices</td>
<td>8</td>
<td>81</td>
<td>75</td>
</tr>
<tr>
<td>Engineering Economics</td>
<td>10</td>
<td>72</td>
<td>51</td>
</tr>
<tr>
<td>Engineering Mechanics (Statics and Dynamics)</td>
<td>13</td>
<td>64</td>
<td>59</td>
</tr>
<tr>
<td>Strength of Materials</td>
<td>8</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>Material Properties</td>
<td>8</td>
<td>79</td>
<td>61</td>
</tr>
<tr>
<td>Fluid Mechanics</td>
<td>8</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>Electricity and Magnetism</td>
<td>11</td>
<td>85</td>
<td>81</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>8</td>
<td>54</td>
<td>51</td>
</tr>
</tbody>
</table>

Outcome a) an ability to apply knowledge of mathematics, science, and engineering

Outcome f) an understanding of professional and ethical responsibility

# FE Results from the PM Session

<table>
<thead>
<tr>
<th>PM Subject</th>
<th># Exam Questions</th>
<th>Institution AVG % Correct</th>
<th>National AVG % Correct</th>
<th>National Standard Deviation**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuits</td>
<td>10</td>
<td>47</td>
<td>58</td>
<td>1.9</td>
</tr>
<tr>
<td>Power</td>
<td>8</td>
<td>48</td>
<td>52</td>
<td>1.6</td>
</tr>
<tr>
<td>Electromagnetics</td>
<td>4</td>
<td>87</td>
<td>56</td>
<td>1.0</td>
</tr>
<tr>
<td>Control Systems</td>
<td>6</td>
<td>92</td>
<td>62</td>
<td>1.4</td>
</tr>
<tr>
<td>Communications</td>
<td>5</td>
<td>53</td>
<td>36</td>
<td>1.1</td>
</tr>
<tr>
<td>Signal Processing</td>
<td>5</td>
<td>80</td>
<td>30</td>
<td>1.2</td>
</tr>
<tr>
<td>Electronics</td>
<td>9</td>
<td>72</td>
<td>61</td>
<td>1.9</td>
</tr>
<tr>
<td>Digital Systems</td>
<td>7</td>
<td>71</td>
<td>55</td>
<td>1.8</td>
</tr>
<tr>
<td>Computer Systems</td>
<td>6</td>
<td>81</td>
<td>60</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Outcome e) an ability to identify, formulate, and solve engineering problems
NCEES Confidentiality Statement

This report contains confidential and proprietary NCEES data. The report itself may not be provided to third parties or used for any purpose other than that contemplated by NCEES and the recipient of this report. The information contained in the report however may be shared with accrediting bodies so long as the report recipient expressly informs the accrediting body that the information is confidential and proprietary and may not be used for any purpose unrelated to the accreditation review of the institution in question. By using any of the information contained in this report the report recipient agrees to respect and be bound by these terms and conditions regarding the use of NCEES data. Your cooperation is appreciated.

Engineering Mission Work

- Projects from last year
  - Small hydropower system in rural Honduras
  - Foam house construction in Armenia
Engineering Mission Work

- Other news
  - National Geographic and Texas Monthly ad spotlighting Engineering School and Engineers with a Mission
  - Engineering trips are becoming a significant recruiting device

Engineering Mission Work

- Possible projects for next year
  - Ugandan solar power system for future orphanage
  - Three hundred foot pedestrian bridge in Kenya
  - Next steps for foam houses in Armenia
Engineering Mission Work

- Needs
  - Frequent flier miles can be donated
    - KLM, British Airways
  - Scholarships to offset student travel costs
  - Connections with potential donors sympathetic to cause (see Rob Kennedy)

ECE Internship Program
ECE Interns for 2007

- Jacob Cox  
  (Fallas Automation)
- Brandon Herrera  
  (ECE Microwave Lab)
- Kyle Kennedy  
  (AT&T)
- Hunter Smith  
  (National Instruments)

Our Goal as We Grow

- Communicate the value of real-world experiences to our students.
- Do a better job of connecting our students with prospective employers.
Our Challenges

- An internal concern dealing with the high cost to students for internship course credit.
- Networking with employers to showcase the value of Baylor Engineers.

Graduate Program Overview

- Degree Programs
- Stipends and Tuition Remission
- Current Numbers
- Graduates
Degree Programs

- Master of Science
  - Electrical and Computer Engineering
  - Biomedical Engineering
  - Mechanical Engineering
  - All require 30 hrs + thesis

- Master of Engineering
  - 33 hrs. + project

Joint Degree Programs

- Master of Science
  - Share 6 credit hrs. between undergrad technical electives and graduate program

- Master of Engineering/MBA
  - Share 15 hrs. of common credit
  - Complete in about 2 years + 1 semester
Stipend and Tuition

- Grad School Funding for 8 stipend positions.
- Grad School Funding for 10 full-time equivalent students.
- Stipend $1500/mo for 10 months.
- RA positions from Research, Start-up and Distinguished Professor Funds

Head Count

- Recruiting: 51 qualified applicants
  GRE – 750 Quantitative, 500 Verbal
- 16 Full-time Graduate Students (9 ECE Advisors)
- 4 Part-time Graduating (All ECE)
- 2 Industry Part-time Students (1 ECE)
- 15 Graduates (10 MS – ECE, 3 M.E)
Baylor’s Vision 2012 Goals

**Strong Graduate Programs:**

“No university has yet gained such rank without strong graduate programs.”

**Clear Christian Identity:**

“Baylor will make its influence felt in the academic world and in our larger society as an institution informed and motivated by its Christian identity.”

**Significant Scholarly Output:**

“Such influence requires a depth of scholarly excellence and a volume of scholarly output that is found only in schools with first-rate graduate programs.”

**Rigorous Christian Perspective:**

“For our influence to be distinctly Christian, a core of this scholarly work must be done from a rigorously Christian perspective.”
Table 2. Private Universities with Doctoral Programs in Engineering by U.S. News Ranking

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Princeton</td>
<td>1</td>
<td>29</td>
<td>122</td>
<td>EE, CS, ME, O(6)</td>
<td>9,700</td>
<td>96.0%</td>
<td>$72.1 M</td>
</tr>
<tr>
<td>Yale</td>
<td>2</td>
<td>33</td>
<td>137</td>
<td>EE, CS, ME, O(10)</td>
<td>5,533</td>
<td>99.0%</td>
<td>$115.8 M</td>
</tr>
<tr>
<td>Duke</td>
<td>3</td>
<td>36</td>
<td>133</td>
<td>ECE, IME, ME, CS, O(5)</td>
<td>6,170</td>
<td>99.8%</td>
<td>$104.4 M</td>
</tr>
<tr>
<td>Dartmouth</td>
<td>4</td>
<td>22</td>
<td>88</td>
<td>EE, ME, E(6)</td>
<td>2,110</td>
<td>97.4%</td>
<td>$77.1 M</td>
</tr>
<tr>
<td>Harvard</td>
<td>4</td>
<td>27</td>
<td>116</td>
<td>EE, ME, CS</td>
<td>9,704</td>
<td>94.8%</td>
<td>$10.3 M</td>
</tr>
<tr>
<td>Johns Hopkins</td>
<td>4</td>
<td>39</td>
<td>135</td>
<td>ECE, IME, ME, O(7)</td>
<td>9,347</td>
<td>98.0%</td>
<td>$54.3 M</td>
</tr>
<tr>
<td>Northwestern</td>
<td>4</td>
<td>34</td>
<td>116</td>
<td>EE, IME, CS, ME, O(7)</td>
<td>8,454</td>
<td>97.6%</td>
<td>$104.4 M</td>
</tr>
<tr>
<td>Vanderbilt</td>
<td>4</td>
<td>33</td>
<td>82</td>
<td>EE, IME, CS, ME, O(10)</td>
<td>9,770</td>
<td>93.2%</td>
<td>$45.4 M</td>
</tr>
<tr>
<td>Notre Dame</td>
<td>4</td>
<td>35</td>
<td>93</td>
<td>EE, CSE, O(6)</td>
<td>8,427</td>
<td>98.8%</td>
<td>$14.6 M</td>
</tr>
<tr>
<td>Lehigh</td>
<td>5</td>
<td>22</td>
<td>116</td>
<td>EE, CS, ME, O(7)</td>
<td>5,743</td>
<td>90.6%</td>
<td>$17.5 M</td>
</tr>
<tr>
<td>Case Western</td>
<td>5</td>
<td>22</td>
<td>116</td>
<td>EE, CSE, IME, ME, O(10)</td>
<td>4,636</td>
<td>93.4%</td>
<td>$21.3 M</td>
</tr>
<tr>
<td>Syracuse</td>
<td>5</td>
<td>32</td>
<td>65</td>
<td>ECE, IME, CSE, O(10)</td>
<td>12,187</td>
<td>97.5%</td>
<td>$25.1 M</td>
</tr>
<tr>
<td>Boston University</td>
<td>5</td>
<td>47</td>
<td>130</td>
<td>EE, CSE, IME, ME, O(5)</td>
<td>16,231</td>
<td>95.6%</td>
<td>$70.9 M</td>
</tr>
<tr>
<td>Brown</td>
<td>6</td>
<td>19</td>
<td>49</td>
<td>EE, CSE, ME, O(2)</td>
<td>6,206</td>
<td>94.2%</td>
<td>$5.7 M</td>
</tr>
<tr>
<td>Harvard</td>
<td>6</td>
<td>59</td>
<td>133</td>
<td>EE, IME, ME, O(5)</td>
<td>11,331</td>
<td>97.8%</td>
<td>$699.8 M</td>
</tr>
<tr>
<td>Georgia Tech</td>
<td>6</td>
<td>44</td>
<td>95</td>
<td>ECE, IME, CS, ME, O(3)</td>
<td>8,084</td>
<td>93.0%</td>
<td>$2.7 M</td>
</tr>
<tr>
<td>Northeastern</td>
<td>6</td>
<td>43</td>
<td>90</td>
<td>ECE, CS, ME, O(6)</td>
<td>18,546</td>
<td>97.0%</td>
<td>$201.1 M</td>
</tr>
<tr>
<td>U of Denver</td>
<td>12</td>
<td>3</td>
<td>30</td>
<td>EE, IME, O(5)</td>
<td>7,473</td>
<td>95.0%</td>
<td>$60.0 M</td>
</tr>
</tbody>
</table>


---

Table 1. ECE Faculty Publication and Funding Record (Since Jan 2002)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Deen</td>
<td>GMU</td>
<td>3</td>
<td>61</td>
<td>$425,118</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>S. Egan</td>
<td>Baylor</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>650,476</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T. Gronev</td>
<td>CMU</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>R. Ram</td>
<td>CMU</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>53,000</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>N. Lee</td>
<td>Michigan State</td>
<td>5</td>
<td>86</td>
<td>0</td>
<td>35,000</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>B. More</td>
<td>Texas Tech</td>
<td>18</td>
<td>41</td>
<td>1,173,136</td>
<td>1,173,136</td>
<td>1,173,136</td>
<td>-</td>
</tr>
<tr>
<td>M. Thompson</td>
<td>TAMU</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>66</td>
<td>147</td>
<td>$2,179,633</td>
<td>$1,016,139</td>
<td>$644,546</td>
<td>$180,022</td>
</tr>
</tbody>
</table>

Important MSP Elements

- How does the plan support and conform to Baylor's mission – to educate men and women for worldwide leadership and service by integrating academic excellence and Christian commitment with a caring community?

- How does the plan help us reach the goal of Vision 2012 – to enter the top tier of American universities while deepening our distinctive Christian mission?

- What are the external opportunities and threats that relate to the proposed project?

- Describe plans to pursue external funds resulting from consultation with a development officer. To what extent are endowment funds a possibility?