BSEE and BS Comp. Eng. Degrees: Ideas for the 2002-2004 Catalog

Prof. Brian L. Evans

On Behalf of the BSEE Curriculum Committee

Profs. R. Gary Daniels, Gustavo de Veciana, Brian L. Evans, Gary Hallock, Jack Lee, and Rebecca Richards-Kortum

Student Participants

Ariane Beck, Robert Knock, Elijah Liu, and Brian Ward
Motivations to Pursue BSEE

- **Early 1980s**: home computers, MTV, voiceband data modems, bulletin boards
- **Late 1980s**: PCs, analog cell phones, audio CD players, bulletin boards
- **Early 1990s**: laptops, digital cell phones, video CDs, Internet browsing
- **Late 1990s**: palm pilots, Internet cell phones, DVD players, MP3 players, ADSL and cable modems, Internet multimedia
Trends in Consumer Electronics

- Increasing amount of communications, signal processing, networking capabilities
- Increasingly digital: software has larger role
- Analog, RF, and optical subsystems needed to interface systems to physical world
- Devices and semiconductor manufacturing
  - Shrinking area, volume & power consumption
  - Exponential increase in processor speeds
Dressed for Success Tomorrow

• Mastery of “hard” skills
  – Fundamentals of mathematics, physics, biology
  – Theory and practice of electromagnetics, devices, circuits, systems, software, networking
  – Design principles, abstraction, and complexity

• Mastery of “soft” skills
  – Oral and written engineering communication
  – Business practice of marketing, budgeting, product development, and ethics
1998-2000 BSEE Degree

Electromag. and Devices (3 courses)
- PHY 303L
- EE 325
- EE 339
- Adv. Lab.

Circuits (6 courses)
- EE 302
- EE 411
- EE 321
- EE 388K
- EE 362K

Systems (3 courses)
- EE 313
- EE 316
- EE 319K

Digital Hardware (2 courses)
- EE 312

Software (1 course)
- EE 351K

Technical Writing (3 courses)
- EE 464H/K

- Shading means lab course
- Black lines mean co-requisites
- Adv. Lab: EE321K, 345M, or 345S
### 1998-2000 BSEE Curriculum

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
<th>Credit Hours</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>analog circuits/systems</td>
<td>40%</td>
<td>24.3</td>
<td>3/5 EE302 + 2/3 EE313 + EE411 + 1/2 EE321 + EE321K + EE338 + EE338K + EE351K + EE362K</td>
</tr>
<tr>
<td>specialization</td>
<td>18%</td>
<td>11.0</td>
<td>1/2 EE464H/K + 3 tech. area electives</td>
</tr>
<tr>
<td>analog devices/electromagnetics</td>
<td>10%</td>
<td>6.0</td>
<td>EE325 + EE339</td>
</tr>
<tr>
<td>technical communication</td>
<td>9%</td>
<td>5.6</td>
<td>EE155 + EE333T + 4/10 EE464H/K</td>
</tr>
<tr>
<td>digital logic/microprocessors</td>
<td>8%</td>
<td>5.0</td>
<td>1/6 EE302 + EE316 + 1/2 EE319K</td>
</tr>
<tr>
<td>programming</td>
<td>8%</td>
<td>4.5</td>
<td>EE312 + 1/2 EE319K</td>
</tr>
<tr>
<td>discrete-time processing/data acquisition</td>
<td>4%</td>
<td>2.5</td>
<td>1/3 EE313 + 1/2 EE321</td>
</tr>
<tr>
<td>business practice</td>
<td>2%</td>
<td>1.1</td>
<td>0.2333 EE302 (ethics) + 1/10 EE464H/K (ethics)</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>60.0</td>
<td></td>
</tr>
</tbody>
</table>

- Required EE courses: 51 hours
- Technical area electives: 9 hours
- Hard skills: 53.3 hours
- Soft skills: 6.7 hours
Possible 2002-2004 BSEE Degree

Electromag. and Devices (3 courses)
Circuits (3 courses)
Systems (3 courses)
Digital Hardware (2 courses)
Software (2 courses)
Technical Writing (3 courses)

- Shading means lab course
- Dashed lines mean “or” among pre-requisites
- Adv. Lab: EE 321, 440, 345L, 345S, or 374L
# Possible 2002-2004 Curriculum

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
<th>Credit Hours</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>specialization</td>
<td>30%</td>
<td>20.0</td>
<td>Advanced Lab + 1/2 EE464H/K + 5 technical area electives</td>
</tr>
<tr>
<td>analog circuits/systems</td>
<td>24%</td>
<td>16.5</td>
<td>1/2 EE302 + 2/3 EE313 + EE411 + 3/4 EE438 + EE351K + EE362K</td>
</tr>
<tr>
<td>digital logic/microprocessors</td>
<td>10%</td>
<td>6.5</td>
<td>1/6 EE302 + EE306 + EE319K</td>
</tr>
<tr>
<td>programming</td>
<td>9%</td>
<td>6.0</td>
<td>EE312 + EE322</td>
</tr>
<tr>
<td>analog devices/electromagnetics</td>
<td>9%</td>
<td>6.0</td>
<td>EE325 + EE339</td>
</tr>
<tr>
<td>technical communication</td>
<td>8%</td>
<td>5.6</td>
<td>EE155 + EE333T + 4/10 EE464H/K</td>
</tr>
<tr>
<td>business practice</td>
<td>6%</td>
<td>3.9</td>
<td>0.2333 EE302 (ethics) + 1/10 EE464H/K (ethics) + EE366 (economics)</td>
</tr>
<tr>
<td>discrete-time processing/data acquisition</td>
<td>4%</td>
<td>2.5</td>
<td>1/6 EE302 + 1/3 EE313 + 1/4 EE438</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>67.0</td>
<td></td>
</tr>
</tbody>
</table>

**Required EE courses:** 49 hours  
**Technical area electives:** 18 hours  
**Hard skills:** 57.5 hours  
**Soft skills:** 9.5 hours
# 2002-2004 BSEE Curriculum

<table>
<thead>
<tr>
<th>Topic</th>
<th>1998-2000 Credit Hours</th>
<th>2002-2004 Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>specialization</td>
<td>11.0</td>
<td>20.0</td>
</tr>
<tr>
<td>analog circuits/systems</td>
<td>24.3</td>
<td>16.5</td>
</tr>
<tr>
<td>digital logic/microprocessors</td>
<td>5.6</td>
<td>6.5</td>
</tr>
<tr>
<td>programming</td>
<td>4.5</td>
<td>6.0</td>
</tr>
<tr>
<td>analog devices/electromagnetics</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>technical communication</td>
<td>5.6</td>
<td>5.6</td>
</tr>
<tr>
<td>business practice</td>
<td>1.1</td>
<td>3.9</td>
</tr>
<tr>
<td>discrete-time processing/data acquisition</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>60.0</td>
<td>67.0</td>
</tr>
</tbody>
</table>

Changes are shown in yellow
More Choices, Faster Finish

- Students can now choose 2 technical areas
  - BSEE students could only choose one before
  - BS Comp. Eng. students used to have no choice
- More technical areas (15 instead of 12)
- 5 choices instead of 3 for advanced lab
- Students can graduate faster
  - Total credit hours reduced from 128 to 125
  - Transfer students can finish in two years
**Advanced Laboratory Course**

- Prepare a student for Senior Design Project while leveraging student’s technical area:
  - EE321 Electrical Engineering Lab I
  - EE440 Microelectronics Fabrication Tech.
  - EE345L Microprocessor Interfacing Lab
  - EE345S Real-Time Digital Sig. Proc. Lab *OR*
  - EE374L Applications of Biomedical Eng.

- May be counted as technical area elective
Tech Areas: EE Emphasis

- Biomedical Engineering
- Communications and Networking
- Electromagnetic Engineering
- Electronics
- Electronic Materials and Devices
- Management and Production
- Power Systems and Energy Conversion
- Premedical
- Robotics and Controls
- Signal and Image Processing
Tech Areas: Comp. Eng. Emphasis

- Computer Design
- Embedded Systems
- Software Development
- System Software
- VLSI Design