Plan of Study for the Electrical Engineering SB Concentration
Effective for Students Declaring the Concentration after July 1, 2016

DATE: _______________ NAME: ____________________________
CLASS: _______________ EMAIL: ____________________________

This Plan of Study Form is for a (Circle One): DECLARATION REVISION

The S.B. Program in Electrical Engineering must contain at least 20 half courses: 4 half-courses in mathematics, 4 half-courses in basic sciences, and 12 half-courses in engineering topics. Plans of Study will not be considered final until this form has been signed. The signature of this form ensures that the proposed plan meets the ABET distribution requirements.

### REQUIRED COURSES
(Circle course and % for course you are taking or plan to take in each category.)

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Math</th>
<th>Science</th>
<th>Engr. Topics</th>
<th>Semester (Fall/Spring Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics Required</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 1a – Intro to Calculus 1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 1b – Calculus, Series, and Differential Equations</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM 21a – Mathematical Methods in the Sciences 1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(or Math 21a or 23a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM 21b – Mathematical Methods in the Sciences 2</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(or Math 21b or 23b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mathematics Elective</strong> (if you started in AM/Math 21a)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Probability and Statistics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES 150 – Intro to Probability with Engineering Applications</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP 50a – Physics as a Foundation for Sci &amp; Eng 1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(or PS 12a, Physics 15a or 16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP 50b - Physics as a Foundation for Sci &amp; Eng 2</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(or PS 12b or Physics 15b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Science Electives</strong> See list on page 3</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Computer Science CIRCLE ONE</strong></td>
<td></td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 50 – Intro to Computer Science 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 51 – Intro to Computer Science 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 61 – Systems Programming &amp; Machine Organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sophomore Forum</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electrical Engineering SB
Rev. Jun 2016 1/3
### REQUIRED COURSES
(Circle course and % for course you are taking or plan to take in each category.)

<table>
<thead>
<tr>
<th>Math</th>
<th>Science</th>
<th>Engr. Topics</th>
<th>Semester (Fall/Spring Year)</th>
</tr>
</thead>
</table>

#### Electrical Engineering Core
- **ES 52** – The Joy of Electronics – Part 1
- **ES 153** – Laboratory Electronics
- **ES 154** – Electronic Devices & Circuits
- **ES 156** – Signals & Systems

*Choose one:*
- **ES 173** – Intro to Electronic & Photonic Devices
- **CS 141** – Computing Hardware
- **CS 148** – Design of VLSI Circuits & Systems

#### Electrical Engineering Electives*
See list on page 3
*Students should consult an advisor to select an appropriate set of Electrical/Engineering Electives*

1. 1.00
2. 1.00
3. 1.00

#### Engineering (or Additional Electrical) Electives*
See list on page 3

1. 1.00
2. 1.00

#### Engineering Design
- **ES 96** – Engineering Problem Solving & Design Project*
- **ES 100hf** – Engineering Design Projects

#### TOTALS
/4 /4 /12

*For courses co-listed in another department, students must enroll in the Engineering Sciences offering.

No more than two of Engineering Sciences 6, 50, 51, and 53 can count toward concentration credit.

ES 96 or ES 227 must be taken in the junior year, prior to taking ES 100hf.*

---

Student signature

______________________________ Date: ______________

Assistant/Director of Undergraduate Signature

______________________________ Date: ______________

This plan does/does not meet the ABET distribution requirements

______________________________ Date: ______________

Assistant Dean for Education

Electrical Engineering SB
Rev. Jun 2016
Mathematics Electives
- AM 104 – Series Expan & Complex Analysis
- AM 105 – Ordinary & Partial Diff Eqs
- AM 106 – Applied Algebra
- AM 107 – Graph Theory & Combinatorics
- AM 108 – Nonlinear Dynamical Systems
- AM 120 – Applied Lin Algebra & Big Data

Science Electives
Introductory Courses
- LS 1a - Intro to the Life Sciences
  or LPS A – Foundational Chem & Bio
- PS 1 - Chem Bonding, Energy, & Reactivity
  or PS 11 – Found & Frontiers of Modern Chem
- PS 10 - Quantum & Stat Found of Chem
- Physics 15c – Wave Phenomena

Upper Level Courses
- Chemistry 160 - Quantum Chemistry
- Physics 140 – Intro to Biophysics
- Physics 143a - Quantum Mechanics I
- Physics 153 – Electrodynamics

Electrical Engineering Electives
ES 50 can only be taken for concentration credit during freshman or sophomore year
- AP 195 – Intro to Solid State Physics
- BE 130 – Neural Control of Movement
- CS 61 - System Program & Machine Org
- CS 141 – Computing Hardware
- CS 143 – Computer Networks
- CS 144r – Networks Design Projects
- CS 146 – Computer Architecture
- CS 148 – Design of VLSI Circuits & Systems
- CS 189r – Autonomous Multi-Robot Systems
- ES 50 – Intro to Electrical Engineering
- ES 151 – Applied Electromagnetism
- ES 155 – Biological Signal Processing
- ES 158 – Feedback Systems: Analysis & Design
- ES 159 – Intro to Robotics
- ES 173 – Intro to Electronic & Photonic Dev
- ES 175 – Photovoltaic Devices
- ES 176 – Intro to MEMS
- ES 177 – Micro Fabrication Laboratory

Engineering Electives (Incomplete List)
For courses that are co-listed in another department, students must enroll in the Engineering Sciences offering
ES 6 and 53 can only be taken for concentration credit during freshman or sophomore year
- BE 110 - Physiological Systems Analysis
- BE 191 – Intro to Biomaterials
- CS 51 – Intro to Comp Science 2
- CS 124 – Data Structures & Algorithms
  or CS 125 – Algorithms & Complexity
- CS 175 – Computer Graphics
- CS 179 - Design of Usable Interactive Sys
- CS 181 – Machine Learning
- CS 182 - Intelligent Machines: Reasoning, Actions, & Plans
- CS 187 – Computational Linguistics
- ES 6 – Intro to Environmental Science & Eng
- ES 51 – Computer Aided Machine Design
- ES 53 – Quant Physiology or Bioengineering
- ES 111 – Intro to Scientific Computing
- ES 115 – Mathematical Modeling
- ES 121 – Intro to Optimization
- ES 120 – Intro to the Mechanics of Solids
- ES 123 – Intro to Fluid Mech & Transport Processes
- ES 125 – Mechanical Systems
- ES 135 – Phys & Chem: In the Context of Energy & Climate
- ES 137 – Energy within Enviro Constraints
- ES 160 – Space Science & Engineering
- ES 162 – Hydrology & Enviro Geomechanics
- ES 163 – Pollution Control in Aquatic Ecosystems
- ES 164 – Environmental Chemistry
- ES 165 – Water Engineering
- ES 181 – Engineering Thermodynamics
- ES 190 – Intro to Materials Sci & Eng