**Plan of Study for the Electrical Engineering SB Concentration**  
*Effective for Students Declaring the Concentration after July 1, 2019*

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.

<table>
<thead>
<tr>
<th>REQUIRED COURSES</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>
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<tr>
<td>Math 1a – Intro to Calculus 1 (or Math Ma &amp; Mb)</td>
<td>1.00</td>
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<tr>
<td>Math 1b – Calculus, Series, and Differential Equations</td>
<td>1.00</td>
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<tr>
<td>Math 21a – Multivariable Calculus (or AM 21a or 23a)</td>
<td>1.00</td>
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<tr>
<td>Math 21b – Linear Algebra &amp; Differential Equations (or AM 21b or 23b)</td>
<td>1.00</td>
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<tr>
<td><strong>Mathematics Elective</strong> (if you started in AM/Math 21a)</td>
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<tr>
<td>1.</td>
<td>1.00</td>
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<tr>
<td><strong>Probability and Statistics</strong></td>
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<tr>
<td>ES 150 – Probability with Engineering Applications</td>
<td>1.00</td>
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<tr>
<td><strong>Physics</strong></td>
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<tr>
<td>PS 12a – Mech from an Analytic, Num &amp; Exp Perspective (or Physics 15a, 16, or AP 50a)</td>
<td>1.00</td>
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<tr>
<td>PS 12b – E&amp;M from an Analytic, Num &amp; Exp Perspective (or Physics 15b, or AP 50b)</td>
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<tr>
<td><strong>Science Electives</strong> See list on page 3</td>
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</tr>
<tr>
<td>1.</td>
<td>1.00</td>
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<tr>
<td>2.</td>
<td>1.00</td>
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<tr>
<td><strong>Computer Science</strong> CIRCLE ONE</td>
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<tr>
<td>CS 50 – Intro to Computer Science 1</td>
<td>1.00</td>
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<tr>
<td>CS 51 – Intro to Computer Science 2</td>
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<tr>
<td>CS 61 – Systems Programming &amp; Machine Organization</td>
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</tbody>
</table>
**REQUIRED COURSES**  
(Circle course and % for course you are taking or plan to take in each category.)

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

### Sophomore Forum

### Electrical Engineering Core
- ES 152 – Circuits, Devices, and Transduction
- CS 141 – Computing Hardware
- ES 155 – Systems and Control
- ES 156 – Signals and Communications

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

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
<td>1.00</td>
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<tr>
<td>3.</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.00</td>
</tr>
<tr>
<td>2.</td>
<td>1.00</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.00</td>
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</tbody>
</table>

### TOTALS

<table>
<thead>
<tr>
<th>Math</th>
<th>Science</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

*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.

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Student signature  
Date: ______________

Associate/Director of Undergraduate Signature  
Date: ______________

This plan does/does not meet the ABET distribution requirements  
Date: ______________

Assistant Dean for Education
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 11 – Found & Frontiers of Modern Chem
- or PS 1 - Chem Bonding, Energy, & Reactivity
- PS 10 - Quantum & Stat Found of Chem
- Physics 15c – Wave Phenomena

Upper Level Courses
- Chemistry 160 - Quantum Chemistry
- Physics 143a - Quantum Mechanics I
- Physics 143b - Quantum Mechanics II
- Physics 153 – Electrodynamics
- Physics 181 – Stat Mech & Thermodynamics

Electrical Engineering Electives

ES 50 can only be taken for concentration credit during freshman or sophomore year. Not more than two from: ES 50 or ES 54 (formerly ES 52), CS 61, ES 170.

- AP 195 – Intro to Solid State Physics
- BE 128 – Intro to Biomedical Imaging & Sys
- BE 129 – Intro to Bioelectronics
- BE 130 – Neural Control of Movement
- CS 61 - System Program & Machine Org
- CS 143 – Computer Networks
- CS 144r – Networks Design Projects
- CS 146 – Computer Architecture
- CS 148 – Design of VLSI Circuits & Systems
- CS 189 – Autonomous Multi-Robot Systems
- ES 50 – Intro to Electrical Engineering
- ES 54 – Electronics for Engineers
- ES 151 – Applied Electromagnetism
- ES 153 – Laboratory Electronics
- ES 154 – Electronic Devices & Circuits
- ES 157 – Biological Signal Processing
- ES 159 – Intro to Robotics
- ES 170 – Engineering Quantum Mechanics
- 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

ESE 6 and ES 53 can only be taken for concentration credit during freshman or sophomore year.

- 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 – Artificial Intelligence
- CS 187 – Computational Linguistics
- ESE 6 – Intro to Environmental Sci & Eng
- ES 51 – Computer Aided Machine Design
- ES 53 – Quant Physiology or Bioengineering
- ES 91hfr - Humanitarian Design Projects (must be taken twice)
- 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
- ESE 160 – Space Science & Engineering
- ESE 163 – Pollution Control in Aquatic Ecosystems
- ESE 166 - State of the Art Instrumentation in Env Sci
- ES 181 – Engineering Thermodynamics
- ES 190 – Intro to Materials Sci & Eng
- ES 231 – Energy Technology

Electrical Engineering SB
Rev. Jul 2019