WELCOME TO THE EE CLASS of 2023

Fall 2020 – YOUR CLASS of 2024 – We’ll take your same picture on Sept 14
The “Big E” Your Home Away from Home

- EE Learn by Doing Headquarters

- 35,000 ft² of Laboratory Space
  (No other EE program has this amount of dedicated undergrad teaching Space!!)

- Lots of Student Gathering Spaces Indoor AND outdoors

- Work on your own projects or assigned class/lab work
MORE EE Student
LEARN BY DOING
FACILITIES ON CAMPUS

Mills, Drills, Paint Shop
EE Antenna and EM Emissions Lab
Semiconductor Fabrication Clean Room
Mustang ‘60 Shop
The “Big E” EE Building
Our Newest “Big E” Space = Outdoor Patio, Study and Event Patio
Full-Time EE Faculty Fall 2019 (33 count)

Computers Technical Area
- Slivovsky
- Oliver
- Mealy
- Benson
- Danowitz
- Callenes
- Sloan
- Hummel
- Botros
- Mohammadi
- Braun
- Smilkstein
- Perks

Systems Technical Area
- DePiero
- MacCarley
- Saghri
- Zhang
- Yu
- Pilkington
- McKell

Power & Energy
- Nafisi
- Shaban
- Taufik
- Dolan
- Poshtan
- Dehghan
- Banadaki

Circuits, Electronics, Photonic, Biomed
- Agbo
- Jin
- Ahlgren
- Chinichian
- Derickson
- Arakaki
- Prodanov
- Vyas

Lecturers (6 FT equiv.)
- Bland (0.8)
- Behpour (0.13)
- Dunton (0.8)
- Malone (0.5)
- McDonald (0.5)
- Murray (0.5)
- Muscarella (0.4)
- Planck (0.33)
- Rairkar (0.4)
- Sparks (0.13)
- Trada (0.9)
- Wilson (0.67)

Mona ElHelbawy
Fall 2019

50% BMED
Spring Quarter 2020
Having Fun
In Our Home Laboratories
Fall 2020 EE Intro – ARDUINO FEST!
Fall 2020 EE Intro – Radio License
COLLABORATION LAB
The IEEE Collaboration Lab (ICL) is the perfect place for students to get homework, lab assignments, or any other project they are working on done. With resources such as soldering stations, test equipment, computers, and electrical components for sale, the ICL provides the tools students need to succeed.
Fall 2020 EE Intro – Clubs –IEEE PES (Power and Energy Society)
Fall 2020 EE Intro – Clubs
Cal Poly Racing – EE team meets Twice weekly in Big E lab 20-130
Fall 2020 EE Intro – Clubs – Audio Engineering Society

Audio Con 2019 at Cal Poly
Fall 2020 EE Intro – Clubs – Amateur Radio Club
Fall 20 IntroCLUBS: Society of Women Engineers, Women in Software/Hardware

Who are we?

SWE is a national organization that facilitates a network of strong and awesome female engineers and their allies from the high school level to the industry level. Any one of ANY gender can join! Social events, networking, and outreach!
Fall 20 Intro - CLUBS: EWB, NSBE, SHPE, Robotics

Nicaragua

LEARN MORE

LEARN MORE

SHPE CAL POLY

NSBE

NATIONAL SOCIETY OF BLACK ENGINEERS
MicroSystems Technology Group
Cal Poly San Luis Obispo

Cleanroom
The microfabrication laboratory is a 1,500 ft², Class 1000 clean room with a complete set of fabrication equipment for processing 100mm (4 inch) size silicon wafers. Our lab contains equipment for deposition, diffusion, patterning (lithography), and etching thin...
Fall 2020 EE Intro – Clubs – Poly Sat
EE Vision: “Preparing Students for a Data-Intensive World”

**Generating Massive Data, Transporting The Data, and Analyzing the Data for Optimal Decisions Drive our field**

- Cloud storage
- And computing
- Local and World-Wide Communication Networks
  - wireless (“5G” 2020 and “6G” 2030)
  - wireline (Tbit/s data rates on fiber)
- Massive Number of Internet of Things (IOT) Sensors are on line.
- Vehicles, Smart Cities, Remote Sensing, Homes, biologic sensors etc.
- A wealth of data is generated and then you need to process it to make good decisions – See Block
- On data for better Decisions.

**Computer Technology Development**
Driven by Bandwidth/Speed/Power and Security Needs

- Advances in semiconductor technology, computing platforms, and software continue to drive applications that require high data rate communication networks to achieve goals

**Machine IOT Massive Data**

- Massive Number of Internet of Things (IOT) Sensors are coming on line.
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**Input Data From Many sources**

**Hardware and Software Security**

- Hardware
- and Software
- Security

**Communication System Networks**

**Using Data for Better Decisions**

- Matlab/Simulink Real-Time AI/Deep Learning System Example
  - Feedback to improve
  - Feedforward to improve

**DATA PROCESSING:**
- New methods of working with large data sets to make decisions including AI/Deep Learning/Advanced Controls
- Very important. New hardware and software Platforms Will be important for industry in the coming decades.

**EE Vision: “Preparing Students for a Data-Intensive World”**

- EE414 Robotic System Integration
- EE 431/531/532/423/524 VLSI Design
- EE 439/EE442/Real Time Computing Systems
- EE446 Design of fault tolerant computing
- EE521 Computer Systems
- EE523 Digital Systems Design
- EE542 Advanced Embedded Systems
- EEXYZ We need to advance our Curriculum to meet needs in this area

**EE Technology Development**
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**EE412/452 Advanced Analog-Sensors**
- EE470/471 IOT Class-processors and sensors
- EEXYZ: We need to further our Investment in this area.

**EE403/443 Fiber optics and Photonics**
- EE 405/455 High Frequency Amplifiers
- EE 502/529 Microwave Frequency Design
- EE440/480 Wireless Communication
- EE415/416/456 Digital Communications
- EE475 Ethernet Networking
- EE504 Software Defined Radio
- EE533 Antennas
- We need to review these courses to make sure they are addressing future comm. systems needs

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EE Vision: “Once in a lifetime opportunity for re-making our Sustainable Energy Systems Infrastructure”

The World is reducing dependency on fossil fuels and moving toward renewable energy sources. This will require a re-design of our electric power delivery system with distributed generation, energy storage, microgrid networks and Electric Vehicle charging stations everywhere. Smart Cities and Energy efficient construction will also be major trends. Our curriculum and Research activity with students needs to move with these major shifts.

- EE406/407 Power Systems
- EE410/411 Power Electronics
- EE420 Sustainable Energy Systems
- EE417 Electric Machines
- EE434 Automotive Engineering
- EE444 Power System Laboratory
- EE450 Solar PV Systems
- EE433 Introduction to Magnetic...
- EE518 Power System Protection
- EE519 Advanced Power Systems
- EE520 Advanced Solar PV
- EE527 Advanced Power Electronics
- EEXYZ We plan on an industrial Automation course, courses around Smart grid and perhaps security of critical infrastructure

Massive shift in energy production and distribution toward renewables

- Smart Cities, Industrial Automation in utilities and roads, Building codes-net energy neutral, sensors everywhere, more city-managed electric utilities
- Increased use of Electric Energy Sources for vehicles

EE Vision: “Once in a lifetime opportunity for re-making our Sustainable Energy Systems Infrastructure”
Electrical Engineering Student Flow Chart
POWER SYSTEMS INTRODUCTION
EXPAND THE BREADTH OF YOUR ENGINEERING KNOWLEDGE
<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronics</strong></td>
<td><strong>EE 306/346</strong></td>
<td><strong>EE 307/347</strong></td>
<td><strong>EE 308/348</strong></td>
<td><strong>EE 409/449</strong></td>
</tr>
<tr>
<td>(CHEM 124, EE 212 &amp; 242, IME 156 or IME 157 or IME 458, PHYS 211)</td>
<td>(CPE 129 &amp; 169 or 133, EE 306 &amp; 346, CPE 229 or 233†)</td>
<td>(EE 307 &amp; 347, EE 302 &amp; 342)</td>
<td>(EE 308 &amp; 348 EE 328 &amp; 368, CPE 329 or 336)</td>
<td></td>
</tr>
</tbody>
</table>

**CMOS NAND gate**

```
VDD
Q4
Q3
Y
Q1
Q2
A
B
```
Electromagnetic Theory and Design
Senior Project

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 460</td>
<td></td>
<td>(EE 314, EE 335, EE 409 &amp; 449 only)</td>
</tr>
<tr>
<td>EE 461 or 463</td>
<td></td>
<td>(EE 409, EE 460)</td>
</tr>
<tr>
<td>EE 462 or 464</td>
<td></td>
<td>(EE 463 for EE 464 only)</td>
</tr>
</tbody>
</table>
Electronics Area Electives

EE412/452 Advanced Analog
EE421 Microelectronics Processes
EE422 Polymer Electronics
EE431 VLSI Design
EE425/455 Filters
EE524 Solid State Electronics
RF/Microwaves Area Electives

EE405/445 Microwave Amplifiers
EE529/541 Microwave Devices
EE502 Microwave Systems

EE440/480 RF Communications
EE533 Antennas
Computer Systems Electives

EE/CPE429 Computer Peripherals    EE/CPE 522 Real Time Systems
EE/CPE523 Advanced Microprocessors  EE/CPE 428 Computer Vision
EE/CPE521 Computer Systems          EE/CPE438 Advanced Embedded Systems
CPE 416 Robotics                      Too many more to list including CPE and CSC offerings
Communication Systems Electives

EE416/456 Digital Communications I
EE440/480 Wireless Communication
CPE464 Computer Networks

EE403/443 Fiber Optic Communications
EE517 Information Theory
EE526 Digital Communications II
Photonics Area Electives

EE403/453 Fiber Optics
EE530 Fourier Optics

EE418/458 Photonic Engineering
Control Systems Electives

EE432/472 Digital Controls
EE513 Control Systems Theory
EE514 Automatic Controls
EE581 Computational Intelligence
Power Electronics Area Electives

EE410 Power Electronics I
EE411 Power Electronics II
EE 527 Advanced Power Electronics
EE 420 Photovoltaic Systems
Signals and Systems Electives

EE419/459 DSP
EE509 Computational Intelligence
EE419/459 Remote Sensing

EE 515 Discrete Time Filters
EE525 Stochastic Processes
EE528 Digital Image Processing
Power Systems Area Electives

EE406 Power Systems I
EE407 Power Systems II
EE 518 Power System Protection
EE519/544 Advanced Power Systems

EE 417 AC Machines
EE 420 Sustainable Energy
EE 511 Electric Machine Theory
### 2019/2020 EE Dept. Major Events Calendar

<table>
<thead>
<tr>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
</table>
- ViaSat robotics event  
- Robo rodentia  
- Club Showcase  
- New Student Recruitment  
- Robotics Event | EE Banquet, May 10  
IAB May 10/12  
EE Technical Conference  
- Class of 1970 Celebration  
- Honored Alumni | Spring Graduation  
June | College Project Expo | | |

**NEED FRESHMAN VOLUNTEERS!**  
Email: ddericks@calpoly.edu

Continue Working on your Robots and enter this competition  
Need event managers too

All Should Attend our Annual Banquet!

All Should Attend our Project Expo!
The Big “E” Building 20 – Center of Campus

Outdoor Research Space
3700 ft²

Outdoor Meeting Space
1800 ft²
Fall 2018
Antenna (Arakaki)
EMC Lab
Robotics Lab (Clark, Benson)

EE Dept. Places
For general student activities
EE LOBBY

A GREAT PLACE TO STUDY OR MEET FACULTY AND OTHER STUDENTS

SEMINARS EVERY FRIDAY AT 2PM
EE Front DESK _ LOTS OF INFORMATION HERE
20-100
Digital Design
20-150 Renewable Energy
20-101
Electric Power Projects
20-149
Circuits and Electronics
20-147
Circuits and Electronics
20-145
Senior Project, Capstone
20-105
Polymer Electronics Fabrication
20-136
Digital Design and CAD
20-118
Senior Project, General Use Lab
20-111
Senior Project and General Use
20-116
High Frequency Electronics
20-113
Communication Systems
20-134
Photonics Teaching
20-106
Wood Working Shop
20-106
3 D Printers and Electronics Support
20-102
Electric Power System Laboratory
Radio Club VHF/UHF Array
SUMMARY

“The Big E” Will be your home away from Home

-We will provide an amazing set of Learn-By-Doing Experiences

-Our EE faculty wants to get to know you, work with you in classrooms and with Projects and we’re always available to help.

FACULTY COMMENTS

DISCUSSION AND QUESTIONS
# Computer Engineering Student Flowchart

## 2019-2020 Catalog

### Suggested 4-Year Academic Flowchart

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman</strong></td>
<td><strong>Computer Engineering Orientation</strong></td>
<td><strong>CPE 100 (1)</strong></td>
<td><strong>CPE 202 (4)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Introduction to Computing</strong></td>
<td><strong>CPE 101 (4)</strong></td>
<td><strong>Data Structures</strong></td>
</tr>
<tr>
<td></td>
<td><strong>CPE 123 (4)</strong></td>
<td><strong>CPE 203 (4)</strong></td>
<td><strong>Computer-Based Object-Oriented Programming &amp; Design</strong></td>
</tr>
<tr>
<td></td>
<td><strong>General Chemistry for Physical Science &amp; Engineering I</strong></td>
<td><strong>CHEM 124 (4)</strong></td>
<td><strong>INTRODUCTION TO OPERATING SYSTEMS</strong></td>
</tr>
<tr>
<td></td>
<td><strong>PHYS 141 IA</strong></td>
<td><strong>PHYS 143 (4)</strong></td>
<td><strong>CPE 327 (3)</strong> &amp; <strong>CPE 367 (1)</strong></td>
</tr>
<tr>
<td><strong>Sophomore</strong></td>
<td><strong>Electric Circuit Analysis &amp; Lab</strong></td>
<td><strong>EE 113 &amp; EE 143 (4)</strong></td>
<td><strong>Digital Electronics &amp; Integrated Circuits</strong></td>
</tr>
<tr>
<td></td>
<td><strong>CPE 133 (4)</strong></td>
<td><strong>EE 211 (3)</strong> &amp; <strong>EE 241 (1)</strong></td>
<td><strong>EE 307 (3)</strong> &amp; <strong>EE 347 (1)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>General Physics III</strong></td>
<td><strong>PHYS 133 (4)</strong></td>
<td><strong>Capstone II</strong></td>
</tr>
<tr>
<td></td>
<td><strong>PHYS 132 (4)</strong></td>
<td><strong>PHYS 211 (4)</strong></td>
<td><strong>CPE 450 (3)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Calculus II</strong></td>
<td><strong>CSC 346 (4)</strong></td>
<td><strong>CPE 335 (4)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>MATH 141 (4)</strong></td>
<td><strong>CSC 346 (4)</strong></td>
<td><strong>CPE 335 (4)</strong></td>
</tr>
<tr>
<td><strong>Junior</strong></td>
<td><strong>Calculus III</strong></td>
<td><strong>CSC 414 (1)</strong></td>
<td><strong>Semiconductors Device</strong></td>
</tr>
<tr>
<td></td>
<td><strong>MATH 142 (4)</strong></td>
<td><strong>MATH 241 (4)</strong></td>
<td><strong>Electronics &amp; Lab</strong></td>
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<td></td>
<td><strong>MATH 143 (4)</strong></td>
<td><strong>MATH 244 (4)</strong></td>
<td><strong>EE 306 (3)</strong> &amp; <strong>EE 346 (1)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Linear Analysis I</strong></td>
<td><strong>MATH 244 (4)</strong></td>
<td><strong>Capstone I</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ENGL 133 or 134 (4)</strong></td>
<td><strong>CPE 355 (4)</strong></td>
<td><strong>CPE 335 (4)</strong></td>
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<tr>
<td></td>
<td><strong>GE (4)</strong></td>
<td><strong>Approved Electives</strong></td>
<td><strong>(3-4)</strong></td>
</tr>
<tr>
<td><strong>Senior</strong></td>
<td><strong>Expository Writing ENGL 149 (4)</strong></td>
<td><strong>CPE 553 (3)</strong></td>
<td><strong>Capstone II</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Dental Examination COURS 101 or 102 (4)</strong></td>
<td><strong>Research Project I &amp; II</strong></td>
<td><strong>CSC 497 (2)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Technical Writing for Engineers ENGL 149 (4)</strong></td>
<td><strong>Research Project I &amp; II</strong></td>
<td><strong>CSC 498 (2)</strong></td>
</tr>
</tbody>
</table>

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**Notes:**

- *Electives can be chosen as GE but must also be approved Technical Elective.*
- *Technical Writing for Engineers is a co-requisite of ENGL 149 (4). Students must pass both courses in order to graduate.*
- *Graduation Writing Requirement: ENGL 149 (4)*

**Credits:**

- Freshmen: 16 credits
- Sophomore: 16 credits
- Junior: 16 credits
- Senior: 15 credits
- Total: 63 credits

**Total:** 191-195 credits
Professional Preparation Curriculum Planning

Computers

In addition to the required courses in the BSEE curriculum and flowchart, if you are interested in careers in any of the following Electrical Engineering Specialty Areas, we would recommend that you choose from the following Engineering Support Electives and Technical Electives.

<table>
<thead>
<tr>
<th>Digital IC Design:</th>
<th>Computer IC Architect:</th>
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<tbody>
<tr>
<td>CSC/CPE 102 Fundamentals of CS II (3+1)</td>
<td>CSC/CPE 102 Fundamentals of CS II (3+1)</td>
</tr>
<tr>
<td>or CSC/CPE 202 Data Structures (3+1)</td>
<td>or CSC/CPE 202 Data Structures (3+1)</td>
</tr>
<tr>
<td>CSC/CPE 103 Fundamentals of CS III (3+1)</td>
<td>CSC/CPE 103 Fundamentals of CS III (3+1)</td>
</tr>
<tr>
<td>or CSC/CPE 203 Object Oriented Program (3+1)</td>
<td>or CSC/CPE 203 Object Oriented Program (3+1)</td>
</tr>
<tr>
<td>CPE 315 Computer Architecture (4)</td>
<td>CPE 315 Computer Architecture (3+1)</td>
</tr>
<tr>
<td>EE 431/CPE 441 Computer-Aided Design of VLSI Devices (4) [F]</td>
<td>EE 431/CPE 441 Computer-Aided Design of VLSI Devices (4) [F]</td>
</tr>
<tr>
<td>CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]</td>
<td>CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]</td>
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<tr>
<td>EE 523 Digital Systems Design (3+1) [F]</td>
<td>EE 523 Digital Systems Design (3+1) [F]</td>
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<tr>
<td>EE 521 Computer Systems with Lab (3+1) [S]</td>
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<th>FPGA Designer:</th>
<th>Roboticist:</th>
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<td>CPE 102 Fundamentals of CS II (4)</td>
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<tr>
<td>or CSC/CPE 202 Data Structures (3+1)</td>
<td>ME 305 Intro. to Mechatronics (3+1)</td>
</tr>
<tr>
<td>CSC/CPE 103 Fundamentals of CS III (3+1)</td>
<td>CPE/EE 428 Computer Vision (3+1) [W]</td>
</tr>
<tr>
<td>or CSC/CPE 203 Object Oriented Program (3+1)</td>
<td>ME 405 Mechatronics (3+1) [W,S]</td>
</tr>
<tr>
<td>CPE 315 Computer Architecture (3+1)</td>
<td>CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]</td>
</tr>
<tr>
<td>CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]</td>
<td>EE 432 Digital Control Systems (3) [F]</td>
</tr>
<tr>
<td>EE 523 Digital Systems Design (3+1) [F]</td>
<td>EE 472 Digital Control Systems Lab (1) [F]</td>
</tr>
</tbody>
</table>

* Not currently an approved Technical Elective
Electronics

In addition to the required courses in the BSEE curriculum and flowchart, if you are interested in careers in any of the following Electrical Engineering Specialty Areas, we would recommend that you choose from the following Engineering Support Electives and Technical Electives.

**IC Design and Fabrication:**
- MATE 210 Materials Engineering (3)
- MATE 215 Materials Lab I (1)
- PHYS 412 Solid State Physics (3) [F]
- PHYS 452 Solid State Physics Lab (1) [F]
- EE/PHYS 422 Polymer Electronics Lab (1) [F, W, Alternate SP]
- EE 431/CPE 441 Computer-Aided Design of VLSI Devices (3+1) [F]
- BMED 434/EE 423/MATE 430 Micro/Nano Fabrication (3) [W]
- BMED 435 Microfabrication Lab (2) [W]
- EE 524 Solid State Electronics (3) [S]
- EE 544 Solid-State Electronics & VLSI Laboratory (1) [S]

**Sustainability in Electronics:**
- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- ME 302 Thermodynamics (3)
- PHYS 310 Physics of Energy (3) [SP]
- EE 410 Power Electronics I (3+1) [F]
- EE 411 Power Electronics II (3+1) [W]
- EE 413 Advanced Electronic Design (4) [SP]

**Biomedical Instrumentation:**
- BMED 310 Measurement/Analysis (4) [FW]
- BMED 440 Bioelectronics and Instrumentation (3+1) [FW]
- EE 412 Advanced Analog Circuits (3) [W]
- EE 452 Advanced Analog Circuits (1) [W]
- EE 413 Advanced Electronic Design (3+1) [S]
- EE 419 Digital Signal Processing (3) [W]
- EE 459 Digital Signal Process. Lab (1) [W]
- CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]

Wireless and RF Electronics:
- MATH 206 Linear Algebra (4)
- MATH 304 Vector Analysis (4) [W, S]
- PHYS 408 Electromag. Fields & Waves I (4) [F]
- EE 440 Wireless Communications (3) [W]
- EE 480 Wireless Communications Lab (1) [W]
- EE 405 High Frequency Amplifier Design (3) [F]
- EE 445 High Frequency Amp Design Lab (1) [F]
- EE 412 Advanced Analog Circuits (3) [W]
- EE 452 Advanced Analog Circuits Lab (1) [W]
- EE 413 Advanced Electronic Design (4) [S]
- EE 425 Analog Filter Design (3) [S]
- EE 455 Analog Filter Design Lab (1) [S]
- EE 524 Solid State Electronics (3) [S]
- EE 525 Stochastic Processes (4) [F]
- EE 529 Microwave Device Electronics (3) [W]

http://www.ee.calpoly.edu/academics/
Power Systems Analysis and Design:

- MATH 304 Vector Analysis (4)
- MATH 451 Numerical Analysis I (4)
- EE 406 Power Systems Analysis I (4) [F]
- EE 407 Power Systems Analysis II (4) [W]
- EE 410 Power Electronics I with Lab (4) [F]
- EE 444 Power Systems Lab (1) [S]
- EE 518 Power System Protection (4) [S]
- EE 519 Advanced Analysis of Power Systems (4) [S]

Sustainable Energy:

- IME 314 Engineering Economics (3)
- CSC 341 Numerical Engineering Analysis (4)
- PHYS 310 Physics of Energy (3)
- EE 420 Sustainable Electric Energy Conversion with Lab (4) [W]
- EE 406 Power Systems Analysis I (4) [F]
- EE 410 Power Electronics I with Lab (4) [F]
- EE 520 Solar Photovoltaic Systems Design (4) [S]
- EE 434 Alternative Energy Vehicles with Lab (4) [W]

Power Electronics Design:

- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- ME 302 Thermodynamics (3)
- ME 343 Heat Transfer (4)
- EE 410 Power Electronics I with Lab (4) [F]
- EE 411 Power Electronics II with Lab (4) [W]
- EE 406 Power Systems Analysis I (4) [F]
- EE 527 Advanced Topics in Power Electronics (4) [S]

Control Systems:

- MATH 306 Linear Algebra II (4)
- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- EE 432 Digital Control Systems (3) [F]
- EE 472 Digital Control Systems Lab (1) [F]
- EE 513 Control System Theory (4) [W]
- EE 509 Computational Intelligence (4) [S]
- EE 514 Adv. Topics in Auto. Control (4) [S]

Magnetic Devices and Machine Design:

- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- MATE 210 Materials Engineering (3)
- MATE 340 Electronic Materials Systems (3)
- EE 417 Alternating Current Machines with Lab (4) [F]
- EE 433 Intro. to Magnetic Design with Lab (4) [S]
- EE 406 Power Systems Analysis I (4) [F]
- EE 410 Power Electronics I with Lab (4) [F]
- EE 511 Electric Machines Theory (4) [S]
In addition to the required courses in the BSEE curriculum and flowchart, if you are interested in careers in any of the following Electrical Engineering Specialty Areas, we would recommend that you choose from the following Engineering Support Electives and Technical Electives.

### Signal Processing:
- MATH 306 Linear Algebra II (4)
- MATH 344 Linear Analysis II (4)
- EE 419 Digital Signal Processing (3) [W]
- EE 459 Digital Signal Process. Lab (1) [W]
- EE 515 Discrete Time Filters (4) [F]
- EE 509 Computational Intelligence (4) [S]
- EE 525 Stochastic Processes (4) [F]

### Image Processing / Computer Vision:
- MATH 306 Linear Algebra II (4)
- PHYS 323 Optics (4) [W]
- CPE/EE 428 Computer Vision (3+1) [W]
- EE 528 Digital Image Processing (4) [F]
- EE 424 Intro. to Remote Sensing (3+1) [S]
- EE 516 Pattern Recognition (3+1) [S]

### Control Systems:
- MATH 306 Linear Algebra II (4)
- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- EE 432 Digital Control Systems (3) [F]
- EE 472 Digital Control Systems Lab (1) [F]
- EE 513 Control System Theory (4) [W]
- EE 509 Computational Intelligence (4) [S]
- EE 514 Adv. Topics in Auto. Control (4) [S]

### Communications:
- MATH 344 Linear Analysis II (4)
- PHYS 322 Vibrations and Waves (3) [F]
- EE 415 Communication System Design (3) [F]
- EE 416 Digital Communications (3) [F]
- EE 456 Communication Systems Lab (1) [F]
- EE 403 Fiber Optic Communication (3) [F]
- EE 443 Fiber Optic Communication Lab (1) [F]
- EE 440 Wireless Communications (3) [W]
- EE 480 Wireless Communications Lab (1) [W]
- EE 504 Software Defined Radio (3+1) [S]
- EE 525 Stochastic Processes (4) [F]
- EE 526 Advanced Digital Commun. (4) [W]

### Robotics/Mechatronics:
- ME 211 Engineering Statics (3)
- ME 212 Engineering Dynamics (3)
- ME 326 Intermediate Dynamics (3)
- EE 432 Digital Control Systems (3) [F]
- EE 472 Digital Control Systems Lab (1) [F]
- ME 423 Robotics: Fundamentals and Applications (3+1) [F,S]
  or ME 405 Mechatronics (3+1) [W,S]
- CPE/EE 439 Intro. to Real-Time Operating Systems (3+1) [F]
- EE 513 Control System Theory (4) [W]

### Audio Engineering:
- PHYS 322 Vibrations and Waves (3) [F]
- MU 311 Sound Design: Technologies (3+1) [F]
- EE 419 Digital Signal Processing (3) [W]
- EE 459 Digital Signal Process. Lab (1) [W]
- EE 425 Analog Filter Design (3) [S]
- EE 455 Analog Filter Design Lab (1) [S]
- EE 515 Discrete Time Filters (4) [F]
Vision: EE looking forward

“Preparing our students for the Data-Intensive World”

Systems Level and Multidisciplinary Experiences:
- Curriculum that brings together skill sets in digital hardware, analog hardware and software from early classes and gives immersive experiences later in the curriculum (beyond traditional senior project experiences).
- Incorporate more project based activities earlier into the curriculum while maintaining rigorous Laboratory experiences. The project-based activities should include digital, analog and software elements.
- Incorporate elements of Machine Learning into existing courses and add technical electives.

Improved Software Skills:
Easily accessible software curriculum in any quarter that works into the EE student’s schedule.

“Promote an Inclusive Environment”

“Give students more opportunity to customize their coursework and career interests at the B.S. Level”
- Free up at least four more technical elective units.
- Add options to free up electives (e.g. choose 2 out of 3).
- Provide better guidance on how to customize an EE Specialization from our broad area of topics.

“Once in a lifetime opportunity for re-making our Sustainable Energy Systems Infrastructure”
- Enhance Power and Energy Curriculum and Labs with microgrid project, industrial controls and associated course upgrades. REC solar project completion.
- Increase the number of Grad Students coming in from other institutions to utilize our great curriculum and labs (this would apply to all EE sub-disciplines but we have a clear competitive advantage in Power and Energy).

“Prepare students to apply holistic and systems thinking required to foster sustainability”

“Upgrade graduate course offerings and research to reflect current needs/trends for our graduate students and industry”
Computer Engineering Student Flow Chart