

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

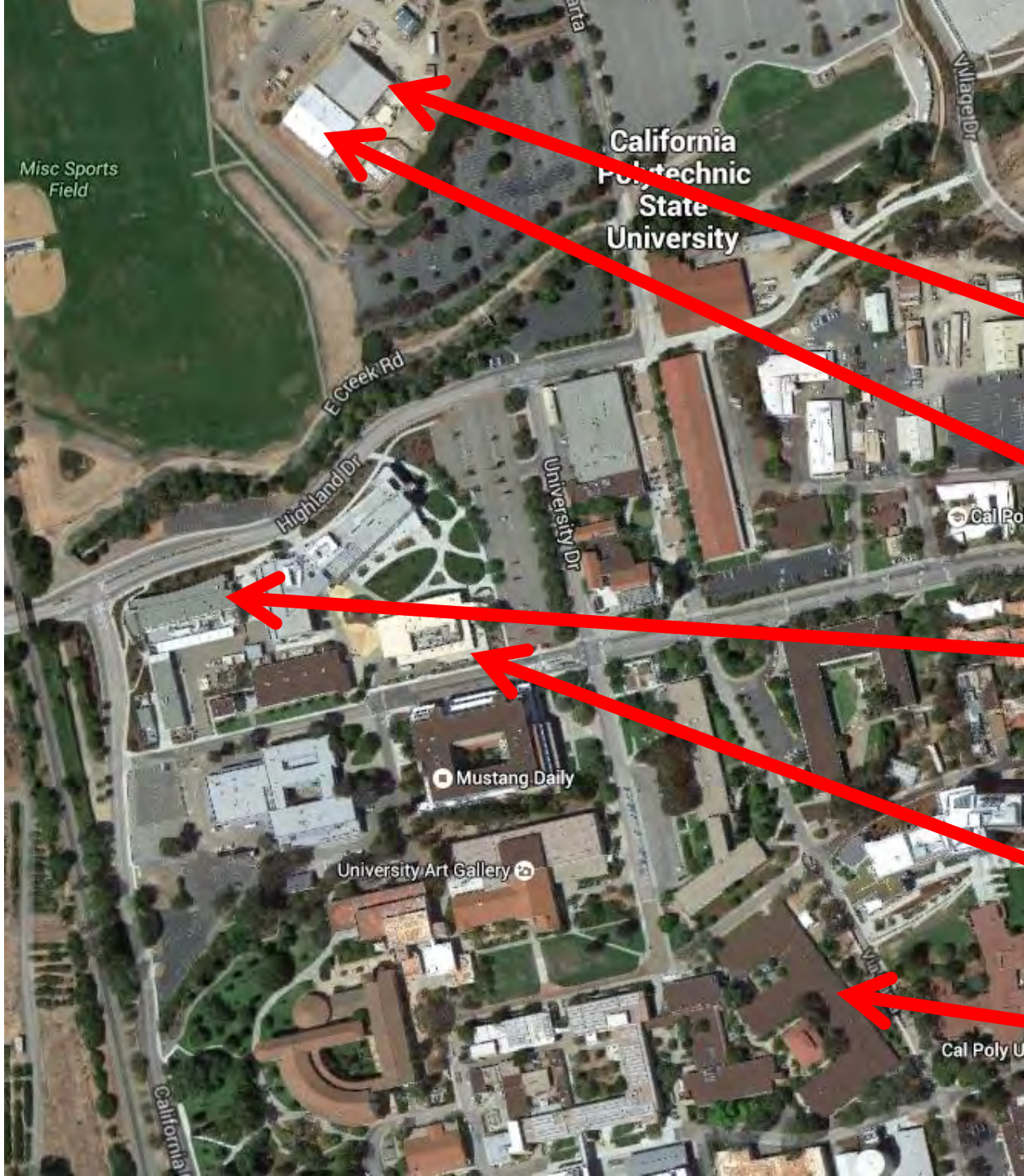


-EE Learn by Doing Headquarters

-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** **Hummel** **Botros** **Mohammadi**
Stuart



Braun **Smilkstein** **Perks**

Systems Technical Area



DePiero **MacCarley** **Saghri** **Zhang** **Yu** **Pilkington** **McKell**

Power & Energy



Nafisi **Shaban** **Taufik** **Dolan** **Poshtan** **Dehghan Banadaki**

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)
- Raikar (0.4)
- Sparks (0.13)
- Trada (0.9)
- Wilson (0.67)

Circuits, Electronics, Photonic, Biomed



Agbo **Jin** **Ahlgren** **Chinichian**



Derickson **Arakaki** **Prodanov** **Vyas**



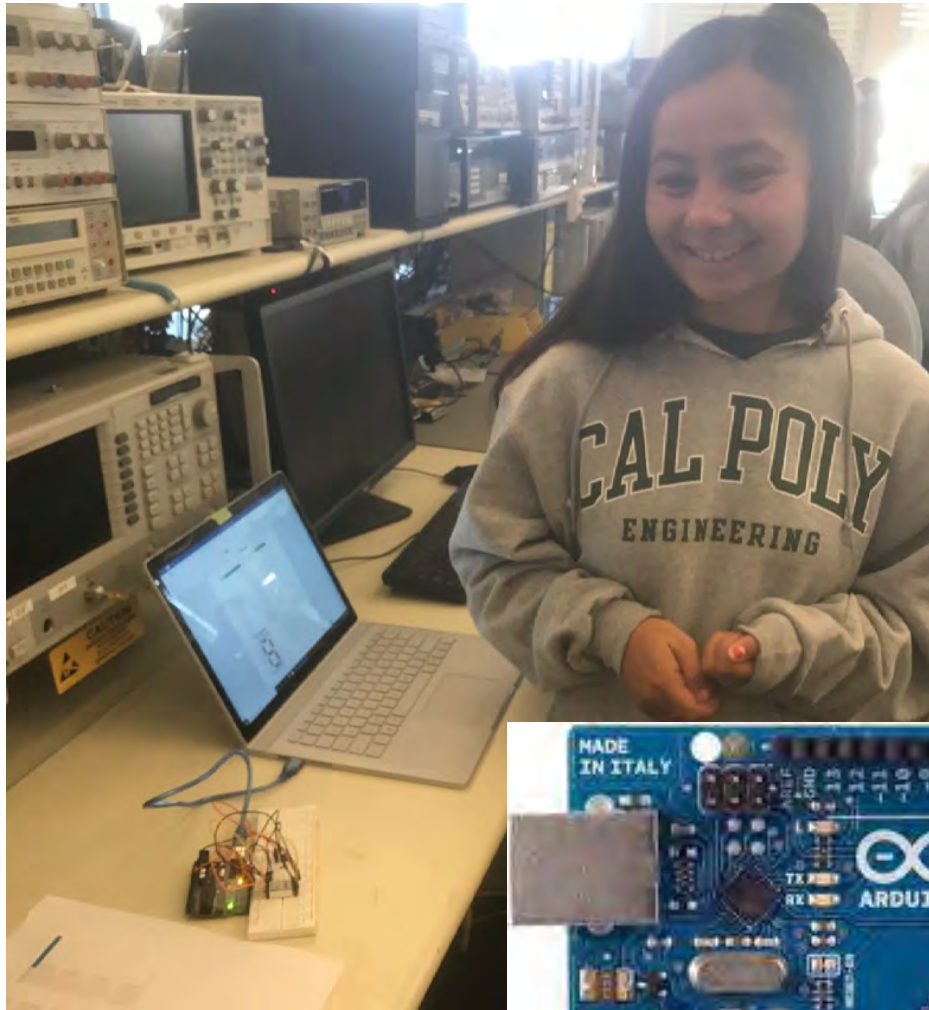
Hawkins
 50% BMED

Mona ElHelbawy
 Fall 2019

Spring Quarter 2020
Having Fun
In Our Home
Laboratories



Fall 2020 EE *Intro* – ARDUINO FEST!



Fall 2020 EE Intro – Radio License



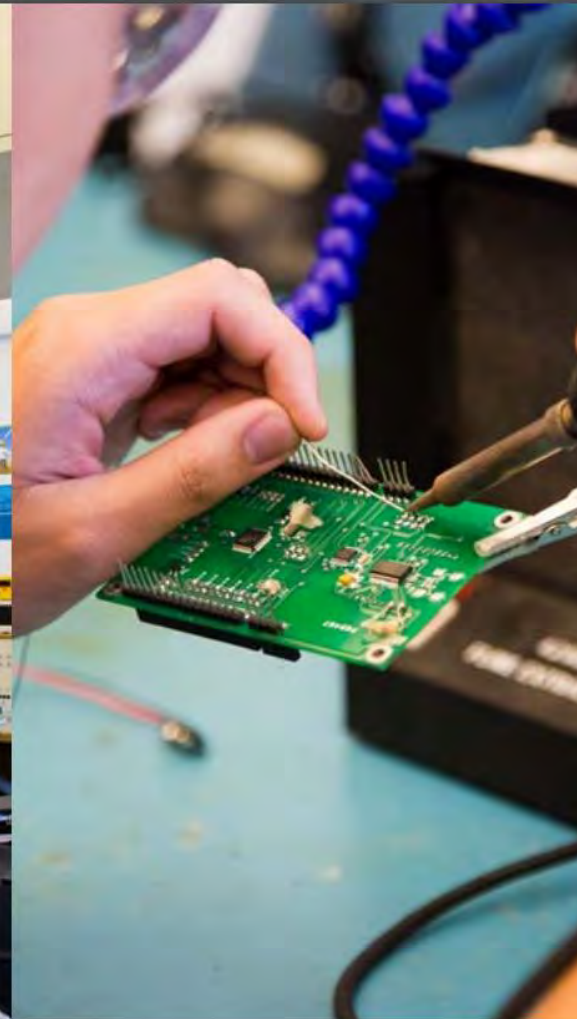
Fall 2020 EE *Intro* – **ROBOT BUILD**



Fall 2020 EE Intro – Clubs -IEEE

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)



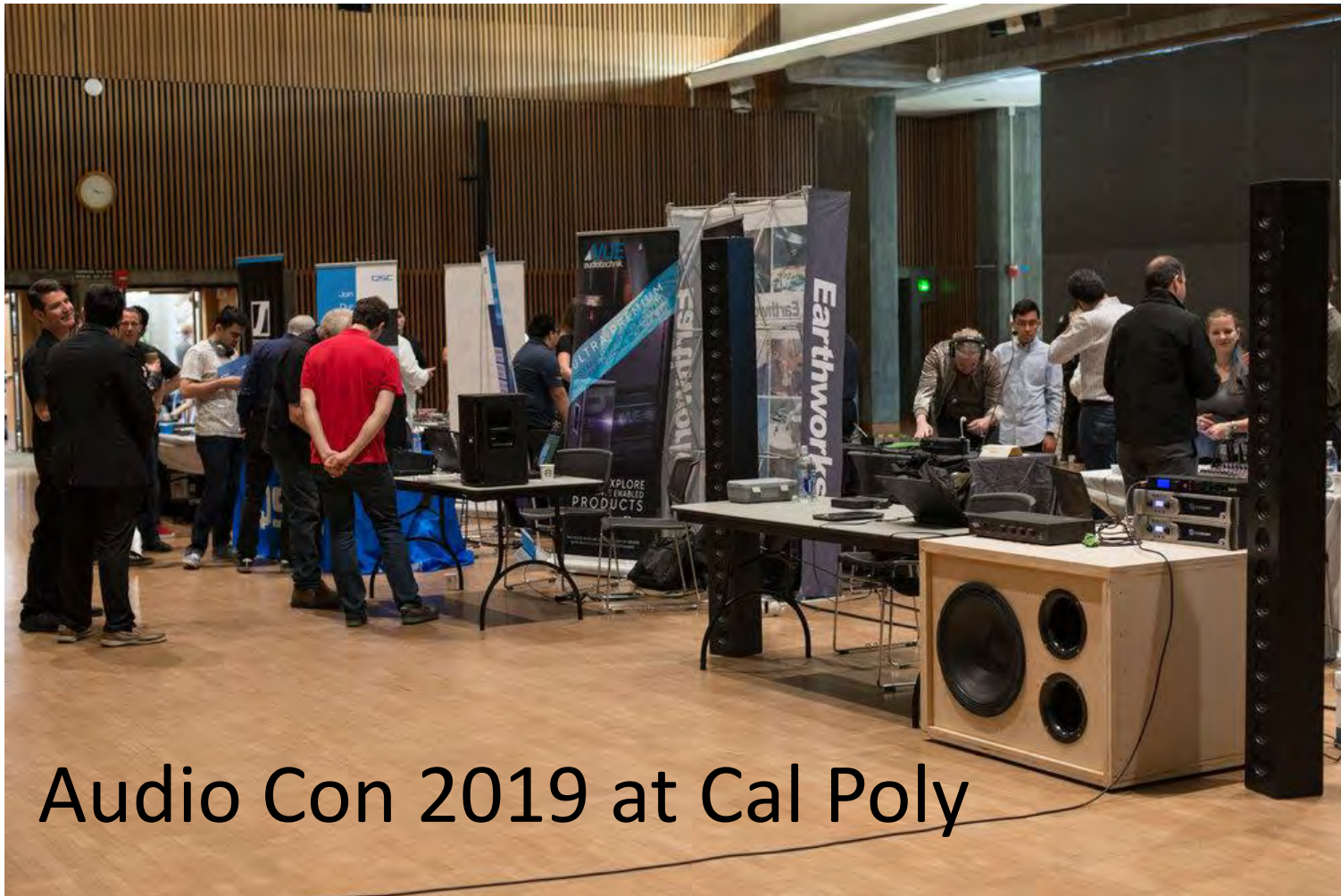
Fall 2020 EE *Intro* – Clubs

Cal Poly Racing – EE team meets

Twice weekly in Big E lab 20-130



Fall 2020 EE *Intro – Clubs –* *Audio Engineering Society*



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!



Women Involved in Software & Hardware (WISH)



Fall 20 Intro -CLUBS: EWB, NSBE, SHPE, Robotics



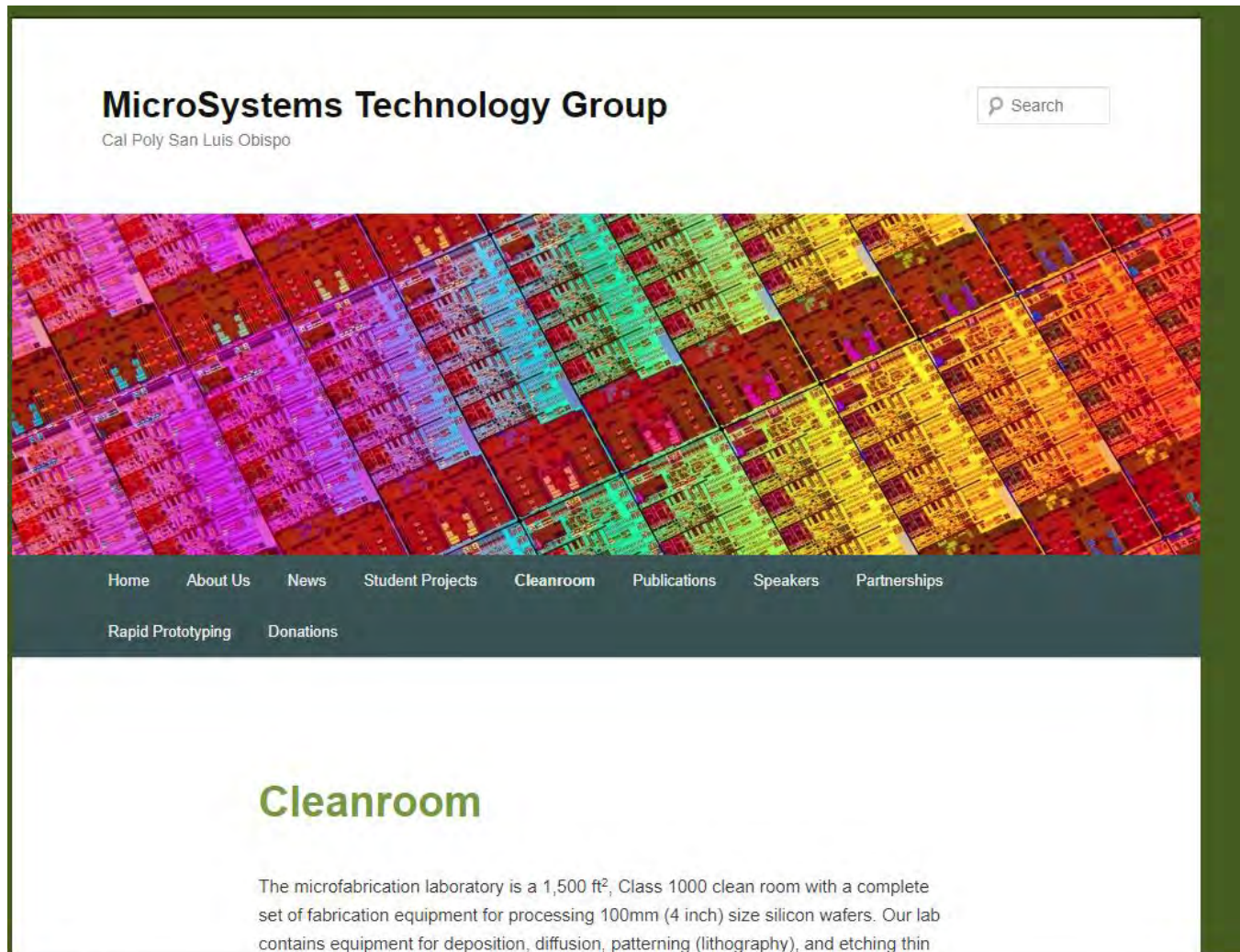
LEARN MORE



LEARN MORE



Fall 2020 EE *Intro – Clubs –* *Microsystems Technology*



Fall 2020 EE *Intro – Clubs – Poly Sat*



[Welcome](#)

[The Team](#)

[Earth Station](#)

[Missions](#)

[Donate](#)



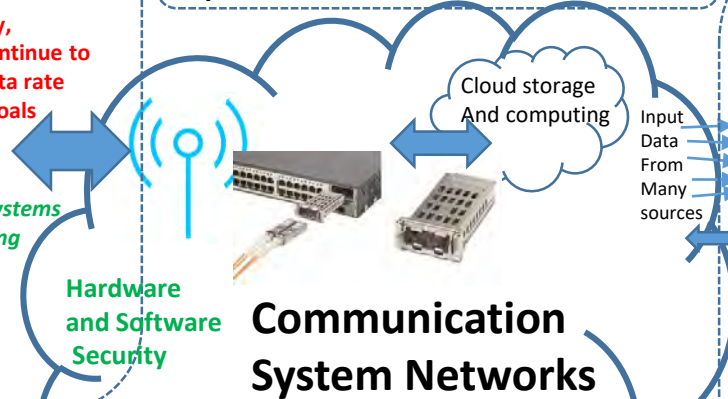
EE Vision: “Preparing Students for a Data-Intensive World”

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

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

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

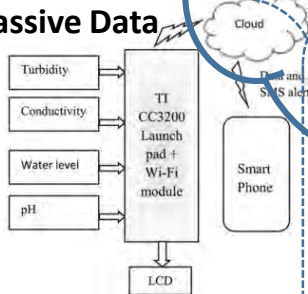


Hardware and Software Security

Communication System Networks

Machine IOT Massive Data

Massive Number of Internet of Things (IOT) Sensors are coming 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.



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

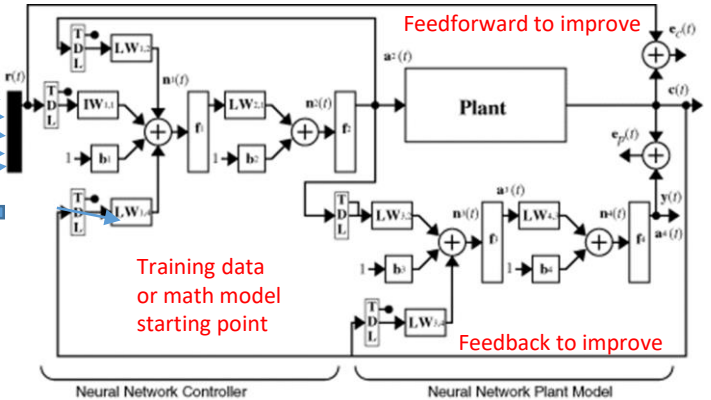
Local and World-Wide Communication Networks

-wireless (“5G” 2020 and “6G” 2030)
-wireline (Tbit/s data rates on fiber)

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

USING DATA FOR BETTER DECISIONS

Matlab/Simulink Real-Time AI/Deep Learning System Example



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

EE432/472 Digital Controls
EE419/459 Digital Signal Processing
EE424 Remote Sensing
EE428 Computer Vision
EE509 Computational Intelligence
EE513 Control System Theory
EE514 Advanced Topic in Automatic Control
EE516 Pattern Recognition
EE528 Digital Image Processing
EEXYZ We need several other courses In this are to be created including a course on Design for AI/Deep Learning at the undergrad and grad level. We have a good base to build from here.

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

Energy System Network

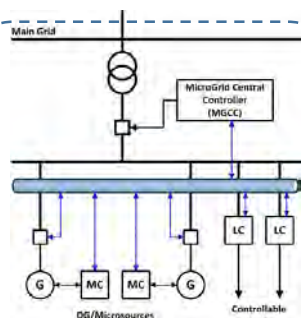
Massive shift in energy production and distribution toward renewables



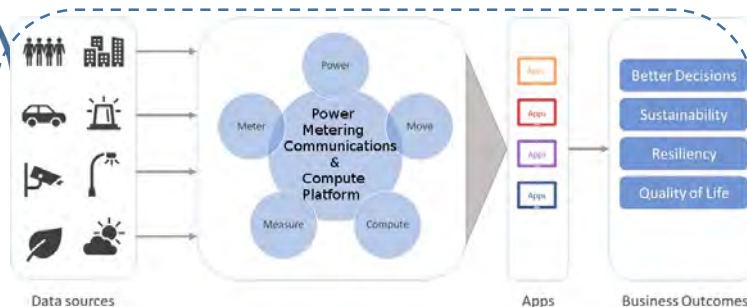
altnerative-energy-sources.com



Nexaraenergy.com



Microgrids,
Smart Grids,
And Grid
Security

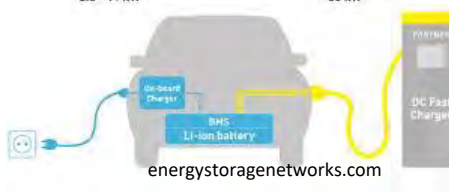


Smart Cities, Industrial Automation in utilities and roads, Building codes- net energy neutral, sensors everywhere, more city-managed electric utilities

Increased use of Electric Energy Sources for vehicles

AC Charging
3.6 - 11 kW

DC Charging
50 kW



energystoragenetworks.com

Electrical Engineering Student Flow Chart

FRESHMAN			SOPHOMORE			JUNIOR			SENIOR		
Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
Introduction to Electrical Engineering & Lab EE 111 (1) & EE 151 (1)	Fundamentals of Computer Science CSC/CPE 101 (4)	Choose One: Electric Circuit Analysis I & Lab EE 113 (3) & EE 143 (1) (MATH 142, Recruit: EE 113, EE 151, PHYS 133) OR Electric Circuit Analysis I EE 112 (2) (MATH 142, Recruit: EE 113, EE 151) & Basic Electronics Manufacturing IME 156 (2)	Electric Circuit Analysis II & Lab EE 211 (3) & EE 241 (1) (EE 112 or EE 113, EE 151, MATH 244 or PHYS 133/14)	Electric Circuit Analysis III & Lab EE 212 (3) & EE 242 (1) (MATH 244, EE 211, 241)	Energy Conversion Electromagnetics & Lab EE 255 (3) & EE 295 (1) (EE 212 & 242, or EE 261 & 242) (EE 212 & 242, or EE 261 &						

Notes:

Legend:

SOPHOMORE

Fall

Winter

Electric Circuit Analysis, Lab II & III

EE 211/241

EE 212/242

(EE 112,

(MATH 244,

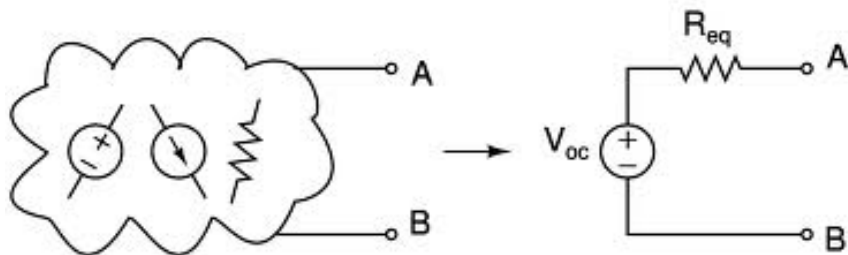
PHYS 133 †

EE 211 and 241)

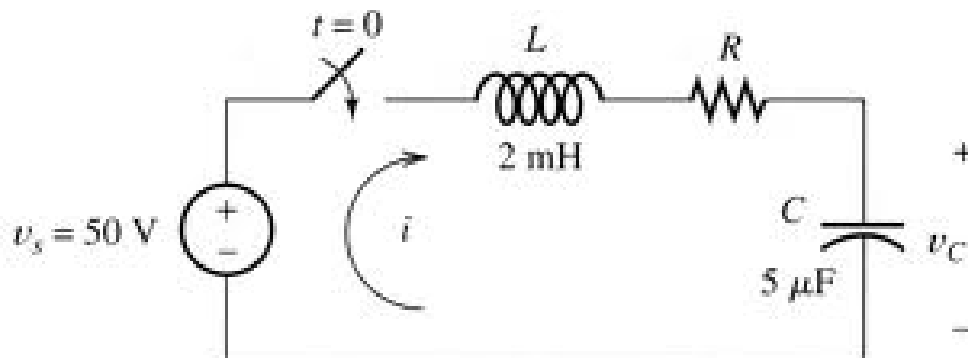
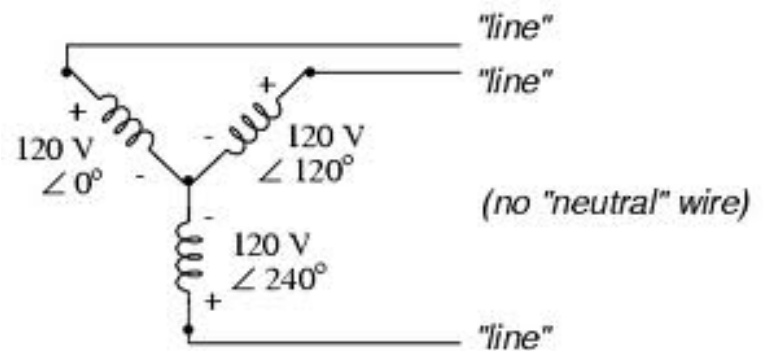
MATH 244 †)

Circuit Design

Thevenin Equivalent



3-phase, 3-wire "Y" connection



$$i(0) = 0 \quad v_C(0) = 0$$

Fund. Comp. Sci.
CSC/CPE 101

(MATH 118 or eqv.
w/ ≥C- & Basic
Computer Literacy***)

Digital Design
CPE 129/169

or CPE 133

(EE 111, EE 151,
CSC 101)

Computer
Design

CPE 229/269

or CPE 233

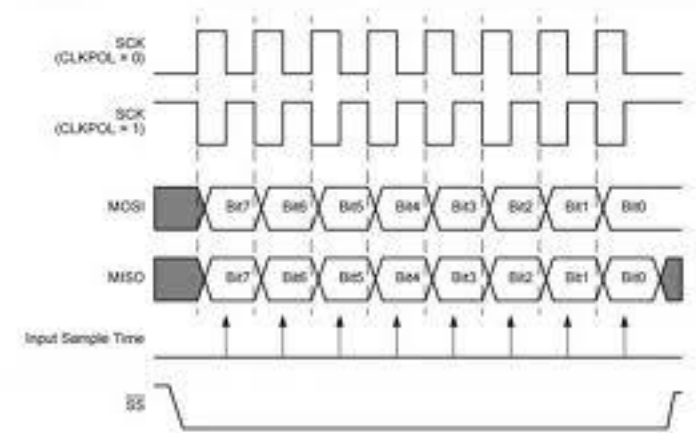
(CPE 129/169 or 133)

DIGITAL DESIGN

Prgr Log / μ Proc
System Design

CPE/EE 329

(EE 307/347,
CPE 229/269 or 233)
or CPE 336
(CPE 229/269 or 233)



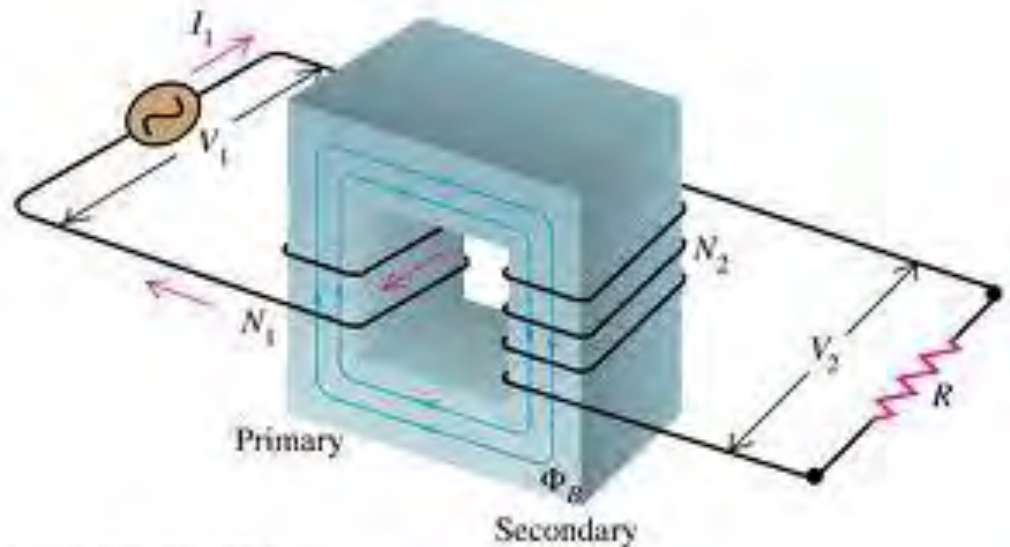
Spring

Energy
Conversion

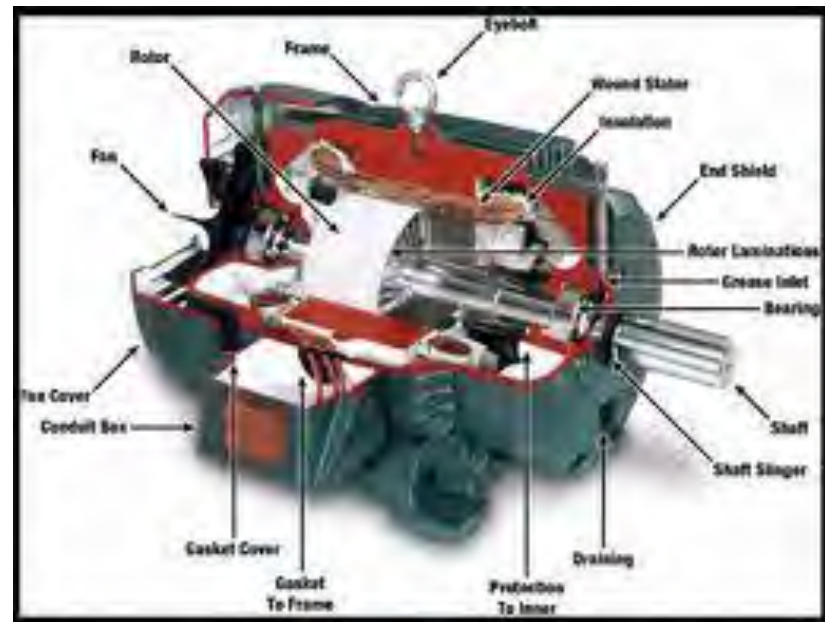
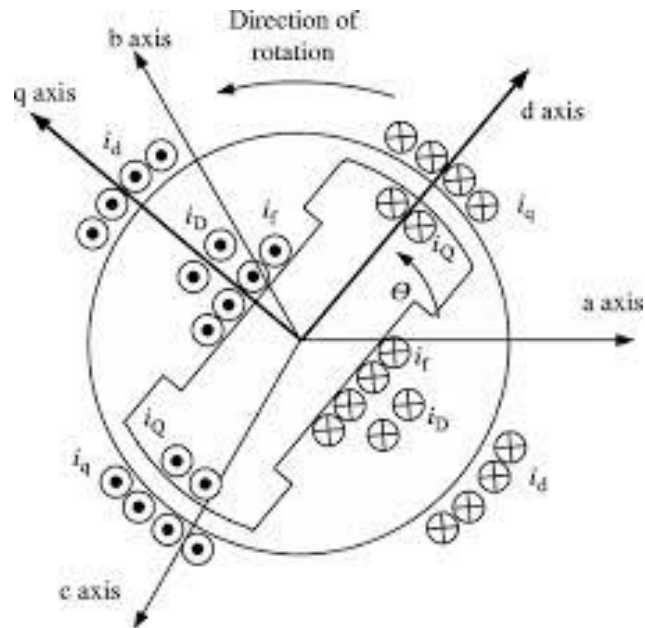
EE 255/295

(EE 212/242)

POWER SYSTEMS INTRODUCTION



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Continuous Time
Signals & Systems

EE 228

(EE 212 and 242, rcmnd
MATH 241)

Discrete Time
Signals & Systems

EE 328/368

(EE 228)

Control
Systems

EE 302/342

(EE 228,
Sugg. EE 368)

Prob/Random
Processes

STAT 350

(EE 228, MATH 241)

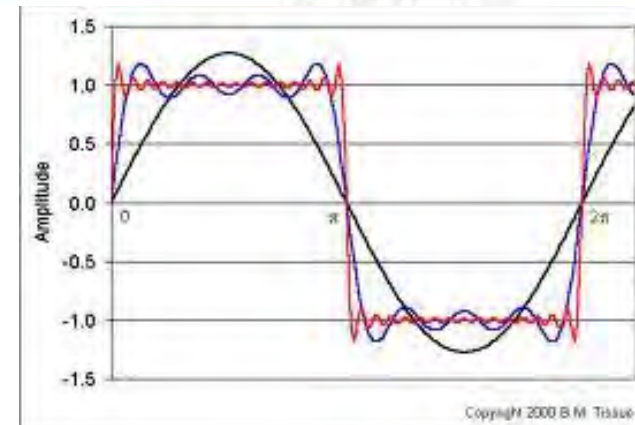
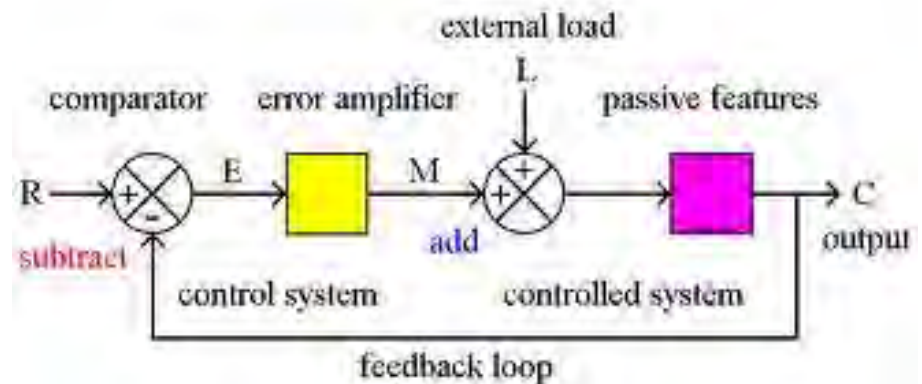
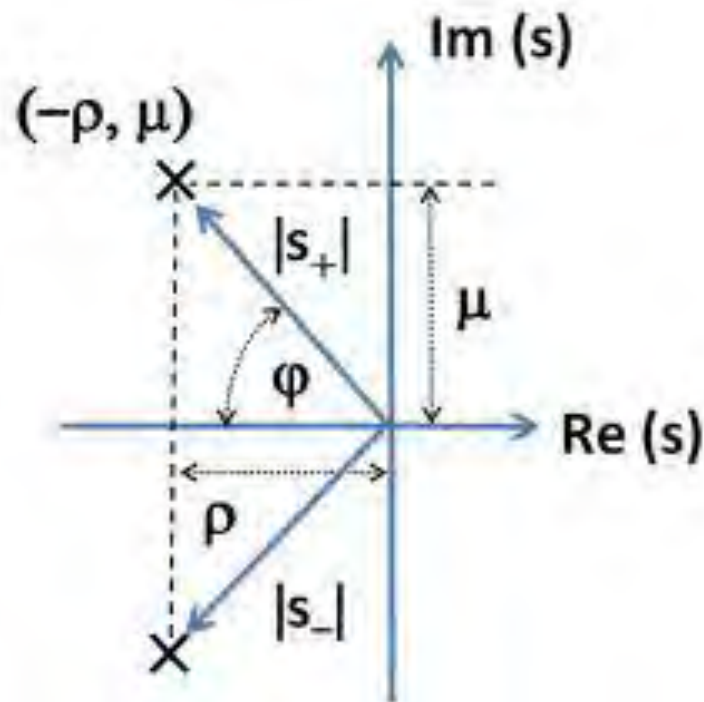
[B6]

Communications

EE 314

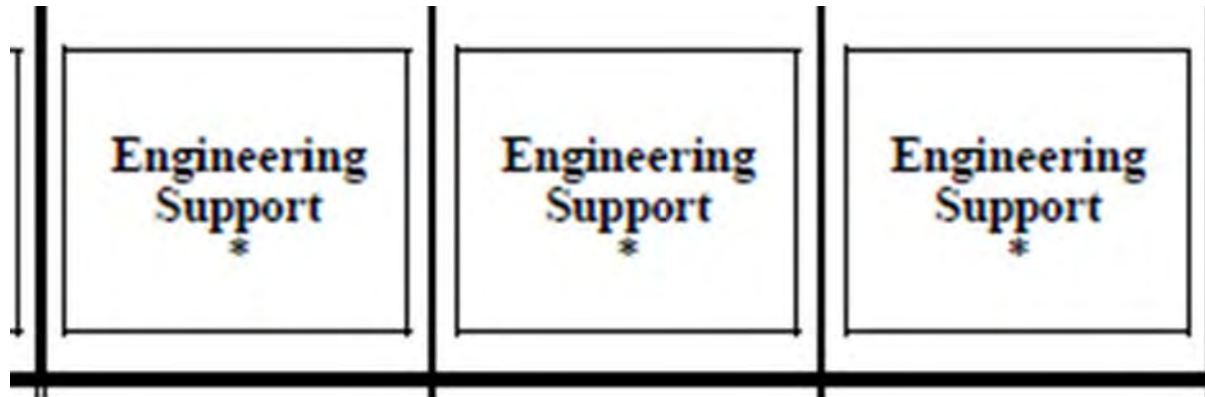
(STAT 350)

Electronics and Computer Systems Foundations



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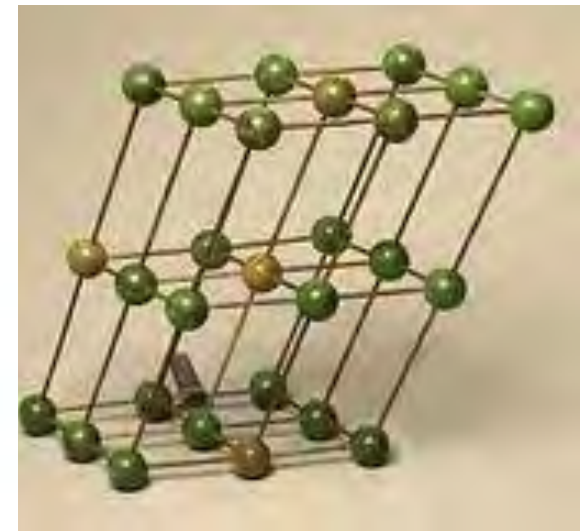
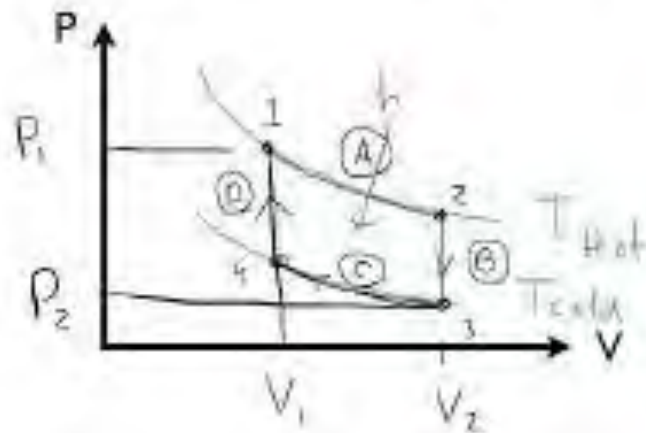
EXPAND THE BREADTH OF YOUR ENGINEERING KNOWLEDGE



Programming

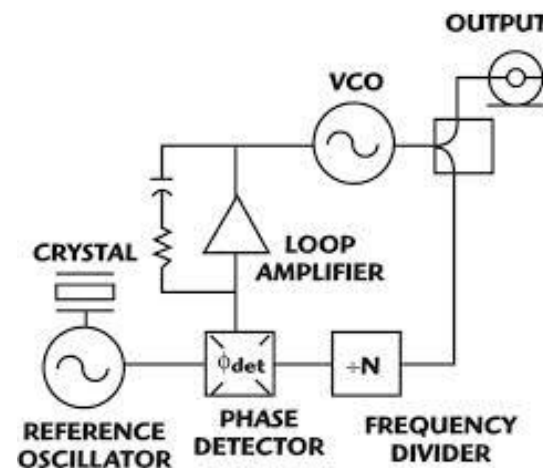
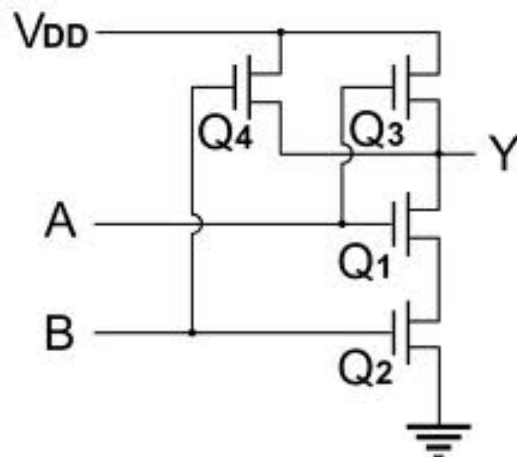
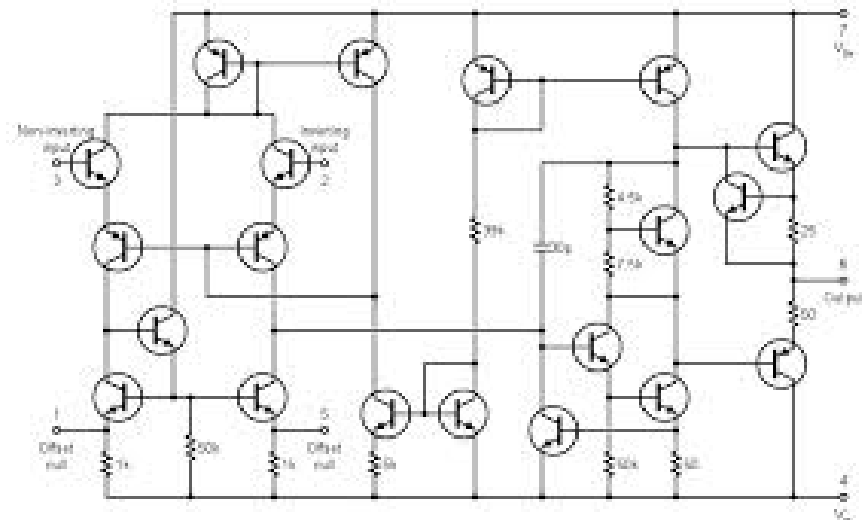
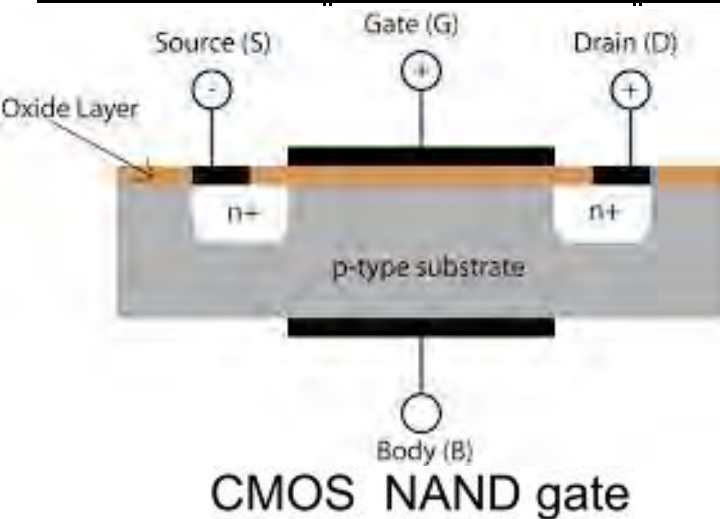


Carnot Cycle



JUNIOR			
Fall	Winter	Spring	Fall
Electronics			
EE 306/346	EE 307/347	EE 308/348	EE 409/449
(CHEM 124, EE 212 & 242, IME 156 or IME 157 or IME 458, PHYS 211)	(CPE 129 & 169 or 133, EE 306 & 346, CPE 229 or 233T)	(EE 307 & 347, EE 302 & 342)	(EE 308 & 348, EE 328 & 368, CPE 329 or 336)

ELECTRONICS!



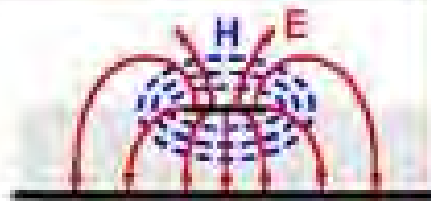
Electromagnetic Theory and Design



<i>Electromagnetics</i>	
EE 335/375	EE 402
(MATH 241, EE 212 & 242)	(EE 335)

Planar Structures

Microstrip



Senior Project

<i>Senior Project</i>		
EE 460	EE 461 or 463	EE 462 or 464
(EE 314, EE 335, EE 409&449 †)	(EE 409 & 449, EE 460)	(EE 463)
		(EE 463 for EE 464 only)



Electronics Area Electives

EE412/452 Advanced Analog

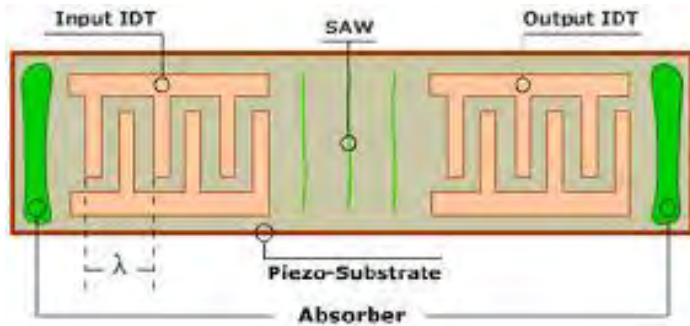
EE421 Microelectronics Processes

EE422 Polymer Electronics

EE431 VLSI Design

EE425/455 Filters

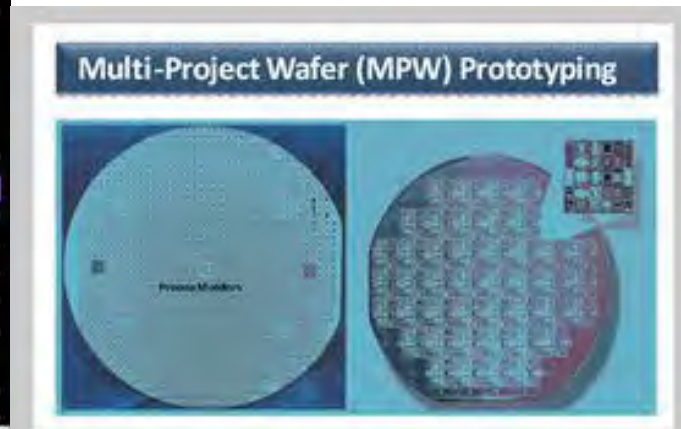
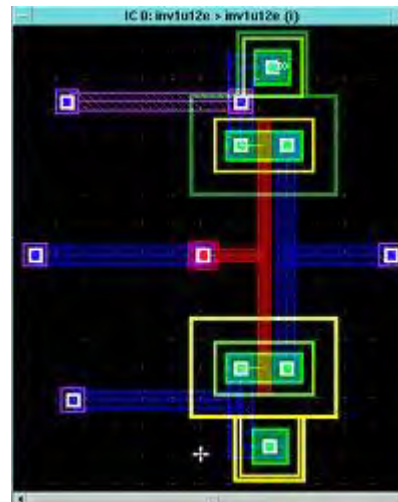
EE524 Solid State Electronics



IDT : Interdigital Transducer V_0 : SAW Velocity of free surface
 λ : Wavelength ($= V_0/f_0$) f_0 : Center Frequency



MOSIS



RF/Microwaves Area Electives

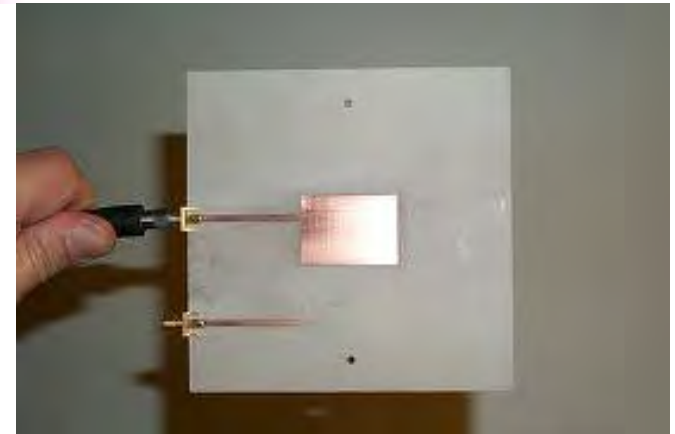
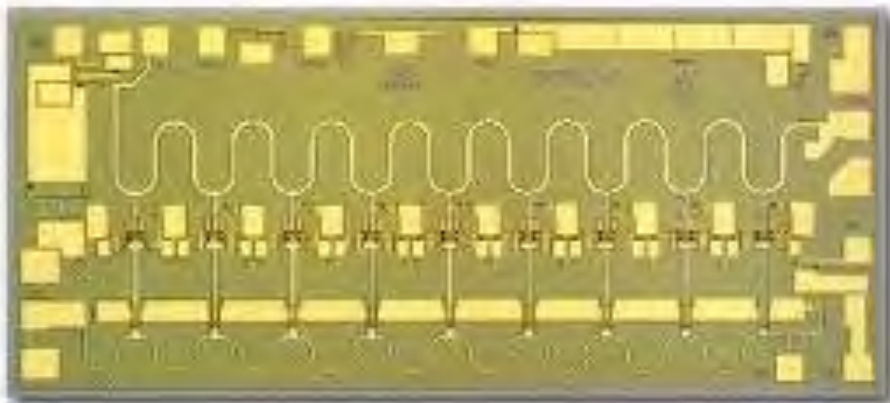
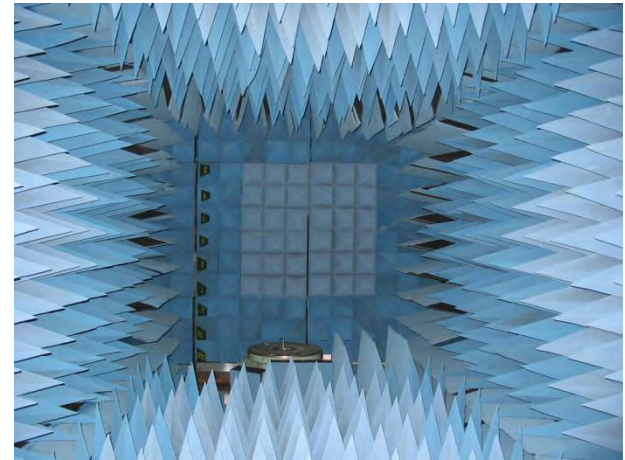
EE405/445 Microwave Amplifiers

EE440/480 RF Communications

EE529/541 Microwave Devices

EE533 Antennas

EE502 Microwave Systems



Computer Systems Electives

EE/CPE429 Computer Peripherals

EE/CPE 522 Real Time Systems

EE/CPE523 Advanced Microprocessors

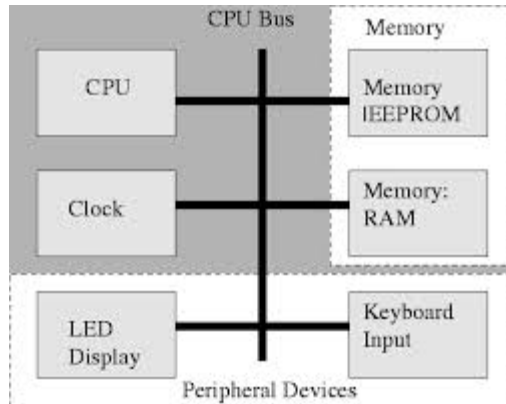
EE/CPE 428 Computer Vision

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



34

The Mathematical Theory of Communication

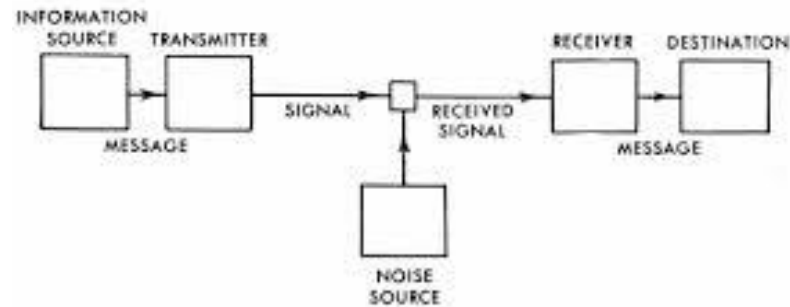
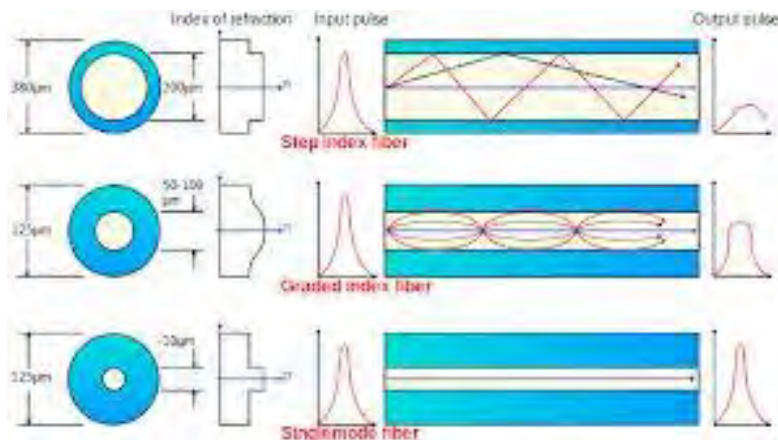


Fig. 1. — Schematic diagram of a general communication system.

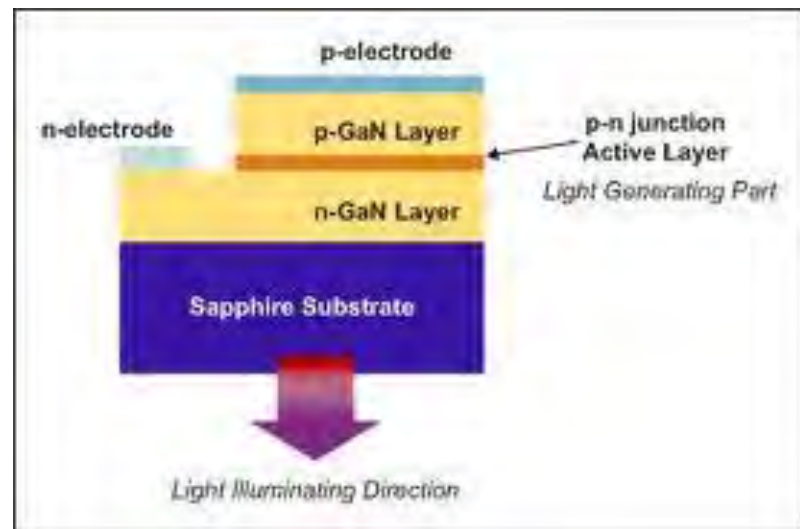
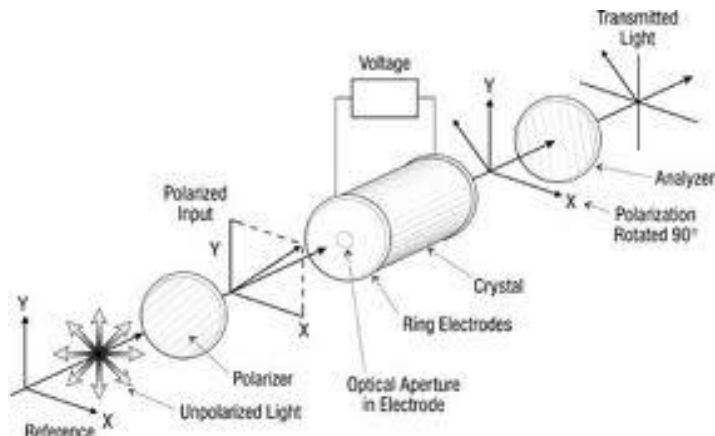
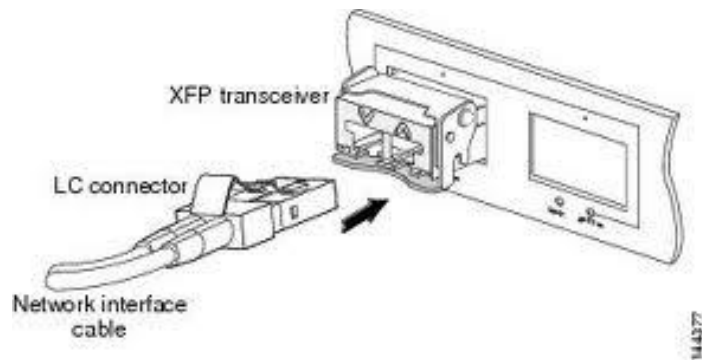


Photonics Area Electives

EE403/453 Fiber Optics

EE418/458 Photonic Engineering

EE530 Fourier Optics



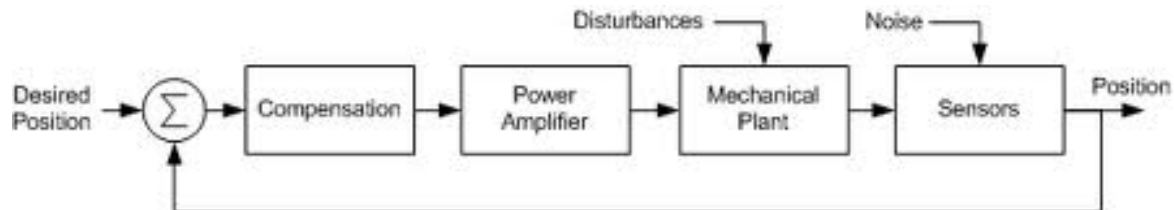
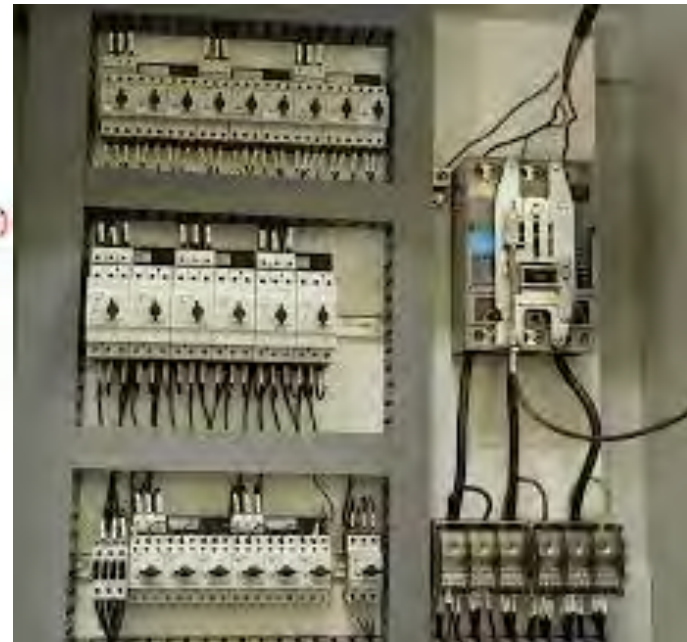
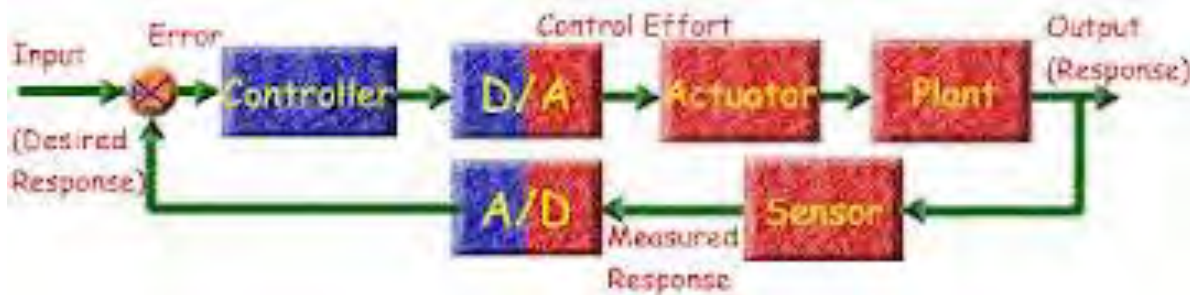
Control Systems Electives

EE432/472 Digital Controls

EE514 Automatic Controls

EE513 Control Systems Theory

EE581 Computational Intelligence



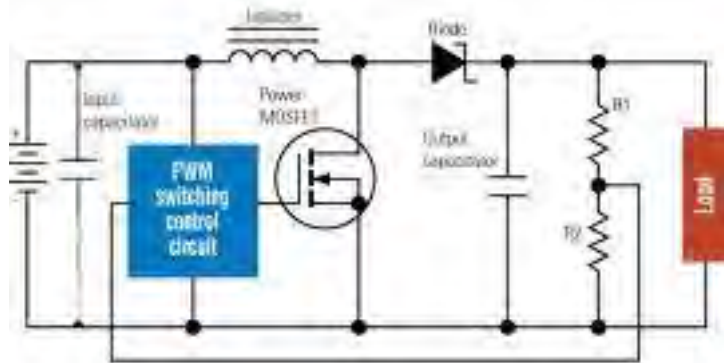
Power Electronics Area Electives

EE410 Power Electronics I

EE 527 Advanced Power Electronics

EE411 Power Electronics II

EE 420 Photovoltaic Systems



2. An inductive boost converter (I) uses an on-chip MOSFET and PWM control circuit to perform the same functions as the simplified circuit in Figure 1. The resistive voltage divider in the output sets the converter's output voltage.



Signals and Systems Electives

EE419/459 DSP

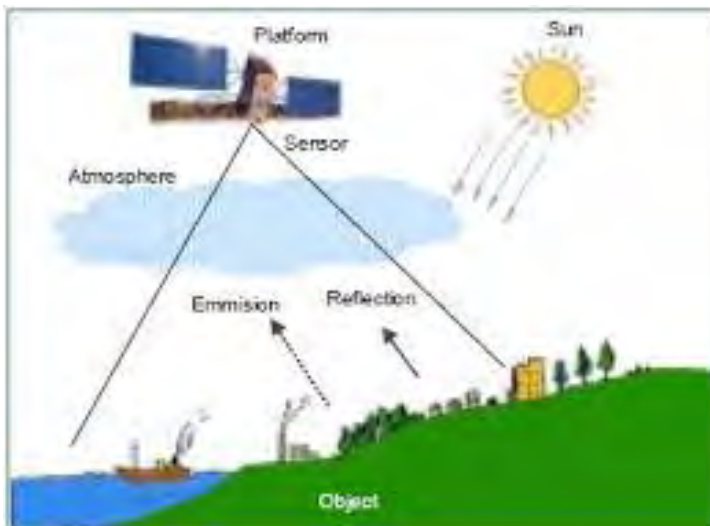
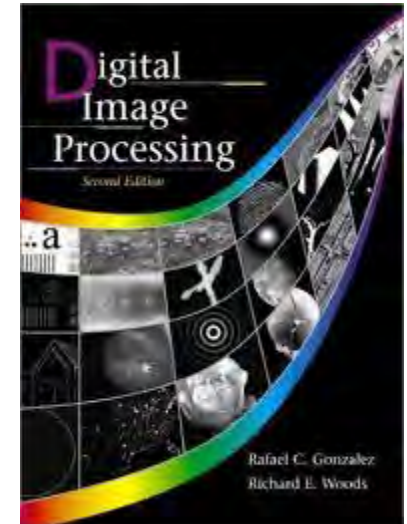
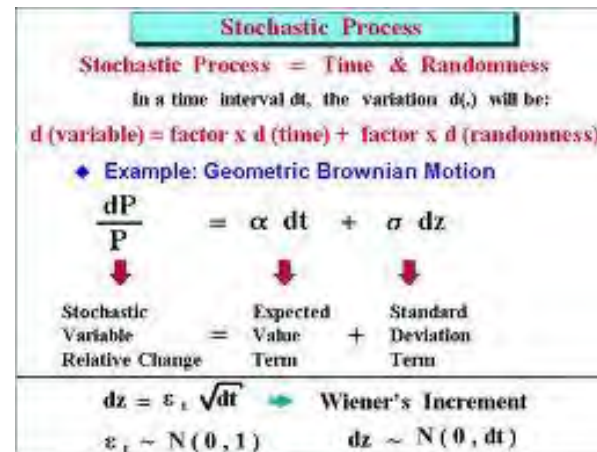
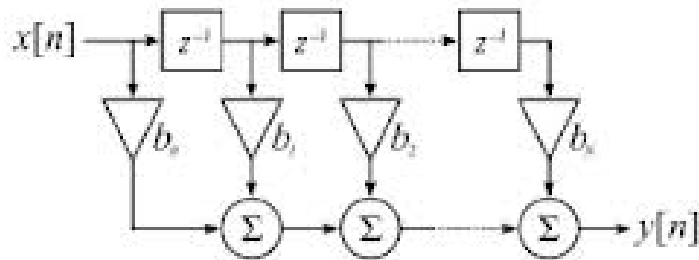
EE509 Computational Intelligence

EE419/459 Remote Sensing

EE 515 Discrete Time Filters

EE525 Stochastic Processes

EE528 Digital Image Processing



Power Systems Area Electives

EE406 Power Systems I

EE 417 AC Machines

EE407 Power Systems II

EE 420 Sustainable Energy

EE 518 Power System Protection

EE 511 Electric Machine Theory

EE519/544 Advanced Power Systems



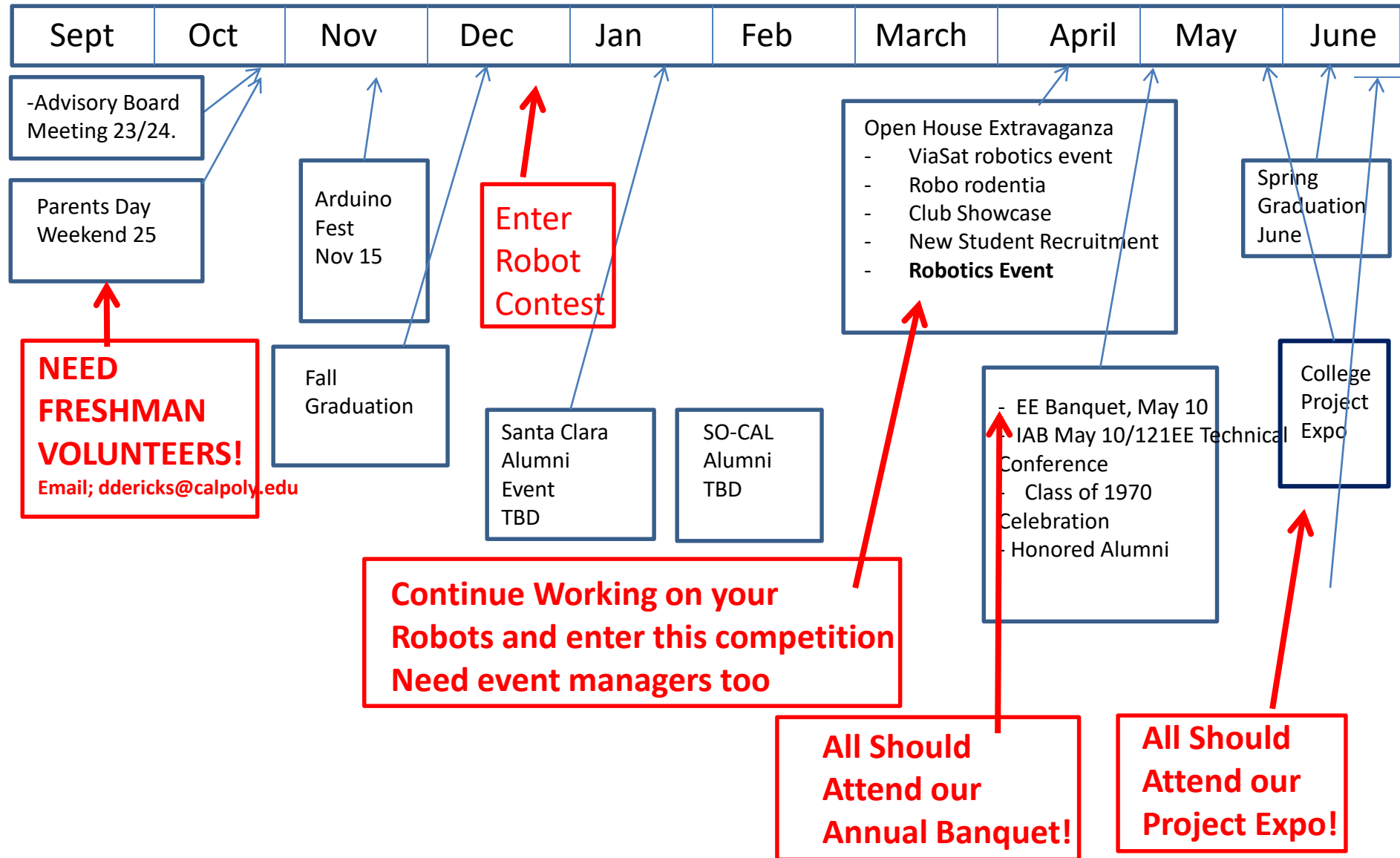
**CAL POLY
SAN LUIS OBISPO
POWER & ENERGY
CONFERENCE**



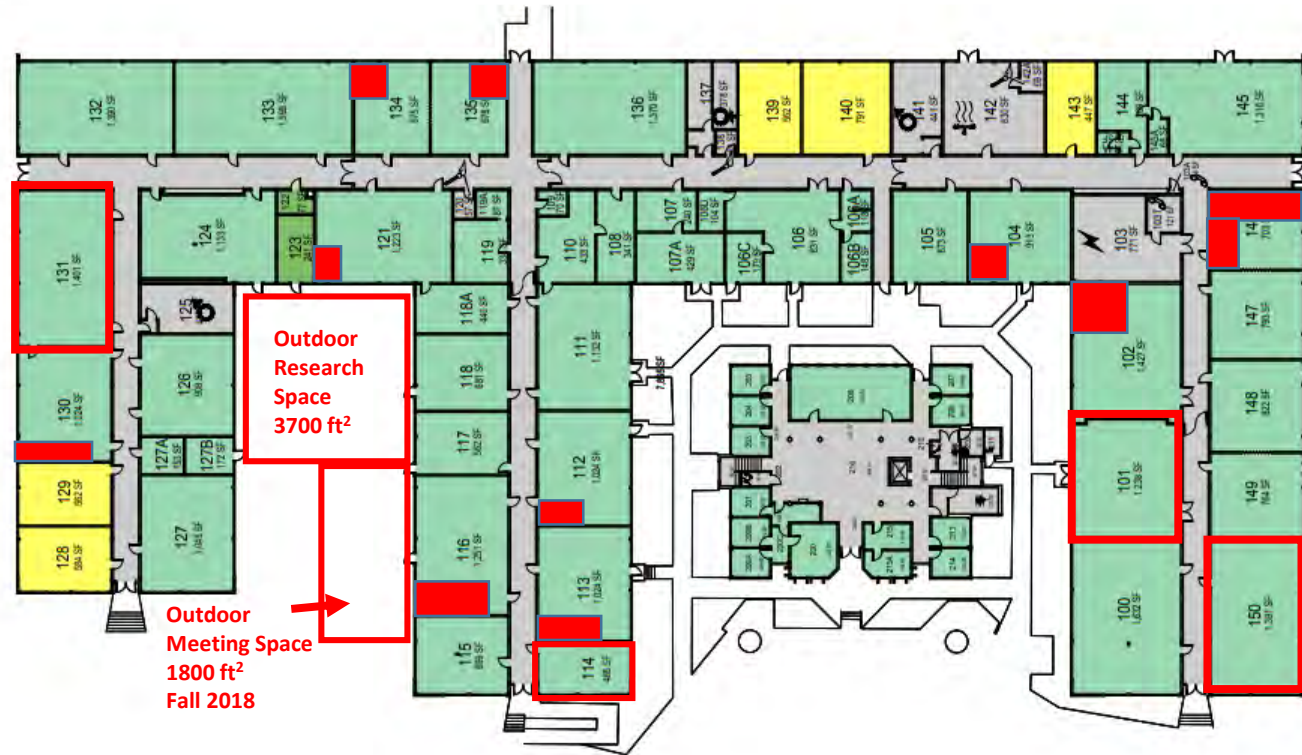
Friday, May 11, 2012
9:30 AM - 4:30PM
Advanced Technology Labs

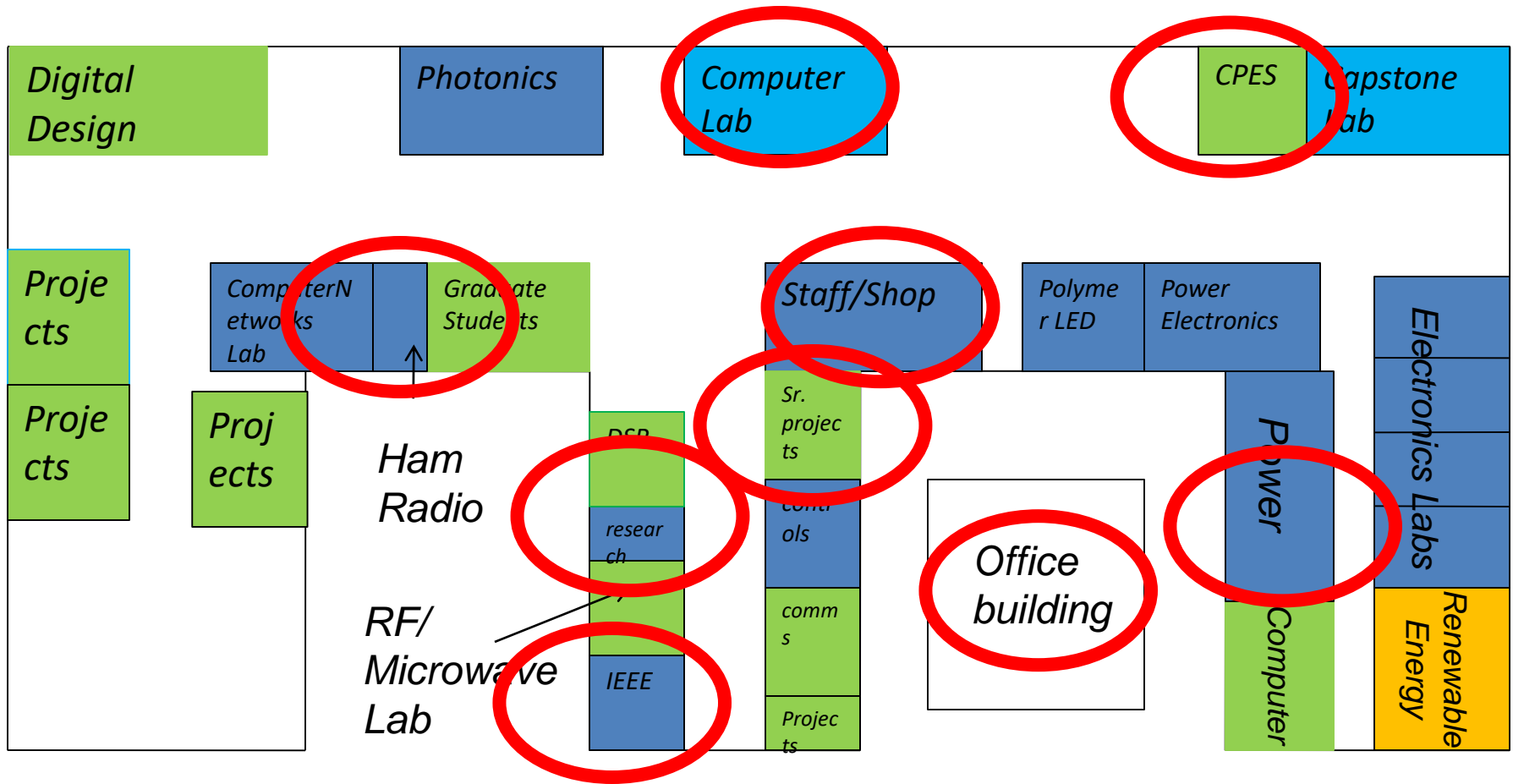


2019/2020 EE Dept. Major Events Calendar



The Big “E” Building 20 – Center of Campus





*EE Dept. Places
For general student
activities*



Antenna (Arakaki)
EMC Lab
Robotics Lab (Clark, Benson)





EE LOBBY

A GREAT PLACE TO STUDY OR
MEET FACULTY AND OTHER
STUDENTS

SEMINARS EVERY FRIDAY
AT 2PM

NT
ATION

ELECTRICAL ENGINEERING
DEPARTMENT OFFICE

GRADER/L
ASSISTAN

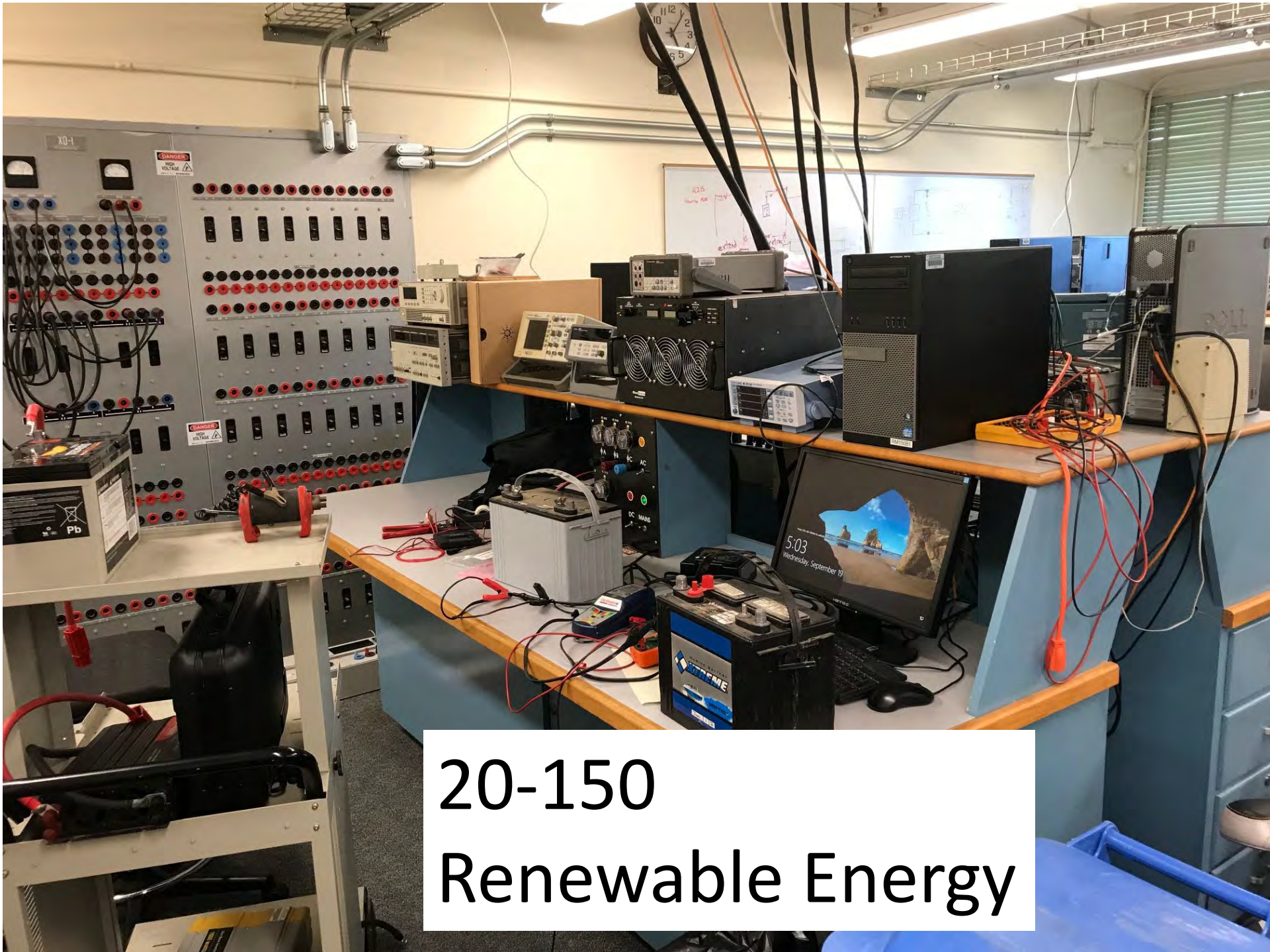


EE Front DESK _ LOTS OF INFORMATION HERE

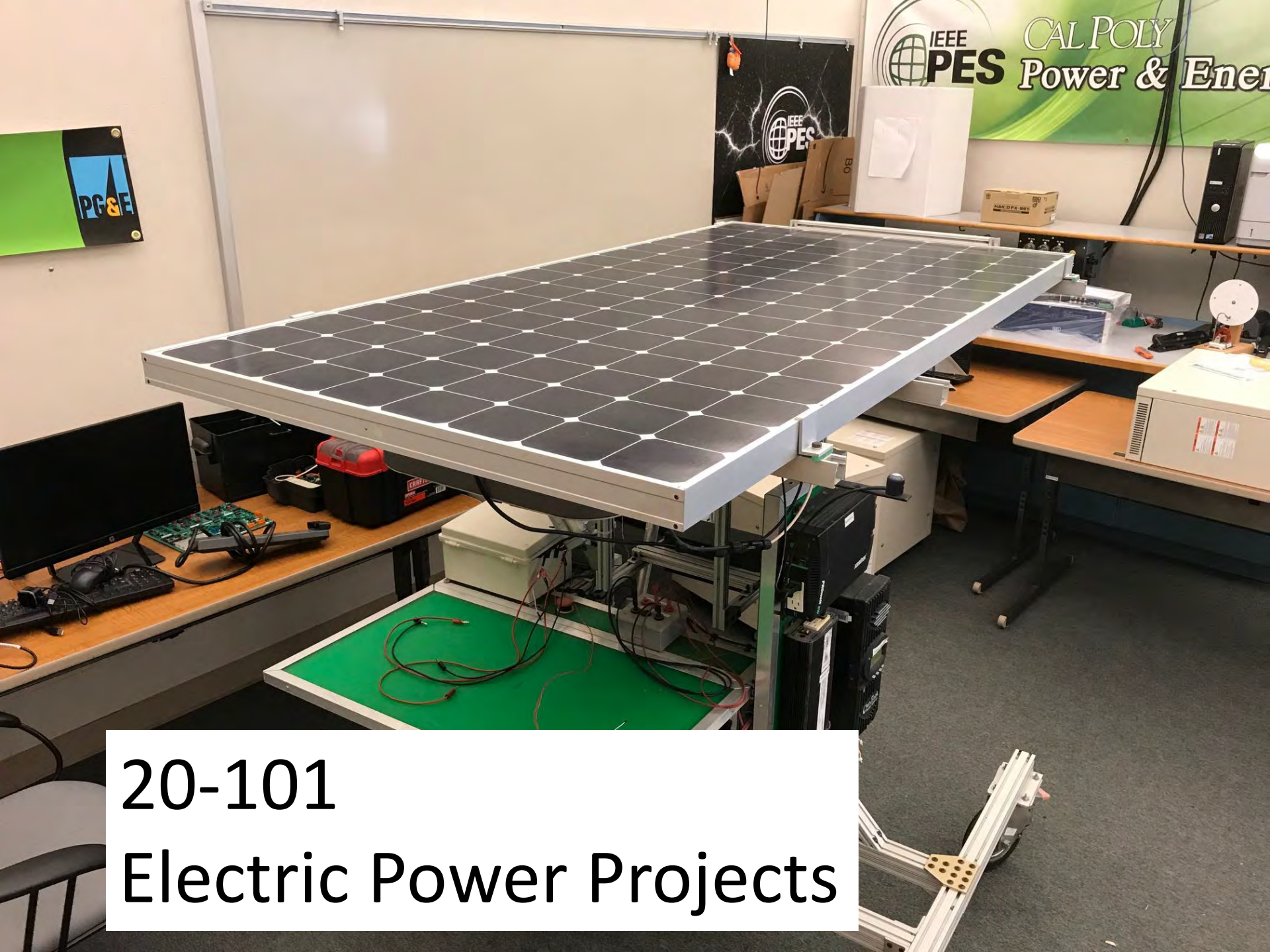


20-100

Digital Design



20-150
Renewable Energy



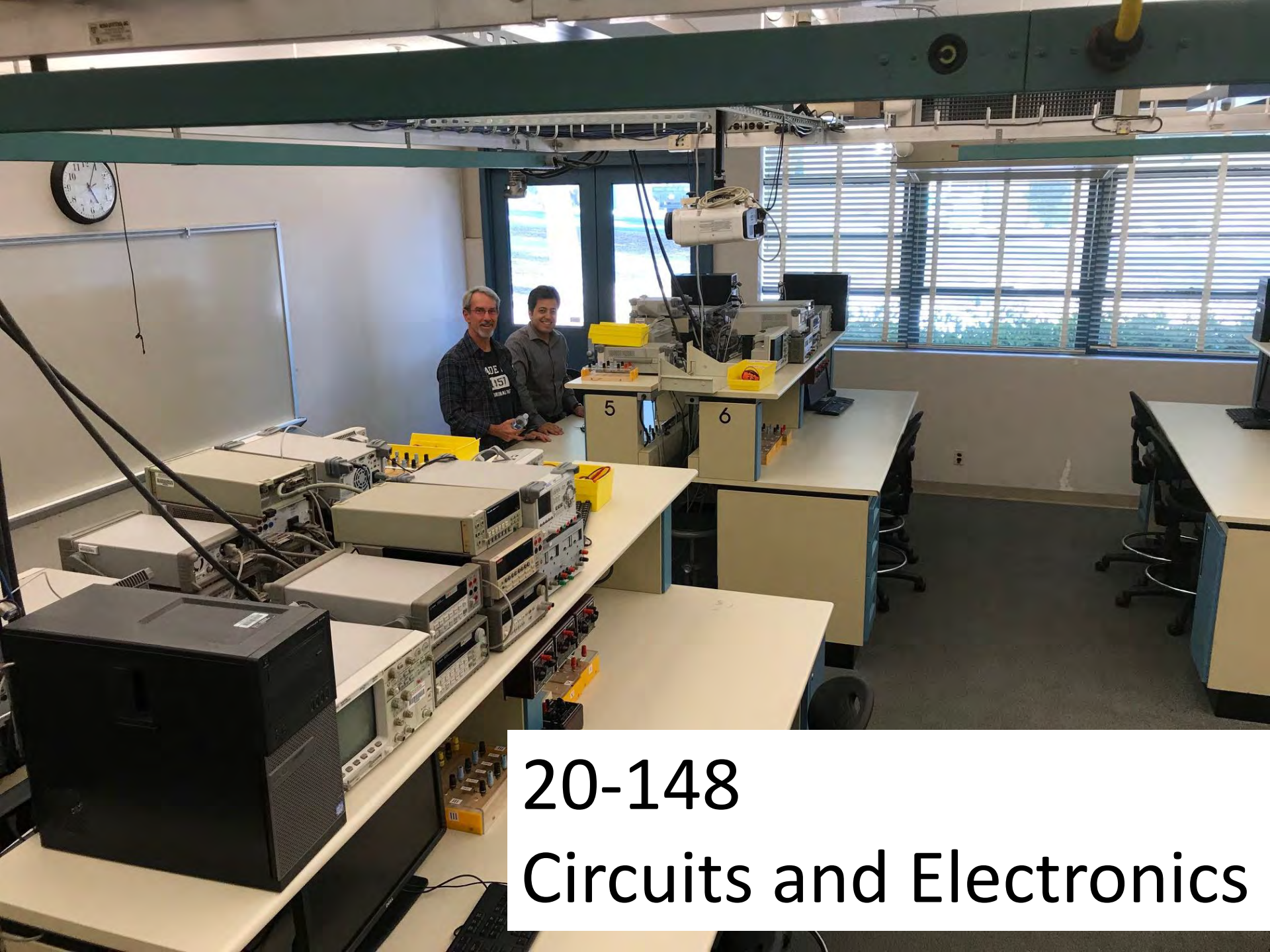
20-101

Electric Power Projects



20-149

Circuits and Electronics



20-148

Circuits and Electronics



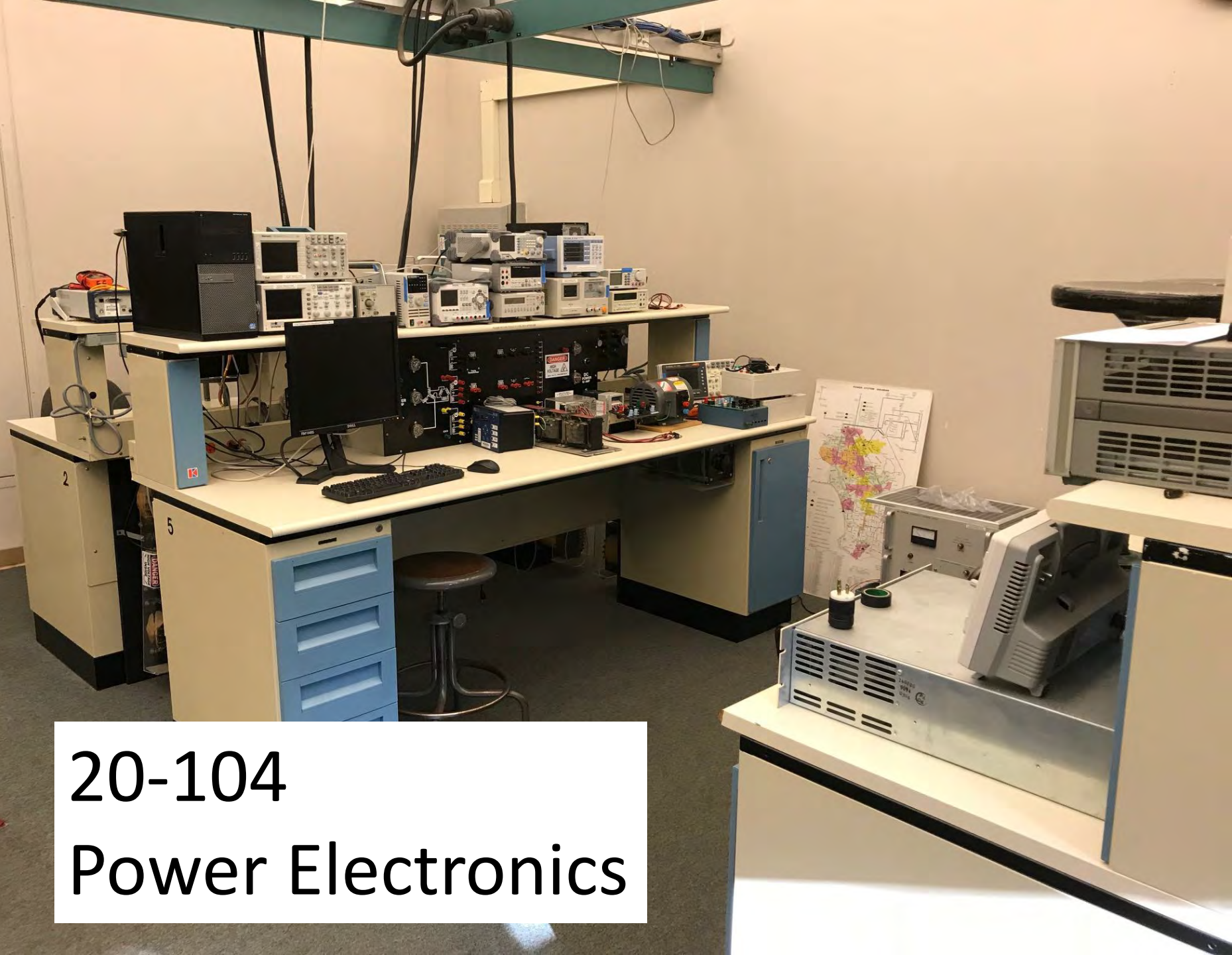
20-147

Circuits and Electronics



20-145

Senior Project, Capstone



20-104
Power Electronics



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



20-112
Control Systems



20-116
High Frequency Electronics



20-113

Communication Systems

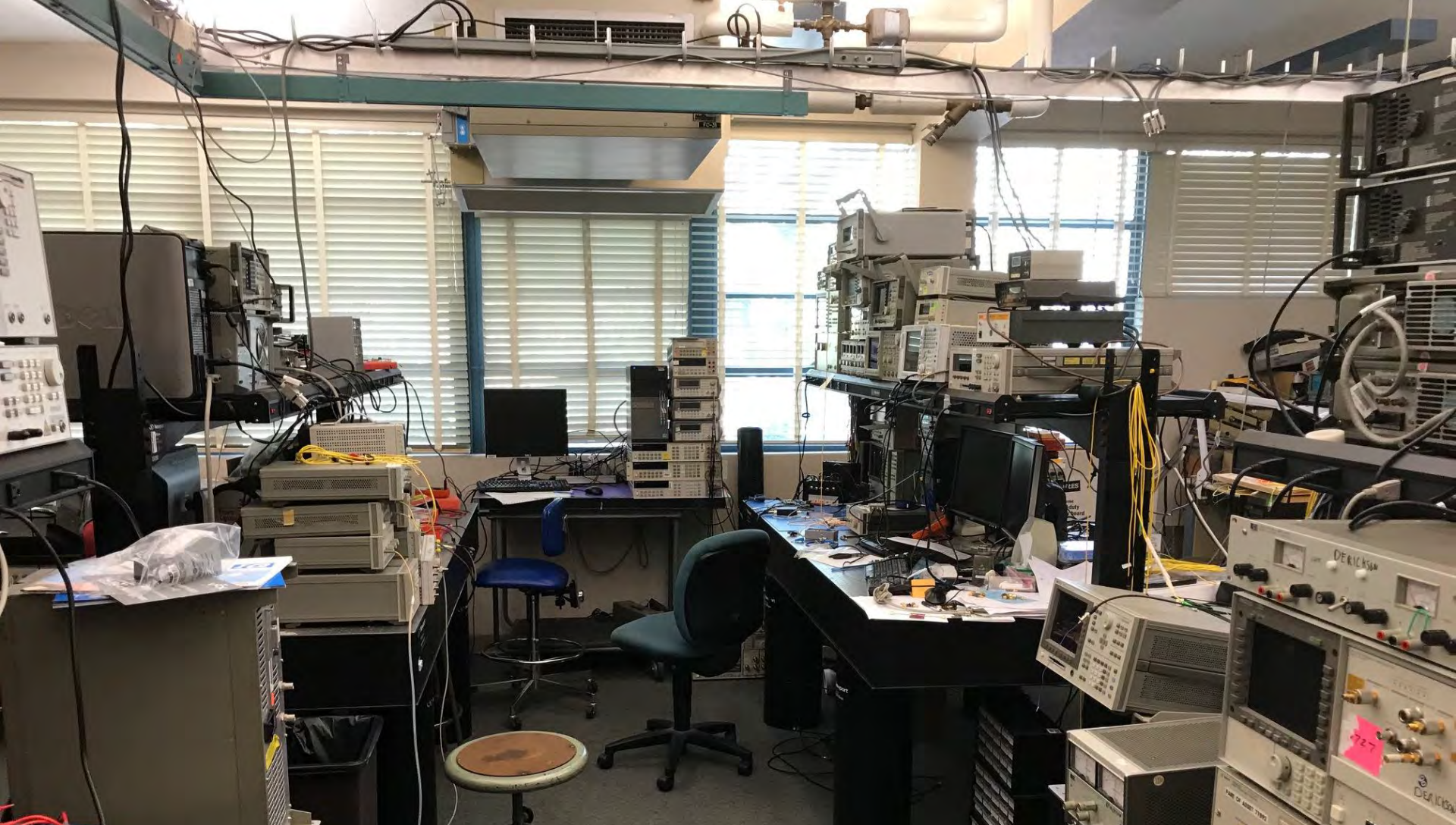


20-115
IEEE Student Room



20-114
Research Area

The image shows a research area filled with various electronic components and tools. In the foreground, a wooden table holds several small, orange and black electronic devices, possibly drones or sensors, along with some boxes and a manual. Behind this table, a desk is cluttered with more equipment, including a computer monitor, a keyboard, and a black bag. To the right, a black computer tower sits on a shelf above the desk. A red metal shelving unit is visible in the background, holding various items. A green and blue cylindrical stool is positioned near the desk. The room has large windows with white blinds on the left side. A black bag and a red bag are on the floor near the desk. A black bag is also visible in the foreground on the right. A black bag is also visible in the foreground on the right.



20-135
Photonics Research



20-134

Photonics Teaching



20-121

Graduate Student Offices



20-132 Digital Design

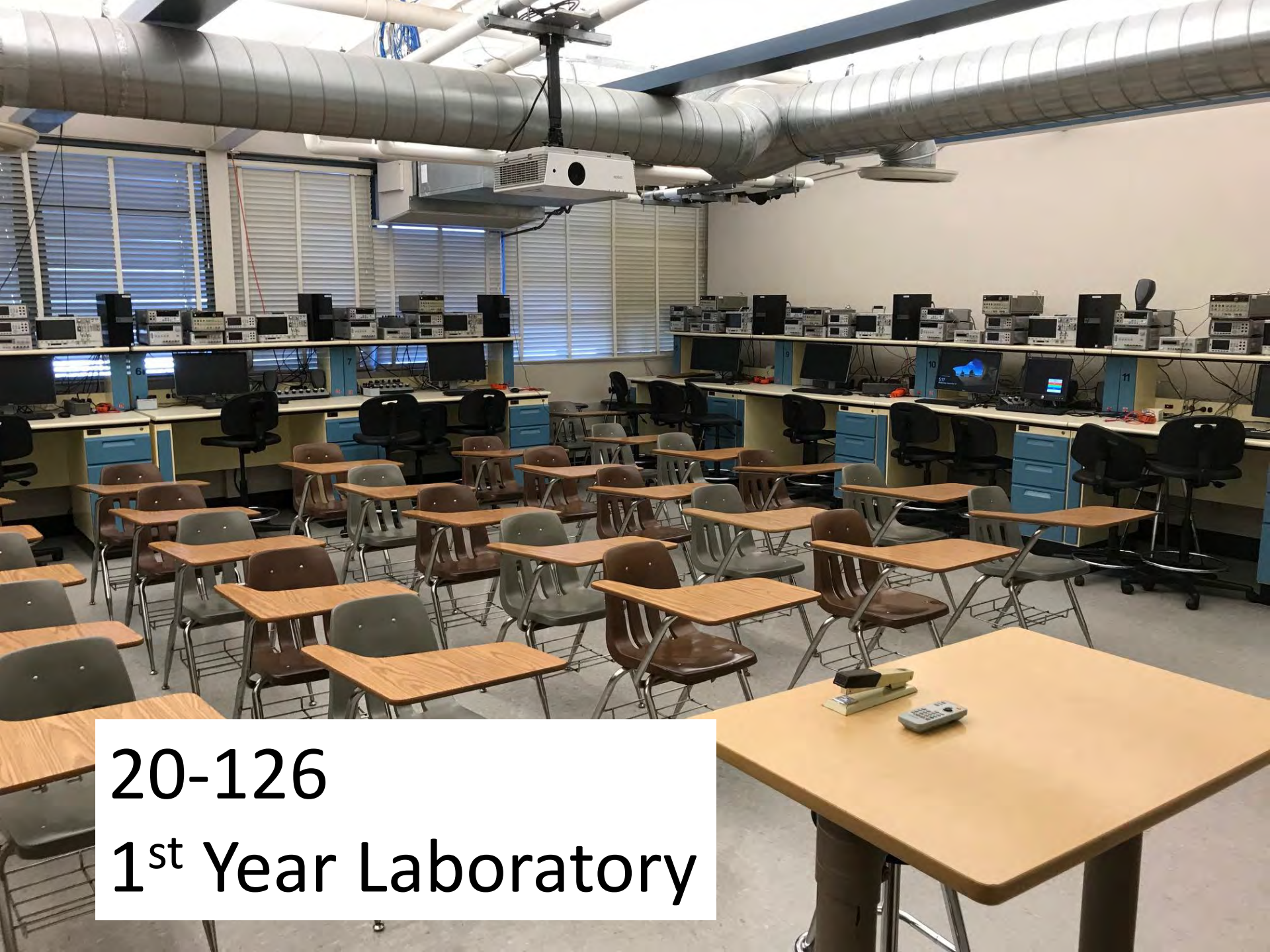


20-131
Research Area



20-130

Circuits and Electronics



20-126

1st Year Laboratory



20-106

Metal Workshop Lab



20-106

Wood Working Shop



20-106

3 D Printers and Electronics Support



20-102

Electric Power System Laboratory



A photograph of a radio club office building with a large antenna system. The building is a single-story structure with a dark roof and light-colored horizontal siding. A tall, lattice-structured antenna tower is positioned in front of the building, with a person visible on a platform near the top. The antenna system consists of multiple horizontal and vertical wires extending from the tower. The background features a clear blue sky, green trees, and a range of brown hills. A white text box is overlaid at the bottom of the image.

Radio Club Office and Antenna



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 Flow Chart

FRESHMAN			SOPHOMORE			JUNIOR			SENIOR		
Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
Computer Engineering Orientation CPE 100 (1)	Fundamentals of Computer Science CPE 101 (4)	Data Structures CPE 202 (4) (CPE 201, approx C-; MATH 241 or 233, letter A-)	Project-Based Object-Oriented Programming & Design CPE 203 (4) (CPE 202, letter C- or better; consent)	Electric Circuit Analysis & Lab II EE 211 (3) AND EE 241 (1)	Electric Circuit Analysis & Lab III EE 212 (3) AND EE 242 (1)	Choose One: Signals and Systems CPE 327 (3) & CPE 367 (1) OR EE 228 (4)	Digital Electronics & Integrated Circuits EE 307 (3) AND EE 347 (1) (CPE 347, EE 306, EE 346, CPE 207)	Introduction to Operating Systems CPE 453 (4) (CPE 407, CPE 226, 229, EE 233)	Introduction to Computer Networks CPE 464 (4) (CPE 347, Introduction to STAT 312, 322, EE 346)		
Introduction to Computing CPE 123 (4)* (Basic Computer Literacy)		Electric Circuit Analysis and Lab EE 113 & EE 143* (4) (MATH 142, Physics 141-142 & 143)	Digital Design CPE 133 (4)* (CPE 130, 140)	Computer Design and Assembly Language Programming CPE 233 (4) (CPE 144)	Systems Programming CPE 357 (4) *	Discrete Structures CSC 348 (4) (not less C- in CPE 100 & 101; or CPE 202 & 203; or letter C; consent)	Microcontrollers & Embedded Applications CPE 316 (4)* (CPE 307, Consol. EE 211)	Capstone II CPE 450 (3)* (CPE 346)	Approved Technical Elective (4)* ***	Approved Technical Elective (4)* ***	
General Chemistry for Physical Science & Engineering I CHEM 124 (4)* (MATH 130, Reason, 80; Chemistry) [BS/BA]	General Physics IA PHYS 141 (4)* (MATH 140, approx C-; MATH 142 or 143)		General Physics III PHYS 133 (4) (MATH 142, approx C-; or MATH 143, Reason 80)	General Physics II PHYS 132 (4) (MATH 141, approx C-; or PHYS 141)	Modern Physics I PHYS 211 (4) (PHYS 132 or 133; MATH 241, Reason 80; MATH 242 or 243)	Semiconductor Device Electronics & Lab EE 306 (3)* AND EE 346 (1)* (CONV. 134, EE 312 & 342, EE 161 or 162, 130 or 240, 450; PHYS 211)		Computer Hardware Architecture & Design CPE 333 (4)* (CPE 301, 324)	Capstone I CPE 350 (4)* (CPE 3147 or 3274 or 3467)	Choose One Series: Senior Project I & II CPE 461 (3) (CPE 460) OR CPE 462 (2) (CPE 456)	
Calculus I MATH 141 (4)* OR [B1]	Calculus II MATH 142 (4)* (MATH 141, letter C-)	Calculus III MATH 143 (4)* (MATH 142, letter C-)	Calculus IV MATH 241 (4) (letter B or C)	Linear Analysis I MATH 244 (4) (MATH 243)			Approved Elective (CSC, EE, Math or Science) (3-4)* ***	Probability and Random Processes for Engineers STAT 350 (4)* (MATH 241, EE 229) [BS]	Research Senior Project I & II CSC 497 (2) (CSC 307 or 308)	Approved Technical Elective (4)* ***	Approved Technical Elective (4)* ***
Expository Writing ENGL 133 or 134 (4)** [A1] Can be taken anytime during Freshman Year	Oral Communication COMS 101 or 102 (4)** [A2] Can be taken anytime during Freshman Year				GE (4) **	GE (4) **	GE (4) **	GE (4) **	GE (4) **	GE (4) **	GE (4) **
							Graduation Writing Requirement: GWR* (Students can exempt to fulfill the requirement after 90 earned units; students should complete the requirement before senior year)		GE (4) **		
17	16	15-12	15	16	15	16	16	15-16	16	17-18	14
										TOTAL:	191-195

Notes:

Legend:

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**

Digital IC Design:

CSC/CPE 102 Fundamentals of CS II (3+1)
or CSC/CPE 202 Data Structures (3+1)
CSC/CPE 103 Fundamentals of CS III (3+1)
or CSC/CPE 203 Object Oriented Program.(3+1)
CPE 315 Computer Architecture (4)
EE 431/CPE 441 Computer-Aided Design of
VLSI Devices (4) [F]
CPE/EE 439 Intro. to Real-Time Operating
Systems (3+1) [F]
EE 523 Digital Systems Design (3+1) [F]
EE 521 Computer Systems with Lab (3+1) [S]

FPGA Designer:

CSC/CPE 102 Fundamentals of CS II (3+1)
or CSC/CPE 202 Data Structures (3+1)
CSC/CPE 103 Fundamentals of CS III (3+1)
or CSC/CPE 203 Object Oriented Program (3+1)
CPE 315 Computer Architecture (3+1)
CPE/EE 439 Intro. to Real-Time Operating
Systems (3+1) [F]
EE 523 Digital Systems Design (3+1) [F]

Computer IC Architect:

CSC/CPE 102 Fundamentals of CS II (3+1)
or CSC/CPE 202 Data Structures (3+1)
CSC/CPE 103 Fundamentals of CS III (3+1)
or CSC/CPE 203 Object Oriented Program (3+1)
CPE 315 Computer Architecture (3+1)
EE 431/CPE 441 Computer-Aided Design of
VLSI Devices (4) [F]
CPE/EE 439 Intro. to Real-Time Operating
Systems (3+1) [F]
EE 523 Digital Systems Design (3+1) [F]
EE 521 Computer Systems with Lab (3+1) [S]
CPE 515 Computer Architecture* (3+1) [W]

* Not currently an approved Technical Elective

Robotician:

CPE 102 Fundamentals of CS II (4)
ME 305 Intro to Mechatronics (3+1)
CPE/EE 428 Computer Vision (3+1) [W]
ME 405 Mechatronics (3+1) [W,S]
CPE/EE 439 Intro. to Real-Time Operating
Systems (3+1) [F]
EE 432 Digital Control Systems (3) [F]
EE 472 Digital Control Systems Lab (1) [F]
CPE 416 Autonomous Mobile Robotics (3+1)

Get CPE202 and
CPE203 on your poly
Planner ASAP so spots
Are planned for.

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]

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]

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]

<http://www.ee.calpoly.edu/academics/>

Power

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**

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]

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]

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]

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]

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]

<http://www.ee.calpoly.edu/academics/>

Systems

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]

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]

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]

<http://www.ee.calpoly.edu/academics/>

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”

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

“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).

“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.

“Upgrade graduate course offerings and research to reflect current needs/trends for our graduate students and industry”

Computer Engineering Student Flow Chart

FRESHMAN			SOPHOMORE			JUNIOR			SENIOR			
Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	
Computer Engineering Orientation CPE 100 (1)	Fundamentals of Computer Science CPE 101 (4)	Data Structures CPE 202 (4) <small>(CPE 101, approved C++/MATLAB or 222, either 2 or 3)</small>	Project-Based Object-Oriented Programming & Design CPE 203 (4) <small>(CPE 101, approved C++ or Java, consent)</small>	Electric Circuit Analysis & Lab II EE 211 (3) AND EE 241 (1)	Electric Circuit Analysis & Lab III EE 212 (3) AND EE 242 (1)	Choose One: Signals and Systems CPE 327 (3) & CPE 367 (1) OR EE 228 (4)	Digital Electronics & Integrated Circuits EE 307 (3) AND EE 347 (1) <small>(CPE 101, EE 206, EE 346, CPE 203)</small>	Introduction to Operating Systems CPE 453 (4) <small>(CPE 450, CPE 226, CPE 452 or 253)</small>				
Introduction to Computing CPE 123 (4) ¹ <small>(Basic Computer Science)</small>		Electric Circuit Analysis and Lab EE 113 & EE 143 ² (4) <small>(MATH 144, Physics EE 143 & 142)</small>	Digital Design CPE 133 (4) ² <small>(CPE 100, 101)</small>	Computer Design and Assembly Language Programming CPE 233 (4) <small>(CPE 148)</small>	Systems Programming CPE 357 (4)			Introduction to Computer Networks CPE 464 (4) <small>(CPE 107, recommended STAT 315, 322, or 347)</small>				
					Discrete Structures CSC 348 (4) <small>(MATH 144 or CPE 100 & 101, or CPE 202 & 203, or consent)</small>			Microcontrollers & Embedded Applications CPE 316 (4) ² <small>(CPE 307, CPE 401, 211)</small>		Capstone II CPE 450 (3) ² <small>(CPE 348)</small>	Approved Technical Elective (4) ^{5,6} ***	
General Chemistry for Physical Science & Engineering I CHEM 124 (4) ² <small>(B5/B6)</small>	General Physics IA PHYS 141 (4) ² <small>(MATH 140, 400/141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000)</small>											
									Choose One Series: Senior Project I & II CPE 461 (3) <small>(CPE 450)</small>		CPE 462 (2) <small>(CPE 450)</small>	
									Research Senior Project I & II CSC 497 (2) <small>(CSC 407 or 303)</small>		CSC 498 (2) <small>(CSC 497)</small>	
Calculus I MATH 141 (4) ² OR (B1)	Calculus II MATH 142 (4) ² <small>(MATH 141, approved C++)</small> (B1)	Calculus III MATH 143 (4) ² <small>(MATH 142, approved C++)</small> (Add'l Area B)	Calculus IV MATH 241 (4) <small>(MATH 143)</small>	Linear Analysis I MATH 244 (4) <small>(MATH 243)</small>					Probability and Random Processes for Engineers STAT 350 (4) ² <small>(MATH 241, EE 229) (B5)</small>	Approved Technical Elective (4) ^{5,6} ***	Approved Technical Elective (4) ^{5,6} ***	
Expository Writing: ENGL 133 or 134 (4)** [A1] <small>Can be taken anytime during Freshman Year</small>												
Oral Communication: COMS 101 or 102 (4)** [A2] <small>Can be taken anytime during Freshman Year</small>												
Technical Writing for Engineers: ENGL 149 (4) <small>(Completion of GE-A, with a P or better, recommended; Completion of lab-A2) Can be taken anytime between Winter of Sophomore and Winter of Sophomore Years</small> [A3]												
								Graduation Writing Requirement: GWR* <small>(Students can exempt or fulfill the requirement after 96 earned units; students should complete the requirement before senior year)</small>				