Engineering Programs: How They Differ
How to Spot a Future Engineer

• They think Spring Break is a kind of metal fatigue
• They know the 2\textsuperscript{nd} law of thermodynamics, but not their own shirt size
• They look forward to assembling IKEA furniture
• To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the future engineer, the glass is twice as big as it needs to be.
Engineering vs Engineering Technology

- They are separate but closely related professional areas
- **Engineering**
  - Focus on theory and conceptual design
  - Multiple semesters of calculus and calculus-based, theoretical science courses
- **Engineering Technology**
  - Focus on application and implementation
  - Focus on algebra, trigonometry, applied calculus, and practical rather than theoretical courses
What to Look For in an Engineering Program

• More focused on theory/research or practical application?

• Program format (3/2, 4/2, 5 year w/co-op, foundational, 4 year with high units)

• How soon do students work with the “cool stuff?”

• Amount of focus on outcomes (grad schools, advisory boards, placement stats)?
ABET Accreditation – Why it Matters  www.abet.org

- Verifies that the quality of the educational experience meets the standards of the profession
- Enhances employment opportunities
- Eases entry to a technical profession through licensure, registration, and certification
- Establishes eligibility for many federal student loans, grants, or scholarships
Engineering in the CSU

- http://degrees.calstate.edu
- Engineering at 20 of the 23 campuses
- 120 units to 164 units
- Not all engineering is impacted.
- Four year graduation varies campus by campus – Reasons may surprise you.
- Advance standing
- CSU “Graduation Initiative”
- Low tuition – great return on investment
Engineering at CSU Maritime Academy (I)

• www.csum.edu/majors
• Three choices (35%-40% of our students)
  – Mechanical Engineering
  – Marine Engineering Technology
  – Facilities Engineering Technology
• All ABET accredited
• These programs are somewhat impacted for Fall 2018 and beyond.
Engineering at CSU Maritime Academy (II)

• As hands-on as it gets.
• Average class size of 20
• **After Year 1** - Required two month voyage on the *Golden Bear*
• **After Year 2** - Required two-month summer internship on ship or shore
• **After Year 3** - Second two-month voyage on the *Golden Bear* as a supervisor or a second internship on shore
### Total Units: 159

#### Writing Proficiency Requirement:
All junior students must demonstrate upper division writing competency as a graduation requirement. This may be fulfilled by passing either the Graduation Writing Exam or EGL 306 Advanced Writing.

<table>
<thead>
<tr>
<th>FALL 2016</th>
<th>SPRING 2017</th>
<th>SUMMER CRUISE 2017</th>
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<tbody>
<tr>
<td>CHE 110  General Chemistry 3.0</td>
<td>DL 105 Marine Survival 1.0</td>
<td>CRU150 Sea Training I 8.0</td>
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<td>CHE 110L General Chemistry Lab 1.0</td>
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<td>ET 110 Introduction to Engineering Technology 1.0</td>
<td>EPO 125 Introduction to Marine Engineering 3.0</td>
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<td>MTH 100 College Algebra and Trigonometry 4.0</td>
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<td>PE 101 Swim Competency Exam 0.0</td>
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<td>PE 102 Beginning/Intermediate Swimming (0.5)</td>
<td>LIB 100 Information Fluency in the Digital World 2.0</td>
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<td>NAU 104 VPDS 1.0</td>
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<tr>
<td>COM 2200 Programming Applications for Engr. Tech Majors Lab 1.0</td>
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<td>EPC 214 Bezier 1.0</td>
<td>ET 230 Properties of Materials 2.0</td>
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<td>EPC 215 Manufacturing Processes I 1.0</td>
<td>ET 232 Statics 3.0</td>
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<td>EPC 230 Steam Plant System Operations 1.0</td>
<td>ET 340 Fluid Mechanics 3.0</td>
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<td>MTH 211 Calculus II 4.0</td>
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<td>PHY 200 Engineering Physics I 3.0</td>
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<tr>
<td>ELEC 22 Humanities Elective (Upper Division) 3.0</td>
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<td>ET 250L Electrical Circuits Lab 1.0</td>
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<td>ET 330L Dynamics 1.0</td>
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<td>ET 332 Strength of Materials 3.0</td>
<td>ET 340 Fluid Mechanics 3.0</td>
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<td>ET 344 Thermodynamics 3.0</td>
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<td>FF 200 Basic/Advanced Marine Firefighting 1.0</td>
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<tr>
<th>FALL 2019</th>
<th>SPRING 2020</th>
<th>STCW Courses (Must receive a “C-” or higher, or “CR”)</th>
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<tbody>
<tr>
<td>ELEC 2 American Institutions Elective 3.0</td>
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<tr>
<td>ENG 430 Naval Architecture 3.0</td>
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<td>ET 350 Electrical Machinery 3.0</td>
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<td>ET 350L Electrical Machinery Lab 1.0</td>
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<td>ET 400 Instrumentation and Measurement 3.0</td>
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5/18/16 Subject to Change
Engineering at CSU Maritime Academy (IV)

- Corps of Cadets –
  - “Divisions” of Engineers
  - Real Leadership Experience
  - Professionalism

- 96% hired within a two months of grad.

Sonoma State University Electrical Engineering
Making engineering impactful and accessible
About me

- Currently an Assistant Professor at SSU in Engineering Science
- Born and raised in Vermont
- Undergrad in Electrical Engineering at McGill University (Montreal)
- PhD in Electrical Engineering at Stanford University
  - President of GradQ – LGBT graduate student organization
  - Served on Vice Provost’s Graduate Diversity Committee
  - Interned at IBM Research, Optical Link Group
  - Senior Scientist at Finisar Corp., Short-reach transceivers
- Director, Out for Undergrad Engineering Conference
  - LGBT non-profit – recruited LGBT undergrads nationally
- Vice President, Stanford Pride Board of Directors (LGBT non-profit)
What is electrical engineering?

• Consider your smartphone:

• Display: each pixel is a semiconductor device that is designed to emit light of a specific color
What is electrical engineering?

- Consider your smartphone:
  - Processor: does the thinking digitally. Designed based on Boolean logic – true / false statements

![Smartphone and Processor Image]

![Boolean Logic Diagram]
What is electrical engineering?

- Consider your smartphone:
- Antenna and receiver: captures electromagnetic signals, converts them to "1" and "0" for the processor to understand
What is electrical engineering?

- Consider your smartphone:
  - camera: lenses and semiconductor devices
Global information infrastructure
Internships and Jobs

Digilock

Google

PG&E

BERKELEY LAB

Calix

KEYSIGHT TECHNOLOGIES

Luma Optics, Inc.

Parker

Solar Installers, Inc.

BUCK INSTITUTE FOR AGE RESEARCH

CYAN
The Engineering Science Department – EE Program

- The only Electrical Engineering program in North Bay
- Offers 4-year B.S in EE. & M.S. in Computer Engineering
- Areas of program focus are
  - Electronics
    - Analog & Digital
    - Integrated Circuits (ICs)
    - Microelectronics
  - Communications
    - Wireless & RF Communications
    - Optical (Lasers & Optical fibers)
    - Networking (Internet-of-Things)
What Makes the Program Attractive....

- Small Class sizes (< 25 students in all major courses)
  - Dedicated Faculty & excellent Student-Faculty relationship
- Strong emphasis on hands-on activities & projects
  - Interdisciplinary & community-based projects
- Strong collaboration with local High Tech companies
- ES Lecture Series brings speakers to lecture on cutting edge technology & research
- Eight state-of-the-art laboratories
Laboratories for Hands-on Experience

- AFC Access Technologies Laboratory
- Agilent Technologies Communications Laboratory
- Rolf Illsley Photonics Laboratory
- William Keck Microanalysis Laboratory
- Networking Laboratory
- Human Computer Interaction Laboratory
- Software Engineering Laboratory
- Electronics Laboratory

24-Hour Access to Computer Labs    24-Hour Access to ES Labs
Completing Electrical Engineering Degree

Senior Design Project

Math  Science  GE


Skill-Building

3D-Printer
AUTO-CAD
Program.
Instrument.
Questions?