Engineering at CEM
Dr. Charlie Mayer
Associate Dean of Academics, CEM
Preview

• Engineering and Computer Science Overview
• Research Opportunities
• All CEM Disciplines
• Student Success
What do Engineers Do?

Damn near everything!
Degrees Offered

- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Geological Engineering
- Aerospace (minor)

- Mechanical Engineering
- Mining Engineering
- Petroleum Engineering
- Computer Science
- Chemical Engineering 2+2
Degrees Offered

• Civil Engineering
• Computer Engineering
• Electrical Engineering
• Geological Engineering
• Aerospace (minor)
• Masters Degrees

• Mechanical Engineering
• Mining Engineering
• Petroleum Engineering
• Computer Science
• Chemical Engineering 2+2
• PhD Degrees in Engineering
What is Engineering?

• Engineers apply **math and science** to benefit humankind.
• Engineers make a world of difference.
• Engineers are creative problem-solvers.
• Engineers help shape the future.
• Engineering is essential to our health, happiness and safety.
• Engineers turn ideas into reality.
Theodore Von Karman — “Scientists discover the world that exists; engineers create the world that never was.”

Albert Einstein — “Scientists investigate that which already is; Engineers create that which has never been.”
Who are some famous Engineers?

- Neil Armstrong - 1st person on the moon
- Alfred Hitchcock - Movie director
- Nancy J. Currie - Astronaut
- Herbie Hancock - Jazz musician
- Ferdinand Porsche - Automotive engineer
- Bill Nye - TV host of “Bill Nye the Science Guy”
- Michael Bloomberg - Billionaire former mayor of NYC
- Tom Landry - former Dallas Cowboys head coach and great football innovator, record 20 consecutive winning seasons
- Marissa Mayer - former Yahoo CEO, former Google engineer
- Jeff Bezos - founder/CEO of Amazon, world’s richest person.

35% of the CEO's of the top US companies have engineering degrees - the most common degree
Rewards + Opportunities of an Engineering Career

- Job satisfaction
- Varied opportunities
- Challenging work
- Intellectual development
- Social impact
- Financial security
- Prestige
- Professional environment
- Understanding how things work
- Creative thinking

A better life for the rest of your life!
Keys to Success in Engineering Study

- Effort - “Work Hard”
- Approach - “Work Smart”
- Attitude - “Think Positively”
Work Smart - Make Use of the Resources Available

- Engineering Tutoring Lab - Du 246
- Math Lab - Chap 305
- Ryan Smith - CEM Advisor - ELIF 338 - Fr, Soph?
  - rosmith@alaska.edu, http://cem.uaf.edu/academics/advising
- Department Advisors - Soph?, Jr, Sr
- 4-yr Course Flowcharts: cem.uaf.edu, Dept, Degrees & Programs
- Writing Center - Grue 801
- Speaking Center - Grue 507
- Academic Advising Center - Grue 509
  - 17 Student Success Workshops - check their website
  - Time management, Test taking, Overcoming anxiety, etc.
Undergraduate Student Research Opportunities

Dr. David Barnes, P.E.
Associate Dean of Research, CEM
Interim Director, Institute of Northern Engineering
ARCTIC INFRASTRUCTURE

Permafrost - Infrastructure Interaction

Greenhouse that maximizes renewable energy usage

Frost free vents for Arctic climates
ARCTIC HYDROLOGY

Understanding and Monitoring Arctic Watersheds

River Flooding

Sub-arctic Hydrology
RESOURCE RECOVERY

Enhanced Oil Recovery

Mineral Extraction and Processing
ENVIRONMENTAL QUALITY

Air Quality

Waste Treatment and Management

Water Quality and Treatment
Engineered Systems

Autonomous Vehicles (Katie Aikens)

Avalanche pouch system that can attach to any backpack

Alaska Research CubeSat

Naturally Inspiring.
Questions?

- Undergraduate Research and Scholarly Activity (URSA, uaf.edu/ursa)
- Institute of Northern Engineering (dlbarnes@uaf.edu)
- CEM Faculty
Civil Engineering

Our society rests on infrastructure built by civil engineers

Structures, Geotechnical, Environmental, Transportation

Water Resources, Construction
Computer Engineering

Dr. Dejan Raskovic
Associate Professor, Department of Electrical and Computer Engineering
Computer engineers are solving real engineering problems that require *the interaction* between hardware and software.

They work on projects, ranging from biomedical devices to game consoles and from home automation to smart phones.

At UAF, computer engineering students work on projects for NASA, private companies, and UAF researchers.
Computer Science

- https://www.youtube.com/watch?v=W0jUbUo4LeMQ
Electrical Engineering
Dr. Richard Wies
Chair, Department of Electrical and Computer Engineering
What do Electrical Engineers do?

- Design and develop real world **electrical**, **electronic**, and **control systems** for a diverse range of technologies.

Focus Areas at UAF

- Tele and Satellite Communications
- Embedded Systems
- Power and Energy Systems
- Control Systems

Laboratories and Research Opportunities

- Space Systems Engineering
- Unmanned Aeronautical Systems (Drones)
- Wireless Sensor Networks
- Power Electronics Design
- Power System Integration (Renewables)
Geological Engineering
Dr. Margaret Darrow
Professor, Department of Geological Engineering
GEOLOGICAL ENGINEERING - CLASSES
Mechanical Engineering

Dr. Rorik Peterson
Chair, Department of Mechanical Engineering
MECHANICAL ENGINEERING
University of Alaska Fairbanks (UAF)

MINING ENGINEERING

An exciting profession; a perfect blend of outdoor, indoor, and computer-based jobs

✔ History
  ➢ Since 1917: oldest major with over 100 years of history [Nationally Recognized]
  ➢ Northernmost ABET accredited Mining Program in the U.S.

✔ Student Success
  ➢ Mine design team won three national and international competitions and finished within top three five times in the last seven years
  ➢ Strong industry collaboration and support

✔ Scholarship Opportunities
  ➢ Most significant number of scholarships per major
  ➢ Average $4000 per student for 90% of Mining majors

✔ High Employment (in-State and beyond)
  ➢ Growing industry in Alaska
  ➢ Several new mines projected to open in next few years
  ➢ 100% job placement in most years (multiple offers)
  ➢ Employment possible in mining, geotechnical, civil and petroleum industries
  ➢ International employment (Australia, Africa, and South America)
  ➢ Summer and winter internship opportunities

✔ Great Salaries
  ➢ Average salary in Alaska Mining sector ~ $115K

✔ Active Student Club (UAF SME)

https://www.youtube.com/watch?time_continue=14&v=M1Ubbyn2vrc
Petroleum Engineering
Dr. Abhijit Dandekar
Chair, Department of Petroleum Engineering
❖ Our primary focus is student success!
❖ Two out of the five professors are distinguished members of the Society of Petroleum Engineers (SPE)!
❖ Three out of the five professors are SPE’s outstanding regional faculty award winners!

UAF SPE student chapter – winner of Gold Standard Award!
Requirements for Success

Intelligence

Motivation

Skills and Abilities

Transition to College Life

Success
Reasons for Failure

- Not keeping up in math (the language of science and engineering)
- Too "smart" or "important" or "busy" to do assignments (Clue: your grade is based on assignments, duh!)
- Think the primary purpose of college is to party
What College Is and Is Not
Clear up any Misconceptions

• College is an opportunity for a much better life, for the rest of your life
• College is a great freedom, but with freedom comes a responsibility
  – You are responsible for your actions, and for getting your work done (so make it a priority)
• For every hour in class, >3-4 hours outside
Undergraduate Activities

Steel Bridge
Micromouse Team
Alaska Student Rocket Project
Cube Sats
Collegiate Cyber Defense Competition
Unmanned Aerial Systems
Clubs and Organizations

- Air and Waste Management Association
- Alaska Native Science and Engineering Program
- American Association of Drilling Engineers
- American Indian Science and Engineering Society
- American Institute of Aeronautics and Astronautics
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Associated General Contractors of Alaska
- Association for Computing Machinery
- Association of Environmental and Engineering Geologists
- Aurora Robotics
- Civil Engineering Honor Society, Chi Epsilon
- Cyber Security Club
- Engineering Honor Society, Tau Beta Pi
- Institute of Electronic and Electrical Engineers
- Society of Hispanic Professional Engineers
- Society for Mining, Metallurgy, and Exploration
- Society of Petroleum Engineers
- Society of Women Engineers
Student Activities
Other Fun things

- Starvation Gulch bonfire
- UAF ski trail system
- Climbing wall
- UAF Outdoor Adventures
  - Rentals: skis, bikes, canoes, camping gear, etc
  - Planned activities: hiking, backpacking, canoeing, skiing, etc
  - Training: avalanche safety, bear safety, wilderness first aid, etc
Apply These Keys to Success in Engineering Study and Achieve Your Goals!

Effort - “Work Hard”

Approach - “Work Smart”

Attitude - “Think Positively”
To the TOP!

Ad Summum
Thanks for Attending!

Questions?