



SANTA CLARA UNIVERSITY

# Building the Next Generation of Engineers

**Samiha Mourad and Maryam Khanbaghi**

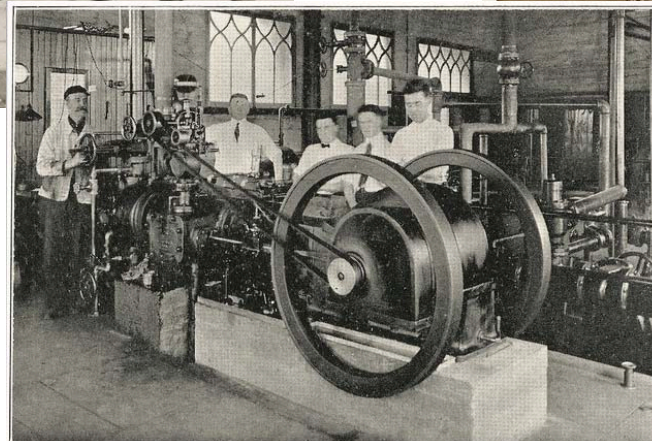
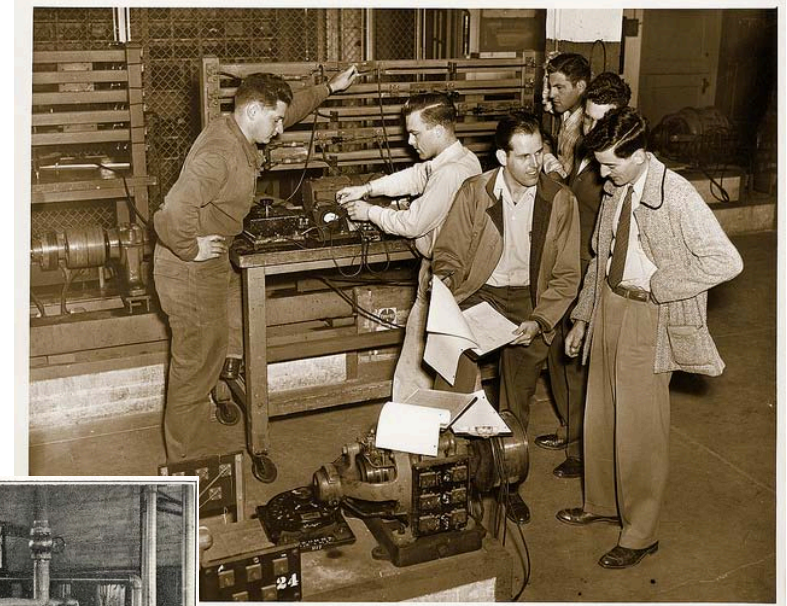
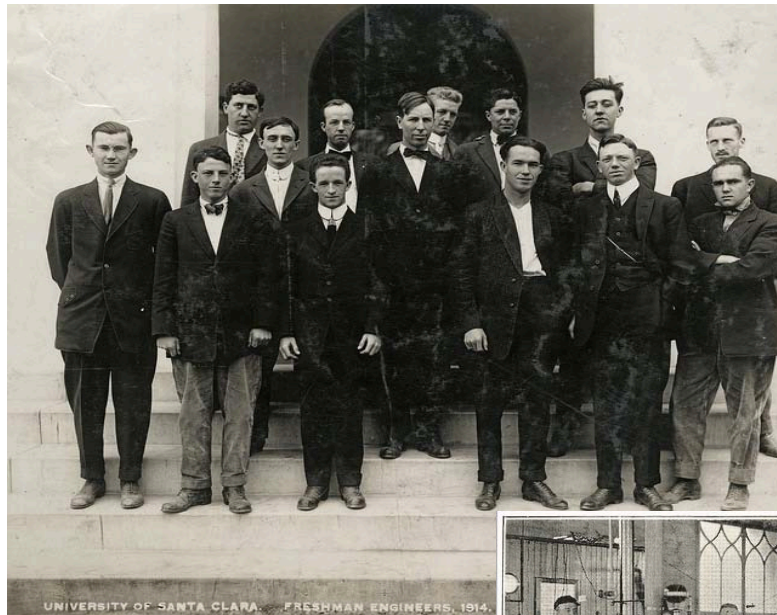
**Spring 2015**

**Email: [smourad@scu.edu](mailto:smourad@scu.edu) [mkhanbaghi@scu.edu](mailto:mkhanbaghi@scu.edu)**



# SANTA CLARA UNIVERSITY

## SCU School of Engineering is 100 years old





## Revitalizing Power and Energy Curriculum

### Graduate Curriculum

2006  
Initiative to add  
Energy  
concentration



Fall 2010  
Graduate  
certificate  
in Renewable  
Energy



Fall 2011  
Masters of  
Science in  
Renewable  
Energy

### Undergraduate Curriculum

Winter 2014  
Energy System  
Design course



Spring 2014  
Power Systems  
Analysis course



Winter 2015  
Two  
additional  
courses



## **Undergraduate Power and Energy Recent Projects and Achievements**

- **Participation in PES scholarship (2013 and 2014)**
- **Senior Design Projects (2014 – 2015)**
  - Smart Thermostat
  - Capacitor bank dynamic control
  - Energy Management tool suite



# SANTA CLARA UNIVERSITY

## Renewable Energy : An Old Love Affair





SANTA CLARA UNIVERSITY

# Sustainable Energy Master's Program

Electives

Specialization  
Core

Energy  
Core

Math  
Core

Sustain  
Core



## Energy Core

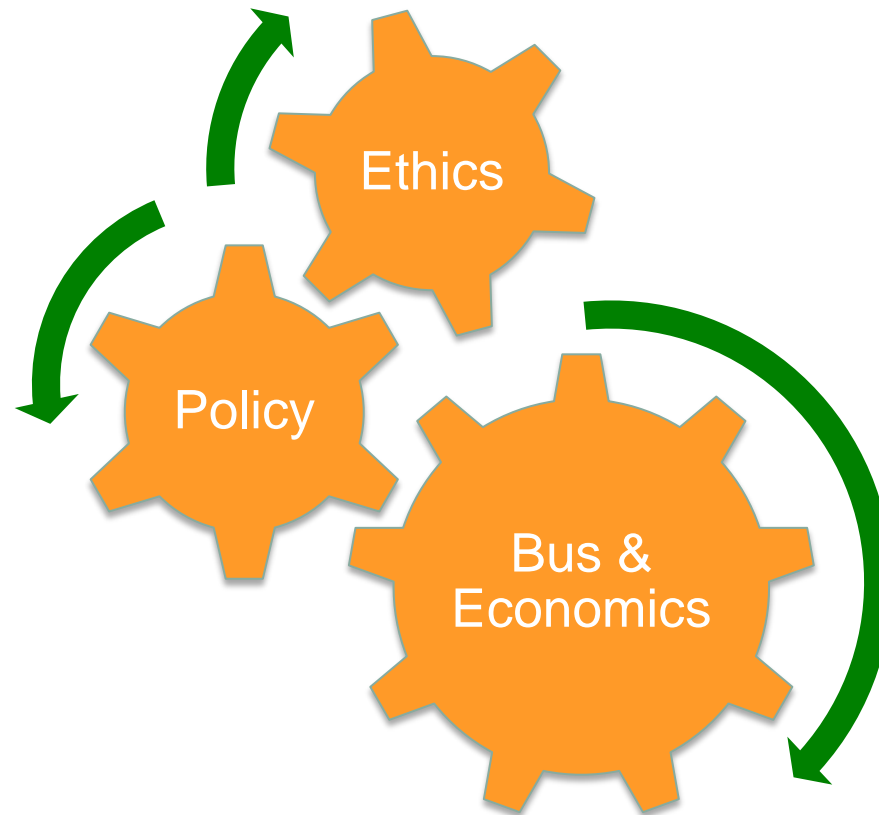
Alternative  
Energy

Power Systems

Smart Grid



## Sustainability Core







## Discipline Dependents

Control

Modeling  
Simulation

### General

Biofuels

Nuclear

### Special

Solar

Wind



## Courses

Program Component	Area of Concentration				Comments
	Mechanical	Electrical	Computer	Civil	
a) Mathematics	8	8	8	8	Depends on concentration
b) SE Core (energy)	4	4	4	4	Common to all concentration types
c) SE Core (sustainability)	6	6	6	6	Varies with engineering type
d) SE Concentration	8	8	6	13	Discipline dependent
e) Renewable Energy	4	4	–	–	Optional for Civil and Computer
f) Electives	15	15	21	14	May include a thesis (6-9 units)
Total # units	45	45	45	45	



## Selected Courses

- Alternative Energy Systems
- Energy Conversion
- Storage Systems
- Power Electronics
- Energy Public Policy

## Enrollment Data

Year	Enrollment
2005	20
2006	30
2007	40
2008	150
2009	200
2010	321
2011	463
2012	422
2013	408
2014	450



## Our Rewards

- IEEE Award
- Recent Graduates





## Where We Want to Be?

- **What does Industry need from Academia?**
- **What does Academia need from Industry?**
  - **How can we collaborate better?**