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## Bachelor of Engineering (BEng) MECHANICAL ENGINEERING Solar Energy Concentration

The curriculum of the BEng in Mechanical Engineering is designed for engineering students intending to launch a career in the design, installation, maintenance, and repair of solar energy conversion and storage devices, modules, and systems used for alternative energy sources or controllers. Coursework in the program is practice-oriented and prepares students to work in a variety of technology-intensive environments – engineering organizations, small or large businesses, product design or manufacturing companies, and alternative energy consultancies and public policy agencies. The breadth of training in hardware, software, power engineering, troubleshooting equipment and other technological tools will enable the graduate to work in a variety of roles in such environments as an electric grid engineer, a power engineering network designer, alternative energy engineer or project manager. The graduate of this curriculum will be a professional engineering specialist in solar energy power sources, but broadly versed in mathematics, physics, computer science, and business fundamentals.

### **The program objectives are the following:**

1. Graduates will be situated in growing careers involving design, development, and support of Mechanical Engineering and Solar Energy Systems.
2. Graduates will perform effectively individually and in teams.
3. Graduates will have demonstrated involvement in high technical and leadership roles.
4. Graduates will have accumulated the technical expertise to remain globally competitive.

### **Completion of this program should result in the following student outcomes:**

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to function on multidisciplinary teams.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for, and an ability to engage in life-long learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## **GENERAL EDUCATION (53 CRS)**

### **Area I: Communications (9 crs)**

ENG 111 English Composition I (3)  
ENG 116 Technical Writing (3)  
SPCH 130 Public Speaking (3)

**Area II: Mathematics (17 crs)**

MATH 145 Introduction to Probability and Statistics (3)  
MATH 162 Calculus I (4)  
MATH 163 Calculus II (4)  
MATH 314 Linear Algebra with Applications (3)  
MATH 316 Applied Ordinary Differential Equations (3)

**Area III: Laboratory Science (12 crs)**

CHEM 121/L General Chemistry II (4)  
PHYS 215/L Engineering Physics II (4)  
PHYS 216/L Engineering Physics III (4)

**Area IV: Social/Behavioral Sciences (6-9 crs)**

ECON 201 Microeconomics (3)  
Elective (3-6)\*

**Area V: Humanities and Fine Arts (6-9 crs)**

PHIL 220 Ethics (3)  
Electives (3-6)\*

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Electives in the General Education Common Core are to be chosen from Area IV and V as shown on pages 25-27.

**Health, Physical Education & Recreation (1 cr)**

Electives (1)

**MAJOR REQUIREMENTS (74 CRS)**

**Solar Energy and Storage (32)**

ME 160L General Engineering Design I (3)  
ME 202 Engineering Statics (3)  
ME 260L Engineering Design II (3)  
ME 301 Thermodynamics (3)  
ME 306 Dynamics (3)  
ME 317 Fluid Mechanics (3)  
ME 318L Mechanical Engineering Lab (3)  
ME 403 Solar Thermal Applications (3)  
ME 490 ME Capstone I (4)  
ME 491 ME Capstone II (4)

**Support Technologies (33)**

EECE 152 Computer Programming I (4)  
EECE 203L Circuit Analysis I (4)  
EECE 238L Computer Logic Design (4)  
EECE 371 Materials and Devices (3)  
EECE 453 Electric Energy Storage Devices (3)  
EECE 472 Photovoltaic Devices (3)  
Electives in CS/EECE/IT/ME at 2x-level (4)  
Electives in CS/EECE/IT/ME at 3x-level (4)  
Electives in CS/EECE/IT/ME at 4x-level (4)

**Business (9)**

Electives in ENGR at 4x-level (9)

**TOTAL CREDITS      128**

**SUGGESTED SEQUENCE OF COURSES**

HFA = Humanities & Fine Arts (Area V)

SBS = Social/Behavioral Science (Area IV)

**First Semester (16 crs)**

ENG 111 English Composition I (3)  
MATH 145 Introduction to Probability and Statistics (3)  
ECON 201 Microeconomics (3)  
PHIL 220 Ethics (3)  
CHEM 121/L General Chemistry IL (4)

**Second Semester (16 crs)**

ENG 116 Technical Writing (3)  
MATH 162 Calculus I (4)  
HFA/SBS Elective (3)  
HFA/SBS Elective (3)  
ME 160L Gen. Engineering Design I (3)

**Third Semester (18 crs)**

SPCH 130 Public Speaking (3)  
MATH 162 Calculus II (4)  
PHYS 215/L Engineering Physics I with Lab (4)  
EECE 152L Computer Programming I (4)  
ME 260L Engineering Design II (3)

**Fourth Semester (14 crs)**

PHYS 216/L Engineering Physics II with Lab (4)  
HPER Elective (1)  
MATH 314 Linear Algebra with Applications (3)  
MATH 316 Applied Ord Diff Equations (3)  
ENGR 4X Elective (3)

**Fifth Semester (17 crs)**

EECE 203L Circuit Analysis I (4)  
ME 202 Engineering Statics (3)  
ME 301 Thermodynamics (3)  
EECE 371 Materials and Devices (3)  
EECE 238L Computer Logic Design (4)

**Sixth Semester (16 crs)**

ME/EECE/CS/IT Elective in 2X (4)  
ME 306 Dynamics (3)  
ME 317 Fluid Mechanics (3)  
ME 318L Mechanical Engineering Lab (3)  
ENGR 4X Elective (3)

**Seventh Semester (17 crs)**

ME/EECE/CS/IT Elective in 3X (4)  
EECE 453 Electric Energy Storage Devices (3)  
ME 403 Solar Thermal Applications (3)  
HFA/SBS Elective (3)  
ME 490 Capstone I (4)

**Eighth Semester (14 crs)**

ME/EECE/CS/IT Elective in 4X (4)  
EECE 472 PV Devices (3)

ME 491 Capstone II (4)  
ENGR 4XX Elective (3)