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## Bachelor of Engineering (BEng) MECHANICAL ENGINEERING Solar Energy Concentration 2012-2014

The curriculum of the BEng in Mechanical Engineering is designed for those engineering students who intend 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 green technology 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, and alternative energy engineer or a project manager. The graduate of this curriculum will be a professional engineering specialist in solar energy power sources, but broadly versed in mathematics, physics, general design, computer science, and business fundamentals.

Failure to maintain an overall GPA of 2.00 or better in all coursework will be sufficient cause for being dropped from the program.

### **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 both individually and in teams.
3. Graduates will demonstrate involvement in high-level technical and leadership roles.
4. Graduates will accumulate 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. Knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### **GENERAL EDUCATION (61 CR)**

#### **Area I. Communications (9 cr)**

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

**Area II. Mathematics (21 cr)**

MATH	145	Introduction to Probability and Statistics (3)
MATH	162	Calculus I (4)
MATH	163	Calculus II (4)
MATH	264	Calculus III (4)
MATH	314	Linear Algebra with Applications (3)
MATH	316	Applied Ordinary Differential Equations (3)

**Area III. Laboratory Sciences (12 cr)**

CHEM	121/L	General Chemistry I with lab (4)
PHYS	215/L	Engineering Physics I with lab (4)
PHYS	216/L	Engineering Physics II with lab (4)

**Area IV. Social/Behavioral Sciences (6-9 cr)**

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

**Area V. Humanities and Fine Arts (6-9 cr)**

HUM	100	FYE: History and Culture of Northern New Mexico (3)
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Electives (3-6) Electives in the General Education Common Core are to be chosen from Area IV and V as shown on pages 26-27.

**Area VI. Library Technology, Library Research Skills (1 cr)**

LT	101	Library Research Skills (1)
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**Area VII. Foreign Language (3 cr)**

Elective (3)		
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**PROGRAM REQUIREMENTS (72 CR)****Solar Energy and Storage (42 cr)**

ME	160L	General Engineering Design I (3)
ME	202	Engineering Statics (3)
ME	301	Thermodynamics (3)
ME	302	Mechanics of Materials (3)
ME	306	Dynamics (3)
ME	317	Fluid Mechanics (3)
ME	318L	Mechanical Engineering Lab (3)
ME	320L	Heat Transfer (4)
ME	390	Power Systems (3)
ME	403	Solar Thermal Applications (3)
ME	495	Advanced Mechanical Engineering Design (3)
ME	490	ME Capstone I (4) (WIC)
ME	491	ME Capstone II (4)

**Support Technologies (21 cr)**

ENGR	110	Introduction to Engineering (3)
ENGR	120	Introductory Mathematics for Engineering Applications (4)
EECE	152	Computer Programming I (4)
EECE	203L	Circuit Analysis I (4)
EECE	453	Electric Energy Storage Devices (3)
EECE	472	Photovoltaic Devices (3)

**Electives (9 cr)**

Elective in ENGR/EECE/ME/MATH at 3XX/4XX-level (9)

**TOTAL CREDITS: 133**

## SUGGESTED SEQUENCE OF COURSES

FOR = Foreign Language (Area VII)

HFA = Humanities & Fine Arts (Area V)

SBS = Social/Behavioral Sciences (Area IV)

### First Semester (15 cr)

ENGR 120 Introductory Mathematics for Engineering Applications (4)  
EECE 152 Computer Programming I (4)  
ENGR 110 Introduction to Engineering (3)  
LT 101 Library Research Skills (1)  
HUM 100 FYE: History and Culture of Northern New Mexico (3)

### Second Semester (17 cr)

ENG 111 English Composition I (3)  
MATH 162 Calculus I (4)  
PHYS 215/L Engineering Physics I with lab (4)  
ME 160L Gen. Engineering Design I (3)  
MATH 145 Introduction to Probability and Statistics (3)

### Third Semester (18 cr)

MATH 163 Calculus II (4)  
PHYS 216/L Engineering Physics II with Lab (4)  
ME 202 Engineering Statics (3)  
CHEM 121/L General Chemistry I with lab (4)  
ECON 201 Microeconomics (3)

### Fourth Semester (16 cr)

EECE 203L Circuit Analysis I (4)  
ME 306 Dynamics (3)  
SPCH 130 Public Speaking (3)  
ENG 116 Technical Writing (3)  
ME 302 Mechanics of Materials (3)

### Fifth Semester (16 cr)

ME 301 Thermodynamics (3)  
Foreign Language (3)  
MATH 264 Calculus III (4)  
MATH 316 Applied Ordinary Differential Equations (3)  
HFA Elective (3)

### Sixth Semester (18 cr)

ME 317 Fluid Mechanics (3)  
ME 495 Advanced Mechanical Engineering Design (3)  
ENGR/EECE/ME/MATH Elective in 3XX/4XX (3)  
MATH 314 Linear Algebra with Applications (3)  
SBS Elective (3)  
EECE 472 PV Devices (3)

### Seventh Semester (17 cr)

ME 390 Power Systems(3)  
ME 320L Heat Transfer (4)  
ME 490 Capstone I (4)  
ME 318L Mechanical Engineering Lab (3)  
HFA/SBS Elective (3)

### Eighth Semester (16 cr)

EECE 453 Electric Energy Storage Devices (3)  
ME 491 Capstone II (4)

ENGR/EECE/ME/MATH Elective 3XX/4XXX (3)

ENGR/EECE/ME/MATH Elective 3XX/4XX (3)

ME 403 Solar Thermal Applications (3)