De Anza College
21250 Stevens Creek Blvd.
Cupertino, CA 95014
408-864-5678
www.deanza.edu

*Academic Year*
**2012 - 2013**

*Environmental Studies*

# Energy Management and Building Science

Biological, Health, Environmental Sciences Division/ES Dept.
Kirsch Center Room 218
408-864-8628, 8773

Counseling Center
Student and Community Services Bldg. 2nd Fl.
408-864-5400

Career Services Info.
Student and Community Services Bldg. 2nd Fl.
408-864-5400

Please visit the Counseling Center to apply for certificates and degrees, and for academic planning assistance.

### *Certificate of Achievement Level Requirements*

A minimum "C" grade in each major course.
Note: A maximum of six (6) quarter units may be transferred from other academic institutions.

### *Certificate of Achievement-Advanced Level Requirements*

1. A minimum "C" grade in each major course.
2. Demonstrated proficiency in English and mathematics as evidenced by eligibility for EWRT 1A or ESL 5 and eligibility for MATH 114.
   Note: A maximum of 18 quarter units may be transferred from other academic institutions.

### *A.A./A.S. Degree Requirements*

1. Completion of all General Education (GE) requirements (31-42 quarter units) for the A.A./A.S. degree. GE units must be completed with a minimum 2.0 GPA ("C" average).
2. Completion of all major requirements. Each major course must be completed with a minimum "C" grade.
   Major courses can also be used to satisfy GE requirements (except for Liberal Arts degrees).
   Note: A maximum of 22 quarter units from other academic institutions may be applied toward the major.
3. Completion of a minimum of 90 degree-applicable quarter units (GE and major units included). All De Anza courses must be completed with a minimum 2.0 GPA ("C" average). All De Anza courses combined with courses transferred from other academic institutions must be completed with a minimum 2.0 GPA ("C" average).
   Note: A minimum of 24 quarter units must be earned at De Anza College.

*Major courses for certificates and degrees must be completed with a letter grade unless a particular course is only offered on a pass/no-pass basis.*

## Energy Management and Building Science

### *Certificate of Achievement*

This program trains students in 21st century energy management/climate policy principles, practices, and technology; environmental science principles; laws of thermodynamics; and effective design and management of energy systems and a sustainable society based on energy efficiency principles. The program will also prepare students in Level 1 introductory energy management practices, protocols, monitoring and evaluation of energy equipment and systems.

*Student Learning Outcomes - upon completion, students will be able to:*

- investigate and communicate the relationships between energy management/climate policy and ecological principles and evaluate the role of energy management in fostering a sustainable society.
- demonstrate an understanding of energy management principles, laws of thermodynamics, effective design of energy systems and a sustainable society utilizing energy management systems.

1. Meet the requirements for this certificate level.
2. Complete the following.

| | | |
|---|---|---|
| ES 1 | Introduction to Environmental Studies | 4 |
| ES 58 | Introduction to Green Building | 1 |
| ES 64 | AB 32 (CA Global Warming Solutions Act of 2006) | 1 |
| ES 65 | Environmental Stewardship | 1 |
| ES 66 | Environmental Leadership | 1 |
| ES 67 | Environmental Team-Building | 1 |
| ES 69 | Energy Reliability and Your Organization | 1 |
| ES 70 | Introduction to Energy Management Technology | 1 |
| ES 70LX | Energy Management Technology and Principles of Building Performance Lab. | 1 |
| ES 71 | The Building Envelope | 1 |
| ES 71LX | The Building Envelope & Climate Responsive Building Design/Construction Lab. | 1 |
| ES 72 | Heating, Ventilating & Air Conditioning (HVAC) Systems | 1 |
| ES 73 | Electric Motors and Drives | 1 |
| ES 74 | Lighting Distribution Systems | 1 |
| ES 75 | Electric Power Systems | 1 |
| ES 76 | Energy Star Products | 1 |
| ES 76A | Solar Thermal Systems | 1 |
| ES 78 | Energy Management Systems and Controls | 1 |
| ES 79 | Renewable and Alternative Energy Systems | 1 |
| ES 79LX | Renewable and Alternative Energy Systems Lab. | 1 |
| ESCI 61 | Introduction to Photovoltaic (PV) Technology | 3 |
| | Total Units Required . . . . . | 26 |

## Energy Management and Building Science

### *Certificate of Achievement-Advanced*

This program trains students in 21st century energy management/climate policy principles, practices, and technology; environmental science principles; laws of thermodynamics; and effective design and management of energy systems and a sustainable society based on energy efficiency principles. The program will also prepare students in Level 2 advanced field-based practices in energy management protocols, monitoring and evaluation of energy equipment and systems.

*Student Learning Outcomes - upon completion, students will be able to:*

- investigate and communicate the relationships between energy management/climate policy and ecological principles and evaluate the role of energy management in fostering a sustainable society.
- demonstrate an understanding of energy management principles, laws of thermodynamics, effective design of energy systems and a sustainable society utilizing energy management systems.
- apply these concepts and techniques to local and statewide case studies to develop strategies for implementing effective energy management systems.

1. Meet the requirements for this certificate level.
2. Complete the Certificate of Achievement course requirements. 26
3. Complete the following.

| | | |
|---|---|---|
| ES 6 | Introduction to Environmental Law | 4 |
| ES 61A | Environmental Protection and Pollution Prevention: Local and Regional | 4 |

*Complete a minimum of eight (8) units from the following:* 8
*(Note: Lab units completed for the Certificate of Achievement do not count toward these eight units.)*

ES 70LX, 70LY, 70LZ (1-3 units)
Energy Management Technology and Principles of Building Performance Laboratory
ES 71LX, 71LY, 71LZ (1-3 units)
The Building Envelope and Climate Responsive Building Design/Construction Laboratory
ES 72LX, 72LY, 72LZ (1-3 units)
Heating, Ventilation and Air Conditioning (HVAC) Systems Laboratory
ES 78LX, 78LY, 78LZ (1-3 units)
Energy Management Systems and Controls Laboratory
ES 79LX, 79LY, 79LZ (1-3 units)
Renewable and Alternative Energy Systems Laboratory

ESCI 63 Photovoltaic (PV) Technology Field Project (2)

Total Units Required . . . . . .42

## Energy Management and Building Science

***A.A. Degree***

This program trains students in 21st century energy management/climate policy principles, practices, and technology; environmental science principles; laws of thermodynamics; and effective design and management of energy systems and a sustainable society based on energy efficiency principles. The program also prepares students in Level 2 advanced field-based practices in energy management protocols, monitoring and evaluation of energy equipment and systems. The trained Energy Management Technician is able to apply these practices and principles to local and statewide case studies and collaborate with key stakeholders in the energy management/climate policy field.

*Student Learning Outcomes - upon completion, students will be able to:*

- investigate and communicate the relationships between energy management/climate policy and ecological principles and evaluate the role of energy management in fostering a sustainable society.
- demonstrate an understanding of energy management principles, laws of thermodynamics, effective design of energy systems and a sustainable society utilizing energy management systems.
- apply these concepts and techniques to local and statewide case studies to develop strategies for implementing effective energy management systems.
- identify and interact with the key stakeholders in energy management/climate policy including the public, governmental agencies, industry, and non-profits to enhance global, cultural, social and environmental well-being.

1. Meet the AA/AS degree requirements.
2. Complete the course requirements listed for the Certificate of Achievement and the Certificate of Achievement-Advanced. 42
3. Complete the following.

| | | |
|---|---|---|
| ES 95 | Introduction to Environmental Careers | 1 |
| ESCI 1 | Environmental Science I | 4 |
| ESCI 1L | Environmental Science I Lab | 1 |

*Complete a minimum of four (4) units from the following:* 4

| | |
|---|---|
| ES 50 | Introduction to Environmental Protection and Pollution Prevention (4) |
| ES 55 | Ten Steps to Effective Learning in Environmental Studies (1) |
| ES 61B | Environmental Protection and Pollution Prevention: State and Federal (4) |
| ES 63 | Agenda 21: Blueprint for Sustainability (1) |
| ES 68 | Community-Based Coalitions & Stakeholders (1) |
| ES 90 | Environmental Research and Field Methods (4) |
| ES 95B | Environmental Studies Internships (2) |
| ESCI 50 | Introduction to Wildlife Corridor Technician: Connectivity (4) |

| | | |
|---|---|---|
| *Major* | *Energy Management and Building Science* | *52 units* |
| *GE* | *General Education (31-42 units)* | |
| *Electives* | *Elective courses req'd. when major units plus GE units total is less than 90* | |
| | *Total Units Required . . . . . 90 units* | |