



21250 Stevens Creek Blvd.  
Cupertino, CA 95014  
408-864-5678  
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Academic Year  
**2016 - 2017**

## Environmental Studies

# Energy Management and Building Science

Biological, Health and  
Environmental Sciences Division  
Kirsch Center, Room 228  
408-864-8773

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

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

### Certificate of Achievement 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 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 EWRT 1AH 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

The Certificate of Achievement - Energy Management and Building Science will prepare students for new and emerging career opportunities in energy management technology, building energy audit, facilities management, building design and sustainability, and renewable energy systems. Completion of the Certificate of Achievement provides an introduction to energy efficiency techniques and principles and prepares students for careers in managing and monitoring energy efficient buildings. The certificate curriculum is aligned with professional certifications offered by the International Facilities Management Association (IFMA), including Facilities Management Professional (FMP) and Sustainable Facilities Professional (SFP). Students will also be well prepared for the certification test for Renewable (Solar) Energy Professional offered by the North American Board of Certified Energy Practitioners (NABCEP).

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

- investigate and analyze energy use and its relationship to non-renewable energy extraction, production, distribution, consumption and greenhouse gas emissions.
- apply an understanding of energy management and building science principles, techniques and strategies, the laws of thermodynamics, and the sustainable use of resources supporting the built environment.

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

|                            |                                                                          |    |
|----------------------------|--------------------------------------------------------------------------|----|
| E S 58                     | Introduction to Green Building                                           | 1  |
| E S 69                     | Energy Reliability and Your Organization                                 | 1  |
| E S 70                     | Introduction to Energy Management Technology                             | 1  |
| E S 70B                    | Advanced Energy Management Technology                                    | 2  |
| E S 71                     | The Building Envelope                                                    | 1  |
| E S 72                     | Heating, Ventilating and Air Conditioning (HVAC) Systems                 | 1  |
| E S 72B                    | Advanced Heating, Ventilating and Air Conditioning (HVAC) Systems        | 2  |
| E S 74                     | Lighting Distribution Systems                                            | 1  |
| E S 75                     | Electric Power Systems                                                   | 1  |
| E S 75B                    | Advanced Electric Power Systems                                          | 2  |
| E S 78                     | Energy Management Systems and Controls                                   | 1  |
| E S 81                     | Leadership in Energy and Environmental Design / Sustainability Codes     | 2  |
| E S 82                     | Project Management and Technical Report Writing for Energy Professionals | 2  |
| E S 95B                    | Environmental Studies Internship                                         | 2  |
| Total Units Required ..... |                                                                          | 20 |

## Energy Management and Building Science

### Certificate of Achievement-Advanced

The Certificate of Achievement-Advanced Energy Management and Building Science will prepare students for new and emerging career opportunities in energy management technology, building energy audit, facilities management, building design and sustainability, and renewable energy systems. Completion of the Certificate of Achievement-Advanced provides an intermediate level of analysis in energy efficiency principles and prepares students for careers in managing and monitoring energy efficient buildings. The certificate curriculum is aligned with professional certifications offered by the International Facilities Management Association (IFMA), including Facilities Management Professional (FMP) and Sustainable Facilities Professional (SFP). Students will also be well prepared for the certification test for Renewable (Solar) Energy Professional offered by the North American Board of Certified Energy Practitioners (NABCEP).

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

- investigate and analyze energy use and its relationship to non-renewable energy extraction, production, distribution, consumption. and greenhouse gas emissions.
- apply an understanding of energy management and building science principles, techniques and strategies, the laws of thermodynamics, and the sustainable use of resources supporting the built environment.
- demonstrate knowledge of the above objectives and strategically conceptualize and implement efficient and sustainable energy management policies, procedures and systems in residential and commercial buildings.

1. Complete the Certificate of Achievement requirements. 20
2. Meet the requirements for this certificate level.
3. Complete the following.

|                                   |                                                 |           |
|-----------------------------------|-------------------------------------------------|-----------|
| E S 64                            | AB 32 (CA Global Warming Solutions Act of 2006) | 1         |
| E S 71B                           | Advanced Building Envelope                      | 2         |
| E S 74B                           | Advanced Lighting Distribution Systems          | 2         |
| E S 76                            | Energy Star Products                            | 1         |
| E S 76A                           | Solar Thermal Systems                           | 1         |
| E S 78B                           | Advanced Energy Management Systems and Controls | 2         |
| E S 79                            | Renewable and Alternative Energy Systems        | 1         |
| E S 83                            | Energy Management Return on Investment          | 2         |
| E S 84                            | Residential Solar Design and Installation       | 1         |
| <b>Total Units Required .....</b> |                                                 | <b>33</b> |

## Energy Management and Building Science A.S. Degree

The A.S. degree - Energy Management and Building Science will prepare students for new and emerging career opportunities in energy management technology, building energy audit, facilities management, building design and sustainability, and renewable energy systems. Completion of the degree program provides students with a skilled knowledge of energy efficiency principles and prepares them for careers in managing and monitoring energy efficient buildings. The program curriculum is aligned with professional certifications offered by the International Facilities Management Association (IFMA), including Facilities Management Professional (FMP) and Sustainable Facilities Professional (SFP). Students will also be well prepared for the certification test for Renewable (Solar) Energy Professional offered by the North American Board of Certified Energy Practitioners (NABCEP).

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

- investigate and analyze energy use and its relationship to non-renewable energy extraction, production, distribution, consumption and greenhouse gas emissions.
- apply an understanding of energy management and building science principles, techniques and strategies, the laws of thermodynamics, and the sustainable use of resources supporting the built environment.
- demonstrate knowledge of the above objectives and strategically conceptualize and implement efficient and sustainable energy management policies, procedures and systems in residential and commercial buildings.

- engage with key stakeholders in Energy Management and Building Science occupations including the public, government agencies, public industry, manufacturing and non profits to enhance, improve and advocate for global, cultural, social, and environmental health and well being

1. Complete the Certificate of Achievement and the Certificate of Achievement-Advanced requirements. 33
2. Meet the A.A./A.S. degree requirements.
3. Complete the following.

## Complete 17 units: 17

|          |                                                                                          |
|----------|------------------------------------------------------------------------------------------|
| E S 1    | Introduction to Environmental Studies (4)                                                |
| E S 61A  | Environmental Resource Management and Pollution Prevention: Air, Water and Land (3)      |
| E S 62B  | Environmental Management Tools: CEQA and Environmental Impact Report (EIRs) (3)          |
| E S 62D  | Environmental Management Tools: Industrial Ecology and Sustainable Design Principles (3) |
| E S 66   | Environmental Leadership (1)                                                             |
| E S 95   | Introduction to Environmental Careers (1)                                                |
| E S 95A  | Environmental Studies Internship (1)                                                     |
| E S 95C  | Environmental Studies Internship (3)                                                     |
| E S 95D  | Environmental Studies Internship (4)                                                     |
| ESCI 1   | Environmental Science (4)                                                                |
| ESCI 61  | Introduction to Photovoltaic (PV) Technology (3)                                         |
| MATH 114 | College Math Preparation Level 3: Intermediate Algebra (5)                               |
| MET 10   | Weather and Climate Processes (5)                                                        |
| PHYS 10  | Concepts of Physics (5)                                                                  |

|                                   |                                                                                |           |
|-----------------------------------|--------------------------------------------------------------------------------|-----------|
| Major                             | Energy Management and Building Science                                         | 50        |
| GE                                | General Education (31-42 units)                                                |           |
| Electives                         | Elective courses required when major units plus GE units total is less than 90 |           |
| <b>Total Units Required .....</b> |                                                                                | <b>90</b> |