# Energy Analysis and Consultation – Associates Degree

## Item 1. Program Goals and Objectives

The Energy and Geo-Environmental Engineering (EGEE) Program offers a comprehensive study of various resources that power the modern society. The EGEE Program course of study promotes accelerating clean technology innovation as well as adopting sustainable business practices for the benefit of the economy and the environment. Particular focus is directed toward basic understanding and appreciation of energy and environmental concepts and interconnectedness. The EGEE Program offers a series of complementary certificates that may be used for job placement and advancement in the field. When combined with the appropriate general education and graduation requirements, an EGEE Program certificate leads to an Associate in Science degree that may be used for advanced job placement in the field.

## Item 2. Catalog Description

The Associates Degree in Energy Analysis and Consultation provides students with a comprehensive education in energy retrofits, green building construction, and building operations. This curriculum prepares students for a career in the clean energy industry specific to the built environment. This course of study covers topics ranging from energy auditing, energy efficiency, solar energy retrofits, green construction, HVAC integration, and zero-net energy design. This pathway includes preparation for industry-recognized certifications geared towards leading businesses in the energy efficiency and renewable energy industry.

Students who successfully complete the award will be able to:

* Recognize conservation strategies and energy saving measures by examining the house-as-a-system.
* Evaluate current issues and technologies regarding greenhouse gases, indoor air quality, building decarbonization, and the ozone layer;
* Compare and contrast the advantages and disadvantages of energy resources in terms of the effects on the environment;
* Describe the relationship between energy use and society;
* Apply various types of energy ratings and performance metrics;
* Identify relevant building codes that govern energy efficiency, energy systems, and green buildings; and
* Evaluate renewable energy and energy storage technology, performance, benefits, and costs.

### Career Goals

Some careers in energy and geo-environmental engineering require education beyond the associate degree and some require a graduate degree. This is not a comprehensive list but some of the most common career options with a degree in energy and geo-environmental engineering include: energy consultant, energy manager, energy auditor, building analyst, green HVAC/R professionals, envelope professionals, solar energy installation managers, solar photovoltaic installer, and weatherization installers and technicians, and various other green careers.

## Item 3. Program Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSES REQUIRED FOR THE MAJOR:** | | **UNITS** | **RECOMMENDED SEQUENCE** |
| [EGEE 050](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=24099&rpt=pdf) | Building Science Principles | 3 | Fall 1 |
| [EGEE 055](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=24086&rpt=pdf) | Air Quality Management and Systems | 3 | Fall 1 |
| [EGEE 070](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=23935&rpt=pdf) | Energy Industry Principles | 3 | Fall 1 |
| [EGEE 072](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=23960&rpt=pdf) | Energy Conservation Strategies | 3 | Fall 1 |
| [EGEE 078](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=24269&rpt=pdf) | Solar Electric Systems | 3 | Spring 1 |
| [EGEE 080](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=24161&rpt=pdf) | Energy Storage | 3 | Spring 1 |
| [EGEE 085](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=24666&rpt=pdf) | Energy Standard Practice | 3 | Spring 1 |
| [EGEE 098](http://www.curricunet.com/SDCCD/reports/course_outline.cfm?courses_id=25031&rpt=pdf) | Energy Service Entrepreneurship | 3 | Spring 1 |
| **Total Units** **24** | | | |

General Education

In addition to the courses listed above, students must complete one of the following general education options:

* The LOCAL/DISTRICT pattern ([San Diego City College Catalog 2019 - 2020](http://www.sdccd.edu/docs/StudentServices/catalogs/2019-2020/City_2019-2020_catalog.pdf), page 96) of General Education coursework allows students to receive an Associate of Arts or an Associate of Science degree from San Diego City College. It is accepted for transfer to some private/independent institutions.
* The IGETC pattern ([San Diego City College Catalog 2019 - 2020](http://www.sdccd.edu/docs/StudentServices/catalogs/2019-2020/City_2019-2020_catalog.pdf), page 121) is accepted by all CSU campuses and most UC campuses and majors. It is also accepted by some private/independent or out of state universities.
* The CSU GE pattern ([San Diego City College Catalog 2019 - 2020](http://www.sdccd.edu/docs/StudentServices/catalogs/2019-2020/City_2019-2020_catalog.pdf), page 130) is accepted by all CSU campuses and some private/independent or out of state universities. It is not accepted by the UC system.

It is strongly recommended students consult with a counselor to determine which general education option is most appropriate for their individual educational goals.

**Summary of the units required for the Associate of Science in Green Building Energy Professional:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **UNITS** | | |
| **Major Requirements** | 24 | | |
|  | **CSU** | **IGETC** | **LOCAL / DISTRICT** |
| **Double Counted** | 0 | 0 | 0 |
| **General Education\*** | 39 | 37 | 25 |
| **Open Electives\*\*** | 0 | 0 | 11 |
| **TOTAL** | **60** | **60** | **60** |

\*Some courses may be applied to both major and general education requirements (i.e. “double counting”). Units associated with those courses are subtracted in order to arrive at an accurate calculation of total units required for the degree.

\*\*Electives as needed to meet minimum of 60 units required for the degree.

## Item 4. Master Planning

San Diego City College has as its highest priority student learning and achievement. The College provides lower division and general education courses that lead to certificates, associate degrees or transfer to a four-year college or university; career technical education programs that meet specific industry needs, upgrade the employment skills of students and fulfill licensing requirements of the state of California as well as contribute to the economic development of our region; basic skills instruction to assist all students in meeting their educational goals; and essential student support services for all students.

### Student Selection

The award will observe the open enrollment required for California community college courses (California Code of Regulations, Title 5, § 51006 and §§ 58100-58108).

### Need

According to the December 2018 Centers of Excellence Occupations for Energy and Geo-Environmental Engineering labor market analysis for San Diego County, there is a demand for occupations that could be trained by an Energy and Geo-Environmental Engineering program. Between 2017 and 2022, Energy and Geo-Environmental Engineering Occupations are projected to increase by 1,953 jobs or seven percent.

According to the State of California Employment Development Department, projections of employment for the 2014 – 2024 for energy and Geo-Environmental Engineering occupations are expected to increase by 1,463 by 2024 in the San Diego-Carlsbad area for manufacturing positions.

Table 1: Occupational Project of Employment 2016-2026

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Occupation** | **Employment** | | **Employment Change** | | **Annual Avg Openings** |
| **Estimated** | **Projected** | **Number** | **Percent** |
| Business Operations Specialists, All Other  (SOC Code : 13-1199) | 14,280 | 15,600 | 1,300 | 9.2 | 1,463 |

Source: <https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSSelection.asp?>

The Clean Energy industry is a promising industry in San Diego. With over 9,985 businesses in energy efficiency and renewable energy, there are a total of 137,399 people employed in the clean energy industry. Prospective students have a 7 percent growth in the industry in the next five years and expect an average annual salary of $65,891.

Sample of San Diego Local Employers:

|  |  |  |
| --- | --- | --- |
| **COMPANY NAME** | **DESCRIPTION** | **NUMBER OF EMPLOYEES** |
| Renovate America  Est. 2008 | Assists homeowners in applying for PACE financing to make energy efficiency improvements to their homes | 501 – 1,000 |
| CP Group  Est. 1954 | Manufactures advanced recycling equipment and systems and waste management systems with multiple locations | 201 – 500 |
| EDF Renewable Energy  Est. 1987 | Produces renewable energy for utilities, commercial and industrial, and corporate entities | 1,001 – 5,000 |
| San Diego Gas & Electric  Est. 1905 | Regulates public utility and incentivizes customers to have energy efficient homes | 5,001 – 10,000 |
| Solar Turbines  Est. 1927 | Manufacturers industrial gas turbines able to operate on a wide variety of fuels, including renewable fuels | 5,001 – 10,000 |
| General Atomics  Est. 1955 | Specializes in nuclear technologies, which provide energy while emitting little to no greenhouse gasses | 5,001 – 10,000 |

As proof of the thriving employment climate, Indeed (Feb. 2017) had 115 HVAC jobs posted in the SD area, including opportunities at United Plumbing Heating Air Electric, Electronic Environments Corp, Sears Carpet & Air Duct Cleaning, the Port of San Diego, Performance Refrigeration & HVAC, Legacy Air, Source Refrigeration and HVAC, Anderson Plumbing Heating and Air, John Stevenson Plumbing & Mechanical, Inc., Qualcomm, SOAL Technologies, LLC, Electronic Environments Corp, AvalonBay Communities, Electronic Environments Corp, and Sony Interactive Entertainment PlayStation, to name a few. Monster (Feb. 2017) had a wealth of additional openings with employers such as Tradesmen International, Inc., C&L Refrigeration, Paragon Services Engineering, Epsilon Systems Solutions, Inc., The Glen at Scripps Ranch, and Sodexo.

Visit <https://www.hvacclasses.org/schools/california/san-diego> for more details.

## Item 5. Enrollment and Completer Projections

(A) Enrollment Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | **2017 – 2018** | | **2018 - 2019** | |
| **CB01: Course Department Number** | **CB02: Course Title** | **Annual # Sections** | **Annual Enrollment Total** | **Annual # Sections** | **Annual**  **Enrollment Total** |
| EGEE 050 | Building Science Principles | \* | \* | \* | \* |
| EGEE 055 | Air Quality Management and Systems | \* | \* | \* | \* |
| EGEE 070 | Energy Industry Principles | \* | \* | \* | \* |
| EGEE 072 | Energy Conservation Strategies | \* | \* | \* | \* |
| EGEE 078 | Solar Electric Systems | \* | \* | \* | \* |
| EGEE 080 | Energy Storage | \* | \* | \* | \* |
| EGEE 085 | Energy Standard Practice | + | + | + | + |
| EGEE 098 | Energy Service Entrepreneurship | + | + | + | + |

\*New course. Course is scheduled to be offered for 2019 – 2020 academic year.

+New course. Course is scheduled to be offered starting Fall 2021.

## Item 6. Place of Program in Curriculum/Similar Programs

After reviewing San Diego City College’s existing program inventory in the CCC Curriculum Inventory, the following questions have been addressed:

1. Do any active inventory records need to be made inactive or changed in connection with the approval of the proposed program? If yes, please specify.  
   *No active inventory records will need to be inactive or revised in connection with the approval of this proposed program. This is a new award to San Diego City College.*
2. Does the program replace any existing program(s) on the college’s inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).  
   *This award does not replace any existing program(s) on the college’s inventory.*
3. What related programs are offered by the college?

* Certificate of Performance
  + Basic Refrigeration and Control Systems
* Certificate of Achievement
  + Advanced Air Conditioning and Direct Digital Control
  + Advanced HVACR Mechanical Systems Installation and Repair
  + Air Conditioning, Heating, and Advanced Refrigeration
  + Basic HVACR Mechanical Systems Installation
  + Green Building Energy Professional
  + Heating, Ventilation, and Air Conditioning Design
  + Mechanical Systems and Solid-State Electronics Technician
  + Mechanical Systems Project Development
* Associate of Science
  + Air Conditioning, Refrigeration, and Environmental Control Technology
  + Green Building Energy Professional
  + HVACR Mechanical Systems Installation and Repair
  + Mechanical Systems and Solid-State Electronics Technician
  + Mechanical Systems Project Development

## Item 7. Similar Programs at Other Colleges in Service Area

There are no other programs within the San Diego Community College District or in the San Diego & Imperial Valley area offering the Associate of Science in Energy Analysis and Consultation.