

RENEWABLE ENERGY, B.TECH.

Major Code: 2398

The Renewable Energy Bachelor of Technology (RE B.Tech.) degree provides students with advanced technical education in the rapidly growing field of renewable energy. The RE B.Tech. program focuses on developing skilled graduates who are prepared to enter the job market as system designers, project managers, installation crew leaders, and operations and maintenance technicians for renewable energy systems including grid-tied solar photovoltaic, solar thermal, wind, heat pump, micro hydroelectric and bioenergy systems.

Students have a well-guided program that covers a wide range of important skills including installation and maintenance of energy systems, electrical and mechanical system design with contemporary software packages, and project management and permitting. Our installation classes focus strongly on real-world systems in state-of-the-art facilities. Graduates are prepared to climb career ladders quickly within a focus area of their choosing.

An internship is a recommended program option (3-15 credit hours) that places students in a supervised work environment with a cooperating employer. This provides students with opportunities to gain valuable experience, make professional contacts and build their resumes in preparation for future employment and career decisions. Many placement sites are available in New York State, but students who wish to travel can find opportunities in other parts of the country or abroad. Successful internships have included experiences in solar and wind energy, cellular communications, geothermal/HVAC, bioethanol production, and bioenergy systems.

Graduates from the RE B.Tech. have been successfully employed as system designers, installation and maintenance technicians, quality control supervisors, and project managers. Graduates are currently working within their chosen renewable energy field in several states across the country and abroad.

Required tools/equipment: Laptop, Klein Tool Kit (available through the bookstore), clipboard, safety glasses, work gloves, work boots (steel/safety toe), waterproof rubber boots (recommended), rain gear (coat and pants/bibs), and cold weather gear (insulated clothing).

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Describe basic social, political, economic and ecological factors impacting renewable energy resources and systems regionally, nationally and abroad.
- Demonstrate problem-solving skills and critical thinking in both hands-on and written technical environments.
- Assess renewable energy resources for residential, commercial, and industrial renewable energy systems in wind, solar PV, solar thermal, heat pumps, geothermal, micro hydroelectricity and/or bioenergy for a wide range of sites and client objectives.
- Design mechanical and electrical components of renewable energy systems based on thorough resource assessment and client requirements.
- Install, maintain, and troubleshoot renewable energy systems. Perform an energy site assessment and develop a comprehensive

energy system proposal for a prospective client and defend the proposal rationale in written and verbal discussion.

- Work safely and responsibly with live systems in diverse groups.

SUNY General Education Requirements: (<https://system.suny.edu/academic-affairs/acaproplan/general-education/suny-ge/>) All SUNY Morrisville B.Tech degree programs require completion of at least 30 credits of SUNY GE, a minimum of seven (out of ten) knowledge and skills areas (including the four required knowledge and skills areas as indicated below), and completion of the two core competencies. The specific courses required within each knowledge and skills area/core competency for this degree program are outlined below.

Knowledge and Skills Areas:

| | |
|---|----------------------|
| Communication Written & Oral (required) | as advised |
| Diversity: Equity, Inclusion, and Social Justice (required) | as advised |
| Mathematics (and Quantitative Reasoning) (required) | MATH 123 or MATH 141 |
| Natural Sciences (and Scientific Reasoning) (required) | RENG 102 |
| Humanities | as advised |
| Social Sciences | as advised |
| The Arts | as advised |
| US History and Civic Engagement | as advised |
| World History and Global Awareness | as advised |
| World Languages | as advised |

Core Competencies:

| | |
|--|------------|
| Information Literacy (required) | as advised |
| Critical Thinking and Reasoning (required) | as advised |

Curriculum Requirements

A minimum of 120 credits is required for degree completion.

| Code | Title | Credits |
|---------------------------------------|--|--------------------------------|
| Major Field Requirements | | |
| RENG 101 | Basic Elec Renewable Energy | 4 |
| RENG 102 | Renewable Energy Resources | 3 |
| RENG 103 | Renewable Energy Seminar | 1 |
| RENG 150 | Analysis Techniques for Renewable Energy | 3 |
| RENG 221 | Introduction to Wind Systems | 3 |
| RENG 231 | Solar Photovoltaic Installation | 3 |
| RENG 310 | Biomass Energy Resources | 3 |
| RENG 460 | Systems Integration | 3 |
| RESC 125 | Residential Electrification | 3 |
| NATR 113 | Intro toGlobal Positioning Sys | 1 |
| NATR 213 | Basics Geospatial Technology | 1-2 |
| | or CAD 181 | Intro To Computer-Aided Drftng |
| CITA 101 | Principles Computer Apps | 3 |
| Upper-Division Major Electives | | |
| Select 24 credits of the following: | | 24 |

| | | |
|----------|-------------------------------------|---|
| DTEC 325 | Electrical Power Generation | |
| RENG 306 | Alternative Fuel Vehicles | |
| RENG 311 | Biofuels | |
| RENG 321 | Intro to Micro Hyro Systems | |
| RENG 331 | Solar Thermal Systems | |
| RENG 332 | Passive Solar Energy Systems | 3 |
| RENG 335 | Solar Photovoltaic System Design | |
| RENG 340 | Renewable Energy Heat & Cool | |
| RENG 350 | Energy Economics & Financing | |
| RENG 355 | Renewable Energy Law & Policy | |
| RENG 420 | Wind Energy Development & Analytics | |
| RENG 435 | Solar Development Engineering | |
| RENG 450 | Advanced Grid Technologies | |
| RENG 480 | Renewable Energy Internship Pr | |
| RENG 490 | Renewable Energy Internship | |

Required SUNY General Education & Liberal Arts and Sciences Coursework

| | |
|--|-----|
| SUNY General Education Natural Sciences (and Scientific Reasoning) as Advised | 12 |
| SUNY General Education Communication Written and Oral as Advised | 3-6 |
| SUNY General Education Diversity: Equity, Inclusion, and Social Justice as Advised | 3 |
| MATH 123 Elementary Statistics or MATH 141 Statistics | 3 |
| Additional General Education as advised | 6-9 |

Recommended Technical Electives

Select 36-37 credits of Technical Electives from the following subjects: AGBS, AGRO, AGEN, AGSC, AUTO, BIOL, BSAD, CAD, CHEM, CITA, DTEC, ENSC, ENROM, MECH, NATR, PHYS, RENG, RESC

Total Credits 121-129

Sample Course Sequence

| Course | Title | Credits |
|--|--|-----------|
| Year 1 | | |
| Fall | | |
| RENG 101 | Basic Elec Renewable Energy | 4 |
| RENG 102 | Renewable Energy Resources | 3 |
| RENG 103 | Renewable Energy Seminar | 1 |
| MATH 123 | Elementary Statistics (or as advised) | 3 |
| SUNY General Education Communication Written and Oral as Advised (ex. COMP 101) | | 3 |
| NATR 113 | Intro toGlobal Positioning Sys | 1 |
| Credits | | 15 |
| Spring | | |
| RENG 150 | Analysis Techniques for Renewable Energy | 3 |
| NATR 213 | Basics Geospatial Technology | 2 |
| RESC 125 | Residential Electrification | 3 |
| SUNY General Education Natural Sciences (and Scientific Reasoning) as Advised (ex. BIOL 101) | | 4 |
| CITA 101 | Principles Computer Apps | 3 |
| SUNY General Education Communication Written and Oral as Advised (ex. COMM 111) | | 3 |
| Credits | | 18 |
| Year 2 | | |
| Fall | | |
| RENG 231 | Solar Photovoltaic Installation | 3 |
| RENG 310 | Biomass Energy Resources | 3 |

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|---|---|
| SUNY General Education Natural Sciences (and Scientific Reasoning) as Advised (ex. PHYS 107) | 4 |
| SUNY General Education Diversity: Equity, Inclusion, and Social Justice as Advised (ex. ENSC 261) | 3 |
| 100-200 Lower Division Elective as advised (ex. NATR 103) | 2 |

Credits 15

Spring

| | | |
|--|--------------------------------|---|
| CAD 181 | Intro To Computer-Aided Drftng | 1 |
| RENG 221 | Introduction to Wind Systems | 3 |
| SUNY General Education Natural Sciences (and Scientific Reasoning) as Advised (ex. CHEM 101) | | 4 |
| SUNY General Education as advised (ex. World History & Global Awareness) | | 3 |
| 100-200 Lower Division Elective as advised (ex. RENG 240) | | 3 |
| 100-200 Lower Division Elective as advised (ex. RESC 260) | | 3 |

Credits 17

Year 3

Fall

| | | |
|--|----------------------------------|---|
| RENG 311 | Biofuels | 3 |
| RENG 335 | Solar Photovoltaic System Design | 3 |
| RENG 355 | Renewable Energy Law & Policy | 3 |
| DTEC 325 | Electrical Power Generation | 3 |
| SUNY General Education as advised (ex. Humanities) | | 3 |

Credits 15

Spring

| | | |
|----------|-------------------------------------|---|
| RENG 331 | Solar Thermal Systems | 3 |
| RENG 340 | Renewable Energy Heat & Cool | 3 |
| RENG 350 | Energy Economics & Financing | 3 |
| RENG 420 | Wind Energy Development & Analytics | 3 |
| RENG 435 | Solar Development Engineering | 3 |

Credits 15

Year 4

Fall

| | | |
|---|--------------------------------|---|
| RENG 450 | Advanced Grid Technologies | 3 |
| RENG 460 | Systems Integration | 3 |
| RENG 480 | Renewable Energy Internship Pr | 1 |
| SUNY General Education as advised (ex. The Arts or World Languages) | | 3 |
| 300-400 Upper Division Elective as advised (ex. CITA 405) | | 3 |
| 100-200 Lower Division or 300-400 Upper Division Elective as advised (ex. RENG 225) | | 3 |

Credits 16

Spring

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|---|-----------------------------|
| Select one of the following options: | 12 |
| Option 1: | |
| RENG 490 | Renewable Energy Internship |
| Option 2: | |
| Elective as advised (ENRM 303) | |
| 300-400 Upper Division Elective as advised (ex. ENRM 332) | |
| Elective as advised (ex. AUTO 102) | |
| Elective as advised (ex. BSAD 400) | |

Credits 12

Total Credits 123