

BEST PRACTICES IN BUSINESS AND WORKFORCE DEVELOPMENT

BRISTOL COMMUNITY COLLEGE'S SUSTAINABLE AND GREEN ENERGY (SAGE) TECHNOLOGY CURRICULUM

Sustainability and Engaged Student Learning:
CONNECT Conference - December 2, 2011

The SAGE Project Vision: Restructure Engineering Tech Curriculum

Train the next generation of engineering technicians to apply principles of sustainability, including renewable, efficient and clean energy production, in a range of technical careers:

1. Restructure BCC's Engineering Technology curriculum
 - a. Infuse sustainable practices and green energy principles and technologies across all technical programs
 - b. Develop & offer new Green Energy Technology degree options
 - c. Develop & offer new Sustainable Technologies certificate

New & Revised Courses

New Courses:

- EGR 183 Energy Efficiency and Conservation Measures
- EGR 282 Wind Power
- EGR 284 Solar Energy

Revised Courses:

- EGR 102 Introduction to Sustainable And Green Energy (SAGE) Technology
- EGR 123 Green Building Practices
- EGR 211 Programmable Control Systems
- Also revised content in ARC201, EGR124 & EGR172

EGR 102 Intro. to SAGE Technology

1. The Engineering/Construction Planning, Design & Implementation Process
2. Spatial, Physical and Energy properties associated with Electricity, Heat and Power
3. Renewable Energy Topics: Solar Power, Wind Energy & Other Forms of Renewable Energy
4. Green Building Practices: Efficiency, Weatherproofing & Siting
5. Sustainable use of Natural Resources: Fossil Fuels & Water

EGR 123 Green Building Practices

1. CSI Master Format & Building Codes
 2. Sustainable Design & LEED
 3. Building Use
 4. Site Selection
 5. Building Structure
 6. Water Usage
 7. Building Energy
 8. Interior Finishes
 9. Landscape Design
- **Certification Goal:** Students prepared & eligible for LEED Green Associate exam

EGR 183 Energy Efficiency and Conservation Measures

1. Data Acquisition, Monitoring, Auditing, and System Balancing
 2. Energy Bill Analysis
 3. Alternative Rate opportunities
 4. HVAC Energy Conservation Measures (ECMs)
 5. Building Envelope, Equipment & Electrical ECMs
 6. Renewable Energy Assessments and Analysis, Green Building, Sustainable Design
 7. Energy Suppliers and Fuel Acquisition
 8. Prioritization of ECMs (Cost Effectiveness & Environmental Impacts)
- **Certification Goal:** Students prepared & eligible for BPI Building Analyst exam

EGR 282 Wind Power

1. Fundamentals of Wind
 2. Wind Resources
 3. Turbine Principles
 4. Small Wind
 5. Medium Scale (Community) Wind
 6. Large Scale (Utility) Wind
 7. Perceptions, Politics and Policies
 8. Future developments
- **Certification Goal:** Course receives American Wind Energy Association Seal of Approval

EGR 284 Solar Energy

1. Introduction to Solar Energy
 2. Passive Solar Thermal : Thermodynamic Concepts, History, Site Orientation, Design, Thermal Mass, Ventilation & Day-lighting
 3. Active Solar Thermal: Thermodynamic Concepts, History, Applications, Components, Siting, Design & Economics
 4. Photovoltaics (PV): History, Applications, Components, Siting, Design & Economic
- **Certification Goal:** Students prepared & eligible for NABCEP Photovoltaic Entry Level exam

SAGE Program Revisions

- AS Programs
 - Electrical Technology → **Electrical with Solar Energy Technology**
 - Mechanical Technology → **Mechanical with Wind Power Technology**
 - Electro-Mechanical Technology → **Electro-Mechanical with Solar Energy Option or Wind Power Option**
- Applied Construction Technology → **Green Building Technology Certificate Program**

Electrical with Solar Energy Technology

- ***EGR 102 Intro to Sust. & Green Energy Tech**
 - EGR 131 Electrical Circuits I
 - EGR 132 Electrical Circuits II
 - EGR 133 Computer Configuration & Repair
 - EGR 137 Digital Computer Fundamentals
 - ***EGR 211 Programmable Control Systems**
 - ***EGR 284 Solar Energy**
 - w/ Math, Physics & Other General Education Courses
- * New or Revised Course**

Electro-Mechanical Technology

with

Solar Energy Option

- CAD 101 Computer Aided Drafting
- ***EGR 102 Intro to Sust. & Green Energy Tech**
- EGR 131 Electrical Circuits I
- EGR 132 Electrical Circuits II
- EGR 137 Digital Computer Fundamentals I
- ***EGR 183 Energy Efficiency and Conservation**
- ***EGR 211 Programmable Control Systems**
- EGR 251 Statics
- EGR 255 Thermodynamics
- ***EGR 284 Solar Energy**
- w/ Math, Physics & Other General Education Courses

Electro-Mechanical Technology

Wind Power Option

- CAD 101 Computer Aided Drafting
- CAD172 Computer Aided Mechanical Design
- ***EGR 102 Intro to Sust. & Green Energy Tech**
- ***EGR 124 Soils & Foundations *w/ Wind Structure Foundations***
- EGR 151 Electrical Machinery
- EGR 137 Digital Computer Fundamentals I
- ***EGR 183 Energy Efficiency and Conservation**
- ***EGR 211 Programmable Control Systems**
- EGR 251 Statics
- ***EGR 282 Wind Power**
- w/ Math, Physics & Other General Education Courses

Mechanical Technology with Wind Power

- ***EGR 102 Intro to Sust. & Green Energy Tech**
- CAD 101 Computer Aided Drafting
- CAD 172 Computer Aided Mechanical Design
- EGR151 Electrical Machinery
- EGR171 Fluid Systems
- ***EGR172 Material Science *w/ new Recycling & Sustainable Design material***
- EGR 251 Statics
- ***EGR 254 Mechanic of Materials & Structures**
- ***EGR 282 Wind Power**
- w/ Math, Physics & Other General Education Courses

Green Building Technology Certificate Program

- CAD 101 Computer Aided Drafting
- CAD 122 Architectural Drawing
- ***EGR 123 Green Building Practices**
- EGR 125 Construction Estimating
- ***EGR 280 Energy Efficiency and Conservation**
- w/ Math & English (General Education Requirement)

Environmental Technology

- ***EGR 102 Intro to Sust. & Green Energy Tech.**
- CAD 101 Computer Aided Drafting
- EGR 141 Introduction to Environment
- ***EGR 183 Energy Efficiency and Conservation**
- EGR 244 Water Supply and Hydrology
- EGR 245 Hazardous Waste/Waste Management
- GIS 101 Introduction to GIS Systems
- GIS 102 Applications of GIS Systems
- INT 101 Work Based Experience
- w/ Math, Science & Other General Education Courses

Non-Credit Articulation Opportunities

- Existing:
 - Green Energy Design & Building (GEDB) Course articulated as EGR 102 Introduction to SAGE Technology
 - NJATC Electrical Curriculum articulated to multiple courses in Electrical & Electro-Mechanical Programs
- Potential:
 - MassGreen Weatherization program that prepares students for the BPI Building Analyst exam – Articulate as EGR 183 Energy Efficiency and Conservation Measures
 - Photovoltaic training that prepares students for the NABCEP Entry Level Photovoltaic exam – Articulate as 284 Solar Energy
 - Note: Center for Workforce & Community Education proposal to provide and/or jointly offer courses



Questions/Comments/Feedback?