Energy Education and Research at UNC Charlotte’s EPIC

Energizing Africa through Partnerships
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- North Carolina's urban research university
- Over 28,000 students with over 125,000 alumni
- 77 Bachelor's, 62 Master’s and 23 Doctoral degree programs
- One of 17 in UNC System, but overly responsible for annual growth of the system’s enrollment
- Transfer destination for students from regional community colleges
EPIC’s Founding and Continuing Mission

- **Education**
  - Attract students to the energy concentration
  - Facilitate and support experiential learning
  - Program development with regional universities

- **Research and Development**
  - Applied multi-disciplinary research in the energy field
    - Corporate Engagement
    - Government Leverage
    - Cross campus participation
  - Partnerships with national and global universities

- **Economic Development**
  - Innovative research and development
  - Creation of energy workforce pipeline
  - Grow jobs, vendors, suppliers of energy companies
  - Incubation of energy related startups
  - Outreach and professional development activities
Education

EPIC offers an array of energy-related courses and experienced faculty within the Lee College of Engineering and Belk College of Business. We provide UNC Charlotte students with opportunities to enhance the energy education experience beyond the traditional classroom setting at both undergraduate and graduate levels.

EPIC faculty supports the following groups and activities:

- Expanded Co-op and Internship Programs
- Student participation in the Leadership Academy
- Energy related Senior Design Projects
- Solar Decathlon Competition
- EPIC sponsored seminars
- Engineers without Borders projects
- International trips
Undergraduate Education

EPIC and the Lee College of Engineering have paired together to create programs, courses and energy concentrations within multiple departments that surpass technical skills and engineering. The curriculum teaches students project management, collaborative teamwork, risk analysis and leadership skills. Our facilities assist UNC Charlotte by training the next generation of engineers who deliver new and creative solutions for the energy industry.

The Energy Concentration is offered under:
- Civil and Environmental Engineering
- Electrical and computer engineering
- Mechanical Engineering
- Systems Engineering
- Engineering Technology
- Engineering Management
- Business Administration
The EPIC Affiliates Program is composed of representatives from corporations who have purchased membership into the program. The major roles of the EPIC Affiliates program:

- Enhance energy workforce development by supporting education and experiential learning opportunities.
- Provide a structure to connect EPIC Affiliates with UNC Charlotte research faculty and student expertise.
- Members will benefit from EPIC’s core capabilities in developing focused energy solutions in technology, workforce development and preferred access to students with an energy concentration.
- Aligning student recruitment programs to the needs of our Affiliates.
- Aligning student internship and exchange programs to the prevalence of North Carolina based multinational companies working within the global economy.
EPIC Affiliate Members

GigaWatt Members

AREVA
ATOM
DUKE ENERGY

MegaWatt Members

ELECTRIC POWER RESEARCH INSTITUTE
SIEMENS

KiloWatt Members

BURNS & MCDONNELL
Piedmont Natural Gas
VERTEX RAILCAR CORPORATION
EPIC Research Faculty Concentrations

Large Power Component Design and Manufacturing
- Mechanical Engineering & Engineering Science, Engineering Technology & Construction Management, and Electrical & Computer Engineering
- 13 faculty

Power Infrastructure Development
- Mechanical Engineering & Engineering Science, Civil & Environmental Engineering, Geography & Earth Science
- 23 faculty

Grid Modernization
- 52 faculty

Energy & Environment
- Mechanical Engineering & Engineering Science and Civil & Environmental Engineering
- 9 faculty

Renewables and Energy Efficiency
- 50 faculty

Energy Analytics and Markets
- 16 faculty

Transportation Energy
- Civil & Environmental Engineering, Electrical & Computer Engineering, and Systems Engineering & Energy Management
- 9 faculty
EPIC Labs

- **The Duke Energy Smart Grid Lab**: with a real-time data system simulator (RTDS), phasor measurement units and a host of simulation software packages and hardware equipment used to analyze and visualize system grid conditions for distribution and transmission networks.

- **The High-Bay Structures Lab**: with a 92-foot by 47-foot strong wall, two 30-ton cranes donated by Westinghouse, networked 3-D shaker tables, high-impact sensing and 3-D laser-based optical tracking instrumentation.

- **The Materials Characterization Lab**: for energy research through materials testing. The MCL can test materials in a variety of environments to measure the effects of stress and materials durability.

- **The Photovoltaic Technology Research Lab**: for research and education programs designed to give the USA a competitive advantage in the field of photovoltaic science, engineering and technology.

- **The AREVA Teaching Lab**: an interactive educational facility for experiments covering basic electromagnetic principles and the operation, control and protection of electrical power systems. Equipment includes electromagnetic trainers, reconfigurable motors and generators, electronic motor drives, and systems to simulate protection of transmission lines, busbar systems, motors and generators.

- **The Siemens Large Manufacturing Lab**: includes a temperature controlled space with a large, high precision Leitz PMMf Coordinate Measuring Machine to enable high precision dimensional measurements of large components. Other dimensional measurement equipment includes laser trackers and scanners.

- **The Flexible Energy Lab**: offers a secure environment to conduct standard compliance as well as functional performance testing of power and energy systems. This lab provides a test and pre-certification environment for low-voltage equipment.
Research Centers & Services

- **CALM**
  
  The Coal Ash and Liquid Management (CALM) Office was launched by EPIC to develop practical, technology-based solutions for the energy production industry to address problems and challenges with coal ash and liquids management.

- **CAPER**
  
  The Center for Advanced Power Engineering Research (CAPER) is a membership driven consortium among several universities and industry partners in the Southeast region of the US. The main mission of the center is to develop and demonstrate grid modernization technologies and enhance the educational experience for students in electric power engineering.

- **SIBS**
  
  Sustainably Integrated Buildings and Sites (SIBS) is a collaboration between leading companies, corporations, universities, government agencies, and other organizations renowned for their innovative research capabilities, with the purpose of conducting research that will promote improved energy use, water use, air quality, and productivity in buildings through the integration of appropriate subsystems and technologies.

- **EPIC Technical Services**
  
  EPIC Technical Services deliver customized client assistance with comprehensive investigative projects, grant collaborations, project management, educational outreach, feasibility analysis, verification, focus groups and surveys, conferences, training and other services.
Thank you