WPI Progress in Power

Dr. John Orr

Professor, Electrical and Computer Engineering
Leadership

Professor Alex Emanuel continues to lead WPI’s Power Program

- IEEE Life Fellow
- Award-Winning Teacher
- Globally Recognized Researcher
- Author
Student interest in power remains high

- ECE 250X, *Introduction to Contemporary Electric Power Systems*: 41 students in Spring, 2014 (Orr)
- ECE 3501, *Electrical Energy Conversion*: 36 students in Fall, 2014 (Emanuel)
- ECE 3503, *Power Electronics*: 31 students in Fall, 2014 (Emanuel)
Awards, Outreach

• 8 current recipients of the IEEE PES Scholarship Plus Initiative (Dan Toland, Program Director is present)

• National Grid Engineering Ambassadors Program
Graduate On-Campus Power Program

Substantial on-campus graduate student interest in Power Systems

- ECE 523 *Power Electronics*: 17 students in Spring, 2014 (Thompson)
- Many on-campus students enrolled in CPE Power courses
- Substantial demand for thesis topics in power
Current Research Activities

• In Electrical and Computer Engineering:
  — Corona Ring Analysis and Design for 345 kV Transmission, Sergey Makarov, J. Yanamadala, M. Zagalskaya

• In Mechanical Engineering:
  — Yan Wang, Batteries (2013 Catalyst Award from the Massachusetts Clean Energy Center)
  — David Olinger, Energy extraction from wind and water

• In Chemical Engineering:
  — Research on Fuel Cells and production of Hydrogen
  — Efficient means of producing biofuels
Corona Ring Analysis & Design

b) $|E|$, kV/mm, $V_{peak} = 281.7$ kV

c) $|E|$, kV/mm, $V_{peak} = 281.7$ kV
Recent Papers

International Conference on Harmonics and the Quality of Power, Bucharest, Romania, May 25-29, 2014


WPI Progress in Power

Michael Ahern

Director, Power Systems

Corporate and Professional Education
Extensive Graduate Power Systems Portfolio

Engineering Courses
✓ ECE 5500. Power System Analysis
✓ ECE 5510. Power Quality
✓ ECE 5511. Transients in Power Systems
✓ ECE 5512. Electromechanical Energy Conversion
✓ ECE 5520. Power System Protection and Control
✓ ECE 5521. Protective Relaying*
✓ ECE 5522. Advanced Application in Protective Relaying*
✓ ECE 5523. Power System Dynamics*
✓ ECE 5530. Power Distribution
✓ ECE 5531. Power System Operation and Planning
✓ ECE 5540. Power Transmission
✓ ME 593Z. Renewable Energy

Typical Business Courses
✓ MIS 576. Project Management
✓ OIE 541. Operations Risk Management
✓ OIE 598E. Engineering Economics
✓ OBC 500. Group and Interpersonal Dynamics in Complex Organizations

* "WPI is recognized by the North American Electric Reliability Corporation as a continuing education provider who adheres to NERC CE Program Criteria."
WPI Progress in Power

In the last year, WPI’s Graduate Power Programs delivered through Corporate and Professional Education:

- Awarded over 30 Master’s Degrees
- Awarded over 30 Graduate Certificates
- Increased Credit Hours Delivered by 16%
- Provided Customized Continuing Education to over 100 Professionals
- Developed and Delivered a New Course in Electric Drives
WPI Progress in Power - Online

WPI began offering its online graduate Power Programs in 2009. Since then:

- Over 100 students are now enrolled
- We’ve taught students from 7 countries -
  - United States
  - United Kingdom
  - China
  - India
  - Canada
  - Australia
  - Qatar
We’re helping to educate people around the world...
3 Years - 4120.5 Credit Hours

. . And Across the United States
WPI Progress in Power

Preparing for the current year

- We developed new courses in:
  - Electromagnetic Compatibility
    - Currently being taught at General Dynamics Electric Boat
  - Energy Management
    - Business Course to be Offered Online in January