To: Members of Center for Power Systems Studies  
Associate Members of Power Systems Studies  
All those in attendance at meeting

We are now at the close the Center for Power Systems Studies’ 49th year of operation. The following is a summary of the last several months of activity within the department of Electrical Engineering and Computer Science that is related to the CPSS along with plans for the summer and coming years.

I. Power-Course Update
   a. Spring 2017
      • EE315 (3 cr) Linear Controls, 22 students (Hietpas)
      • EE436/L EE536/L (3+1 cr) Photovoltaic Systems Engineering and Lab, 30 students (Tonkoski)
      • EE447 (3 cr) Advanced Power Systems, 8 students (School of Mines Faculty)
      • EE732/L (3+1 cr) Modeling and Control of Power Electronic Systems and Lab, 4 students (Tonkoski)
      • EE751 (3 cr.) Linear Systems Theory, 10 students, (Ni)
      • EE790 (1 cr) Seminar - Power and Energy, 3 students (Tonkoski, Hansen, Ni)
   b. Fall 2017
      • EE434/L (3+1 cr) Power Systems/Lab*, (Ni)
      • EE733/L (3+1 cr) Advanced Power System Analysis and Lab (Hansen)
      • EE731/L (3+1 cr) Advanced Power Electronics and Lab, (Tonkoski)
      • EE790 (1 cr) Seminar - Power and Energy (Tonkoski, Hansen, Ni)
      * This course is also being offered to students from SD School of Mines
   c. Spring 2018 (tentative)
      • EE315 (3 cr) Linear Controls, (Ni)
      • EE447 (3 cr) Advanced Power Systems (School of Mines Faculty*)
      • EE751/L (3+1 cr) Computational Intelligence (Ni)
      • EE732/L (3+1 cr) Modeling and Control of Power Electronic Systems and Lab (Tonkoski)
      • EE436/L EE536/L (3+1 cr) Photovoltaic Systems Engineering and Lab (Tonkoski)
      • EE790 (1 cr) Seminar - Power and Energy (Tonkoski, Hansen, Ni)
      * This course will not be accepted from SD School of Mines unless faculty assignment is changed from current instructor to new.
II. Power Faculty Activities Spring Semester

See Appendix for research group summaries and list of publications.

a. Tonkoski
   - 2 MS Students Graduated
   - Currently Supervising:
     - 2 PhD students
       - Coordination of Virtual Inertia in Microgrids
       - Developing Hybrid Renewable Energy Systems for Low Voltage Distribution Systems
     - 2 MS EE graduate students
       - Focus Areas:
         - Fuel Consumption Reduction in PV-Diesel Hybrid Microgrids Operation of Data Center Microgrids as Virtual Power Plants
         - Voltage Control in LV Systems with High Penetration of PV.
     - 3 Senior Design Groups
     - Voltage Controller (Sponsor: NorthWestern Energy /CPSS)
     - Daktronics Battery Management System (Sponsor: Daktronics) – Co-supervision with Jason Sternhagen
     - EECS Datacenter Power (DCP) – Co-supervision with Tim Hansen
   - NSF Panel Reviewer
   - Serving the EE Scholarship Program Committee
   - Serving the EE UG Curriculum Committee
   - Serving the IEEE Student Branch
   - Serving as the IEEE Siouxland Section Chair April/2017-January 2018
   - Publications:

b. Hansen
   - Currently supervising:
     - 3 MS EE graduate students, 2 PhD students
- New Ph.D. student from Brazil

- Focus Areas:
  - Demand response algorithms and markets
  - Data center virtual power plant management
  - Use of solid-state transformers and smart PV inverters for renewable energy integration and voltage regulation
  - Home energy management systems
  - IEEE PES Power Engineering Education Committee (PEEC) Awards Subcommittee Secretary
  - IEEE Region 4 Executive Committee, Young Professionals Chair

- Ni
  - Current Supervising:
    - 7 MS EE graduate students
      - Focus areas:
        - Power grid security and cyber-physical system
        - Adaptive control for Synchronous Machine
        - Energy storage system in microgrid and smart home
        - Islanded microgrid control and operation
      - Served on the EE graduate faculty committee
      - Served on the EE search committee
      - Vice Chair, Task Force of ADP and RL in Power and Energy Internets, IEEE, CIS-ADPRL TC
      - Served on the CPSS 2016 Conference planning committee

III. Scholarship Activity – Power Company Sponsored Scholarships – 2017--2018
a. The EE Program is expecting to award approximately $40,000 in scholarships
b. Of this total, approximately 60% are a direct result of the power community sponsorship

IV. Power Students
Please see separate report: CPSS Undergraduate Student Report

V. Summer Power and/or CPSS Activity
a. Hietpas
   - Prepare for 2017 Fall Meeting and 50th Anniversary Celebration for the CPSS
   - Serve on the CPSS 2018 SoDaRP Conference planning committee
b. Tonkoski

- Graduate 2 MS EE Students.
- Identify industry partners/collaborators for research proposals
- Write proposals to obtain funding from external agencies
- Attend REMOO 2017, Venice, Italy
- Attend IEEE PES GM 2017, Chicago, IL
- Attend IEEE ECCE 2017, Cincinnati, OH.
- Serve the EE Scholarship Program Committee
- Serve the EE UG Curriculum Committee
- Serve the IEEE Student Branch
- Serve the SDSU Environmental Stewardship and Sustainability Committee
- Serve as the IEEE Siouxland Section Chair April/2017-January 2018
- Serve on the CPSS 2018 SoDaRP Conference planning committee

c. Hansen

- Graduate 1 MS EE Student
- Write proposals to obtain funding from national agencies
- Attend REMOO 2017, Venice, Italy
- Attend IEEE PES GM 2017, Chicago, IL
- Invited faculty to UTBM, France for Summer 2017 to conduct research on Data Center Demand Response
- Serve on the CPSS 2018 SoDaRP Conference planning committee

d. Ni

- Graduate 3 MS EE Students
- Write proposals to obtain funding from national agencies
- Attend IEEE ISGT 2017, Washington DC
- Attend IEEE PESGM 2017, Chicago, IL
- Attend IEEE IJCNN 2017, Alaska, AK
- Serve on the CPSS 2018 SoDaRP Conference planning committee

Respectfully submitted,

Steven M. Hietpas, Ph.D., P.E.
Coordinator, Center for Power Systems Studies
Professor and Head of EECS Dept.
Appendix - Power Group

Power Systems Research Group Summaries:

Microgrids: Dr. Tonkoski is working on developing energy management systems for remote microgrids including novel power dispatching algorithms, load and solar forecasting techniques, frequency stability through inertia emulation and a microgrid testbed.

Smart Grid Markets and Energy Management Systems: Dr. Hansen joined the program in Fall 2015. He is working on creating new control algorithms for residential and commercial building energy management systems, focusing on their market integration and economic benefits.

Smart Grid Security and Adaptive Control Systems: Dr. Ni joined the program in Fall 2015. He is working on smart grid security (e.g., cyber-attack and cascading failure), and, new intelligent control approaches for modern cyber-physical systems.

Publications


37. B. PALMINTIER, E. HALE, T. M. HANSEN, B. HODGE, K. BAKER, “Experiences Integrating Transmission and Distribution Simulations for DERs with the Integrated Grid Modeling System


