



The Power Factor



Power Engineering Society

Fall 2004

From the President

Welcome to the third newsletter of Power Engineering Society (PES) at Cal Poly, San Luis Obispo. It is a great time to get involved in PES. PES's mission is to provide the society with the essential knowledge of the real world profession, in order to enhance their academic goals and become leaders in the field of Power Engineering. PES was established in 1981 and re-chartered in 1999 with nine members. This year, we are starting out with fifty members strong. We are working towards the ownership of power supply kits for IME 156. We have about twenty activities planned for this year from industry tours to student paper contests. Industry has been recruiting specifically for power engineers. Chevron Texaco and San Diego Gas and Electric are just a few examples.

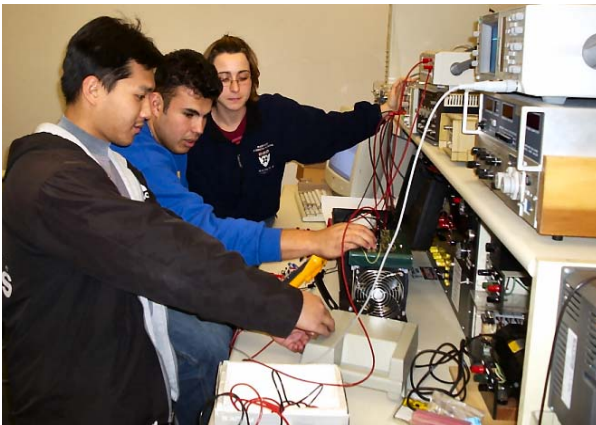
I am honored and privileged to serve as the president of PES for 2004-2005. We have hard working executive board to help our members with their needs. I am very happy to work with our hard-working and energetic members. Our advisors are very active in club activities. I would also like to thank our alumni for their

continued support and encouragement. We depend on them for their leadership and guidance.

PES welcomes everyone (students, faculty, and staff) to join. There is no membership fee. PES offers services to its members for all facets of student life. Industry tours introduce students to companies; various academic workshops help students with their studies, and scholarship and resume workshops help students with their financial and career planning. PES goes beyond Cal Poly with our outreach community services—Junior High outreach, farmers' market display booth, and information sessions at community colleges. If you are interested in joining our meetings, please contact me at kohn@calpoly.edu. Go PES!



-Kay Ohn, President



Students conducting experiment in Power Electronics Lab

From the Faculty Advisor

Welcome back. I hope everyone had a great summer. I know I did. This past summer I visited my family and friends in Java, Indonesia. While I was there, I was also invited by several universities to give technical presentations and seminars. The first university I went to was "Universitas Kristen Indonesia", located in Jakarta. I spent about an hour chatting with the EE Chair and faculty there before I made my presentation on Synchronous Rectification with about 100 students attending. My next visit was to one of the largest private universities in Jakarta: "Universitas Trisakti". Before giving my presentation, I met with the Dean of the College of Engineering, EE Chair, and EE faculty. This time I presented "Role of Power Electronics in Utility Applications" and the auditorium was packed and close to 200 students attended the presentation. The next trip I did was a two-day visit to "Universitas Muhammadiyah Malang" located in Malang, East Java. One thing I found out about the city, besides its beauty, is that it is literally a "College Town". With city's population of about 1 million, it hosts at least 40 universities. The first day, I met with the Vice President of the University, the Dean of Engineering, EE Chair and EE faculty. Following the meeting, I had my first talk about Cal Poly Electrical Engineering and its Power concentration. Students were very curious about the university in the US, so they asked a lot of questions about our classes, labs, etc. The rest of the day, I gave technical seminar on Switching Mode DC-DC Converters which continued on the following day. Toward the end of my summer

vacation, I made a trip to Philippines to visit three universities there who invited me to give technical presentations. One thing I learned from this trip is that Philippines Monsoon season is actually during Indonesia's dry season! Not long after I arrived from Manila, we were greeted by tropical rain. We drove up to about 180 km north of Manila to Cabanatuan City where I visited NUEST University. That evening, I had dinner with the President of the University, dean of Engineering, EE Chair, and Faculty. The next morning, I presented "Efficiency Improvement of dc-dc converter" which was followed by question and answer session. The very next day, I was supposed to leave for Manila for my visit to Technical Institute of Philippines and Mapua Technology University. However, mother nature prevented me from doing this since Manila was hit by heavy downpour and the majority of Manila was literally flooded. On the third day, once the rain settled down, we finally made our trip back to Manila. However, all schools were still closed on that day, so we were only able to visit Mapua Tech and had lunch with their president, dean and faculty. Although, the trip didn't go as planned, I still enjoyed it especially the part where I get to meet with people from different parts of the world. One thing I will always remember about Philippines is not the rain, but rather their hospitality, and yes I plan to go there again in the future if I have the opportunity, but certainly not during their monsoon season, though 😊.



Dr. Taufik's visit to NUEST University, Cabanatuan, Philippines

From the SEEC/Webmaster

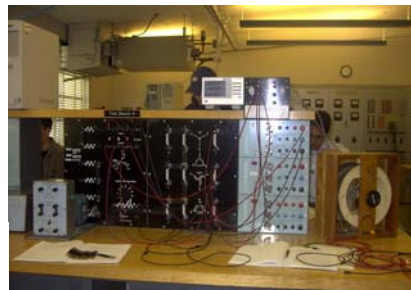
Although PES is open to all Cal Poly students from any major, traditionally PES members are students majoring in electrical engineering concentrating in power and controls. The courses available to power students fall within the categories power systems, power electronics, and controls. The descriptions for these available power and controls courses and other information, for power/non-power-concentration-students, may be reviewed at the PES website, at www.calpoly.edu/~pesclub. The pool of power/controls courses allows students to customize their curriculum specifically for their particular interests and career direction. The power-concentration advisors, whom also happen to be the PES advisors, work with students to charter a projected curriculum and mentor students as they progress; advisor contact information is available on the PES website as well. Other power-concentration related information is available on the PES website to help students get more involved with PES and ultimately, help better prepare them for their chosen profession by providing an information medium to industry through industry sponsored tours, seminars, and information sessions for future employment. The PES website provides this event information and other links to help

power-concentration students with their academic and career success. The website may also provide pertinent information for non-power students still deciding whether or not the power concentration is the academic route that would best facilitate their career goals. There is an "Employers" link that classifies a number of companies, which hire power-concentration students, into various industry sectors such as: Generation and Distribution, Engineering and Construction, Power Electronics and Control, and Industrial. This link may help students decide if one of these companies is one which they would wish to work for, or not at all. The PES website may help you decide that the power-concentration is right for you and help guide you towards your chosen profession, or on the other hand, help you decide that it is not the concentration for you, and again, help guide you toward your chosen profession, that being away from power. In either case, the PES website may be of benefit to you, and perhaps most beneficial to students early in their academic career.

-Brian Butterfield, PES SEEC/Webmaster

"PES truly keeps the best interest of its members in mind by going beyond the technical and helping students.."

Machines Lab at Cal Poly



From the Secretary

I first heard of the Power Engineering Society through classmates. Being a relatively small club, I was unaware of the benefits PES had to offer. The officers were very welcoming, and general meetings were an opportunity to converse with fellow power concentrations. Until then, I didn't really know there were others with the same interests as mine. Membership is free and it's a great way to get involved. We have an Open House booth and are active during National Engineers Week. PES is also responsible for supplying the IME lab kits and, of course, you get donuts if you participate! PES is also a great way to meet your professors. Our power professors provide support and advice year-round. This year, I hope to keep you well informed. Please encourage your colleagues to attend, and hopefully PES will be a household name like IEEE or SWE. Thanks to all our new and continued memberships, and we appreciate your participation.

-Jessica Vantine, Secretary



"PES is a great way for students and companies to interact; it is kind of like a "Match Maker Service" for Power Engineers."



PES Potluck, Fall Quarter, 2004

From the Treasurer

Not knowing what to expect, I joined PES (Power Engineering Society) during the Spring 2004 quarter. To become familiarized with the club, I attended a fieldtrip to a power company in Nevada. This trip gave me a small understanding of what really goes on in the power engineering profession. I realized that PES helps the members develop relationships with industries by inviting guest speakers and by providing industrial tours. Since PES is a small club, members can interact with guest speakers on an individual basis. The experienced and friendly faculty members of

-Lily Pang, Treasurer

PES are never too busy to answer any questions regarding power engineering and/or the club. Students have the opportunity to become acquainted with the staff and other members through such events as picnics and barbeques held throughout the school year. PES is a vehicle where not only can one develop professional skills, but it is also a place where one can interact professionally with other members. Although there is no fee in joining PES, the club is still able to offer rewarding opportunities to its members.

My Internship at San Diego Gas & Electric

If you have ever seen a California map showing the service territories of major utility company's, you may have missed San Diego Gas & Electric. In fact, if it weren't for the Power Engineering Society tour of SDG&E last year, I may have missed a fantastic opportunity. Pacific Gas & Electric (PG&E) and Southern California Edison (SCE) may dominate our state's power industry, but where SDG&E may be lacking in size, they more than make up for in spirit.

As an intern, I was assigned to Substation Maintenance and Construction on Kearny Mesa. "Kearny," as it is referred to, is a special part of SDG&E because it houses a very diverse group of employees, including management, engineers, electricians, mechanics, analysts, and various other personnel. Working at Kearny allowed me to get out into the field a lot. Through my experiences with the electricians and engineers at many different substations, the "one-line" diagrams came to life, and I was able to see real-life versions of what our textbooks have shown us on paper.

The most exiting project I worked on was to create a PowerPoint training presentation for electricians and new associate engineers. The presentation gave some basic background to transformer construction and operation, showed SDG&E's system voltage level and phase shift design, and then explained how certain transformer connections are needed to keep voltage level, phase, and phase rotation matched at every point in the network.

More important, however, were the friends I made, and I *was* in San Diego, so enough about work. One of the company's unofficial mottos is "work hard...play even harder," and

we did, including volleyball, BBQs, motorcycling, bicycling, golfing, baseball games, street-scene, horse races, and much more.

My time at SDG&E was an experience I will cherish for the rest of my life. I recommend an internship or career at SDG&E to anyone who is looking for the benefits of a big company with the family atmosphere of a small business. I made many new friends, learned a lot, and had *too* much fun. Additionally, by working in the industry with such a diverse group of people, I gained the confidence in myself needed to get me through the turbulent time of searching for a job.

Jean Tharaldsen

SDG&E Field Trib. Fall 2003



Cal Poly Goes to Washington...

A Solar Powered Adventure

Last year, the Department of Energy invited Cal Poly to participate in the 2005 Solar Decathlon, a national competition to build the most graceful, practical and efficient solar house powered entirely by the sun. The Renewable Energy Club is spearheading the effort on campus, which involves a large multidisciplinary team of students. Ultimately, judges will evaluate each home in ten different categories including architecture, hot water, comfort zone, lighting and energy balance. Most of these contests involve power engineering in a significant way.

Working from a design originally fleshed-out by previous ME seniors Luke Swan and Omar Hawit, the Photovoltaic Team is now finalizing the component selection and beginning to draw up construction documents. Faculty advisors

assisting these efforts include professors Jesse Maddren (ME), Robert Peña (ARCH) and Taufik (EE). The general system uses twenty-four highly efficient PV cells donated by Sun Power. These cells feed into a Maximum Power Point Tracker (MPPT), which acts to maximize the efficient transfer of power between the solar array and the battery bank. From the battery bank, the power routes to two Trace inverters that convert the DC signal to 60Hz AC for use by the rest of the house.

As power students, you are invited to contribute to the design and construction of the home, which will be displayed on the National mall in Washington DC in November. For more information, and specific details of the system, contact the Renewable Energy Club at recclub@calpoly.edu or visit <http://www.calpoly.edu/~recclub/>

Robert Johnson

WANNA BE POWER? JOIN PES!

At some point all electrical engineering students must make the decision to follow the Electronic (EL) course block, or take the Power (EE) block. For those interested in power systems, or power electronics, the choice is a straightforward one, but understanding all the disciplines underneath the power umbrella can be more difficult. This is where the Power

Engineering Society (PES) can help. By inviting guest speakers and organizing field trips, PES works hard to introduce Cal Poly students to new technologies and interesting companies within the world of power.

Are you a student interested in Cal Poly's Power program? Contact Dr. Taufik at (805) 756-2318 for more information about the exciting

things you can do within power. Are you interested in joining the Power Engineering Society? We would love for you to visit one of our meetings! Get involved in EE. Get involved with PES!

Tony Moreno
EE Alumni

Power Engineering Society

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We're on the Web!

See us at:

**[www.calpoly.edu/
~pesclub](http://www.calpoly.edu/~pesclub)**

Upcoming Events

- SDG&E Industry Tour, January 2005
- Intramural Flag Football, Winter Quarter
- Farmer's Market Display Booth, National Engineers Week, February, 2005
- Pspice Workshop, Winter Quarter 2005

We want your articles and feedback...

Students, Faculty, and Alumni are welcome to write articles and feedback for 'The Power Factor'. Please send the articles and comments to Jessica Vantine at jvantine@calpoly.edu.

The next issue of Power Factor will be coming your way in Winter 2005

Power Course Offerings at Cal Poly (Starting Fall 2005):

Fall Quarter

- EE 407—Power Systems Analysis II
- EE 410—Power Electronics I
- EE 520—Solar-Photovoltaic Systems Design

Winter Quarter

- EE 411—Power Electronics II
- EE 518—Advanced Power Systems Analysis

Spring Quarter

- EE 406— Power Systems Analysis I
- EE 417—AC Machines
- EE 444—Power Systems Lab
- EE 527—Switching Power Supply Design

Planned new courses in Power

- EE 420—Sustainable Electric Energy Conversion (Winter)
- EE 433—Introduction to Magnetic Design (Spring - alternates with EE 527)
- EE 519—Power Systems Design
- EE 511—Electric Machines Theory (Fall)