

Industrial Advisory Group Annual Meeting

Klipsch School of Electrical and Computer Engineering

Date and Time: November 5, 2014 from 1PM to 5PM

Location: Thomas and Brown Building, Rm. 204

Attendees

NMSU

Dr. Satish Ranade – Head of Klipsch School

Dr. Steve Stochaj – Undergraduate Studies Committee (USC) Chair

Dr. Bob Paz – Graduate Studies Committee (GSC) Chair

Dr. Krist Peterson – former Assistant Dean of Engineering and ABET chair

Industrial Reps

Rodwan Jallad – Calculix

Rick Shumard – Leidos Engineering

Peggy Morse – Boeing (unable to attend this year – visiting new twin grandkids)

ECEA Academy Reps

Jeff Carlson – Sandia National Labs

Dave Wiegant – Sandia National Labs

Rick Shumard – Leidos Engineering

UTEP Rep

Pat Nava – EE Department Head (unable to attend, prior commitment)

Agenda

- 1) Undergrad Program Update/Review (Ranade and Stochaj)
 - a. Educational Objectives
 - b. Changes in undergrad program
- 2) Grad Program Update/Review (Ranade and Paz)
 - a. Assessment
 - b. Changes – added Masters of Engineering Degree
- 3) Role of IAG (All)

Program Reviews

Satish provided a summary of both the undergraduate program and the graduate program.

Undergraduate Program Review

Steve Stochaj provided a more detailed assessment and update of the undergraduate program. A major upcoming change will be a reduction in the number of required credit hours to obtain a EE degree. Currently, the requirement is 128 hours. The new target is 120 hours. This will be done to keep pace with other universities across the nation. The reasoning is to allow students a better chance of graduating within a 4-year period, and also to reduce the cost of a EE degree. Note that this is not being driven from within the Klipsch School but more to conform with changes taking place across the nation. The reduction to 120 hours will have impacts, including increasing the hours for full-time enrollment status to 15 credit hours per semester. Currently, full-time enrollment status requires only 12 credit hours per semester. Other impacts will likely include a reduction in either, or both, the EE core curriculum and EE electives. A good deal of the IAG meeting was spent discussing potential changes to the undergrad curriculum and what classes should be included in the core curriculum.

Krist Peterson recommended the following core curriculum.

- 1) AC & DC Circuits
- 2) Electronics
- 3) Computer Hardware and Software
- 4) Electromagnetics
- 5) Signals and Systems

Questions and recommendations were provided by the IAG in terms of amending the core curriculum recommended by Krist. The IAG recommended other areas be considered as part of the core curriculum, including coursework in the following areas.

- 1) Control Systems
- 2) Power (Utility) Systems
- 3) Communications
- 4) Optics

The 120-hour constraint makes it difficult to attain all the desires of a core curriculum. It was recognized that the 120-hour constraint also makes the establishment of a solid core curriculum even more important than it is today. In lieu of the 120-hour constraint, the IAG suggested the possibility of allowing multiple cores with designated specialties. The IAG pointed out that the Klipsch School could greatly benefit from a niche core that made it significantly stand out from other core curriculum offered at competing universities. It was suggested that Power (Utility) Systems Engineering could provide a unique niche as this is already a strength of the Klipsch School and that only a handful of universities across the country provide any formal education in Power Systems Engineering.

Some discussion also centered around what every student should know upon graduation. These essentials included:

- 1) Circuit analysis theory and tools
- 2) How to use computers
- 3) How to program computers
- 4) Signals and Systems Theory and Analysis skills
- 5) Electronic Design skills
- 6) Emag, Antenna Theory
- 7) RF Communications Theory
- 8) Engineers that are trainable and socially adept
- 9) Enough educational background and EE skills to allow students to effectively intern between junior and senior years.

Rick and Dave suggested it would be better if students were ready to intern following their freshman and sophomore years.

Other options and suggestions provided by Krist for curriculum realignment included:

- 1) Do nothing
- 2) Decouple DC and AC circuits
- 3) Decouple lectures and labs
- 4) Convert most classes to 2 lecture credits

- 5) Merge most labs into freshman, sophomore, junior, and senior projects

The path forward is partly being driven by the ABET accreditation process schedule:

- 1) Form curriculum review committee – fall 2014
- 2) Committee reviews curriculum – spring 2015
- 3) Committee presents recommended curriculum to faculty – fall 2015
- 4) Decision to proceed – fall 2015
- 5) Develop common course syllabi – fall 2015
- 6) Submit catalog changes – spring 2016
- 7) Implementation of changes – fall 2017

The Program Educational Objectives were presented and no changes were suggested/made.

Graduate Program Review

Bob Paz provided a more detailed update and assessment of the graduate program. The IAG spent less time on the graduate program due to the fact that the formal assessment of the graduate program has not started (will start formally this coming year). One special change to the graduate program was the development and implementation of a new Masters of Engineering (ME) program.

Role of IAG to the Klipsch School

A good portion of this year's IAG meeting was spent discussing the role of the IAG.

Satish commented that the involvement of the IAG in ABET Accreditation is one of the most important functions of the IAG.

ABET has a list of objectives and outcomes they recommend. NMSU has created a map for assessing ABET objectives and outcomes. They want 70% or more students to achieve the objectives and outcomes. Sticking to the ABET process is critical. The process itself is really quite simple:

- 1) Assess program

- 2) If changes are made, tell why
- 3) Assess program again after changes are implemented

The IAG can provide insight on what education should be provided in today's timeframe and provide recommendations on ABET objectives and on assessing objectives. In this regard, the IAG made the following recommendations/suggestions:

- 1) The process of learning the course content is as important as the content.
- 2) Teaching/learning creative problem solving skills is as important as teaching/learning "text-book" skills.
- 3) Emphasize why the skills being taught are important/valuable to future employers.

The IAG can provide input on curriculum realignment. Recommendations included:

- 1) Survey other university curriculums
- 2) Survey needs in industry, laboratories, and government programs
- 3) Assess other curriculums and needs relative to the current EE curriculum

Satish suggested we look at the IAG at 3 levels:

- 1) As a conduit to industrial needs
- 2) As an ABET process enforcer:
 - a. How to assess the program
 - b. How to assess changes to the program
 - c. Ask questions that force the Klipsch School to conform to the process
- 3) Need IAG to make sure the Klipsch School is covering the bases that industry needs and to inform the Klipsch School of high-need areas.

Satish also recommended that the IAG meet at least once annually with the NMSU President (currently Gary Carruthers) to discuss high-priority needs. The IAG can request a meeting with the NMSU President anytime throughout the year.

The IAG can also meet with New Mexico legislators and recommend/lobby for changes that will benefit the Klipsch School. Faculty members are not allowed to do this on their own volition.

Other areas were also identified where the IAG & ECEA Academy can help out.

- 1) Provide internships for students – internships have proven to significantly improve student retention rates.
- 2) IAG members can provide tech talks to help inspire students and indicate career opportunities.
- 3) E-mail “burning” issues that should be shared with the ECEA Academy.
- 4) Hold informal IAG meetings at least every couple of months
- 5) Provide on-going program/curriculum review support

The IAG meeting concluded shortly after 5PM. In closing, Dave and Jeff agreed to write up a page or two on the IAG mission, roles, and strategies for providing maximal impact to the Klipsch School of Electrical and Computer Engineering.