



ELECTRICAL POWER ENGINEERING EDUCATION: HOW TO BRIDGE THE GAP BETWEEN INDUSTRY AND UNIVERSITIES

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Question 1 – What level of specialization of engineering curricula should be sought for? Is basic, fundamentals knowledge more formative and potentially more effective for industry than up-to-date information ?

- Fundamentals are sacred – must never be reduced. The only problem is defining what these fundamentals are – do they change with time? We have 30 hours (10 courses) of ECE core – includes the freshman intro lab and the senior capstone design lab. Industry views communication as fundamental.
- Electives give freedom to specialize – minimum of 7 ECE undergrad courses – this is where “up-to-date information” is taught – after the fundamentals. More normal to be 9 courses. We have 9 power electives – but nobody would take all of them!



Question 2 – What are the differences between Industry needs and expectations and Academia ones ?

- Industry has indicated a need for good communication skills – they assume the technical expertise is there.
- Academia needs to train students to go to graduate school – prepare them for research.
- Industry values internships, use of commercial software and familiarity with business and legal issues.
- Academia emphasizes technical maturity and innovation. Academia is often criticized for using “small, toy examples”.
- Academia wants real-world data – hard to get.



Question 3 – What are the reasons behind the gap between Academia and Industry, if any ?

- Academia focuses on technical excellence and research.
- Industry focuses on personal skills, leadership ability, preparation to work with the public, latest products.
- Academia focuses on publications and new contributions.
- Academia does not engage industry on a fast time scale – much slower response – i.e. sometimes a few times per year.



Question 4 – What is the current status of cooperation between Academia and Industry and in particular the interaction between industry and undergraduate/doctoral programs ?

- PSERC, FREEDM, CURENT, are very intense in industry collaboration and cooperation at the doctoral level. They all need industrial financial support. TCIPG works with over 500 industry engineers on a regular basis.
- Most universities have affiliate programs involving local companies that aim to involve industry engineers in education and research. Many universities involve industry in undergraduate education – site visits, internships/scholarships.
- Many faculty and students are involved with IEEE – this helps cooperation with industry – especially at the doctoral level.



Question 5 – Is at present the number of PhDs produced every year for the higher education establishment too much to be absorbed by Industry?

- Most universities report that PhD students are in high demand both in industry and academia.
- There is a strong demand for power engineers at all levels of education.
- There are still a large number of international graduate students being hired to perform research and fill the need for faculty.
- Continued funding for research in power engineering is the key to continued prosperity.



Question 6 – Should industry be involved in the management of Educational Establishments?

- Management is an odd word – maybe operation would be better.
- They are involved in the operation of PSERC, FREEDM, and CURENT.
- Curriculum and course content are still the decision of the faculty, but we constantly consult with the industry on what they would like to see.
- We do not get enough industry involvement in IEEE activities.



Item 7 – Additional contribution

- Times have changed – industry is not as involved in professional societies as they once were.
- Service to our profession is the key to the advancement of faculty – this is a little understood fact.
- Faculty need to be close to industry either through sabbatical leaves, Summers, or frequent collaboration.
- Students need to be exposed to industry engineers on a regular basis – either through interns, or professional service events.



Conclusions

- Strong collaboration between industry and academic institutions is a win-win thing.
- Professional societies such as Cigre and IEEE can facilitate this collaboration.
- Corporate leaders need to appreciate the importance of collaboration with academia – students and faculty.
- Faculty need to devote more time to industrial collaboration and professional society involvement.

