

## ECE Alumni Survey 2007 (12 April 2007, JH)

In order to assess the department’s success at achieving its four Program Educational Objectives as well as its 14 outcomes (a)-(n), ECE surveyed alumni who graduated between 1997 and 2006. (A similar survey was conducted in 2000 and targeted alumni who graduated between 1991 and 2000.) Email was sent in Spring 2007 to 1425 EE and CE alumni whose email addresses were on file with the UI Alumni Association. A total of 225 responses were received. Averages are given here alongside the averages from 2000. Respondents were also offered space to write whatever feedback they cared to share, and those replies are reprinted in full in Section 3 (p. 3). The survey form is reprinted in the Appendix (p. 14).

### 1. Program Educational Objectives

Alumni assessed the department’s success in achieving four broad Program Educational Objectives:

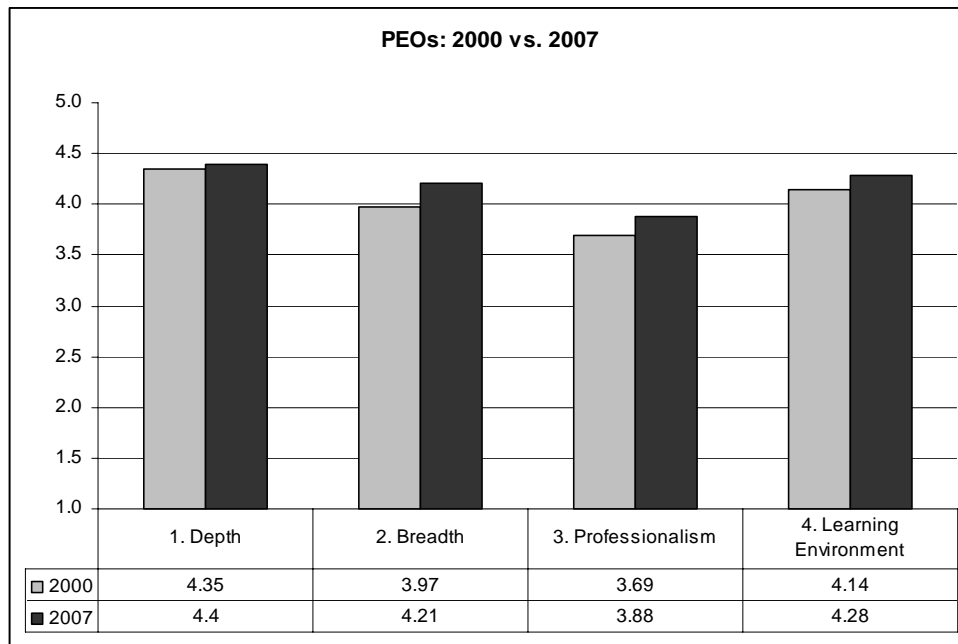
#### To produce graduates...

**Depth:** ...who apply in-depth understanding of scientific principles, rigorous analysis, and creative design to achieve success in the practice or advanced study of electrical engineering.

**Breadth:** ...who apply broad knowledge of electrical/computer engineering to a diverse range of successful public or private sector careers, or in their pursuit of graduate education, within the context of the technological, economic, environmental, social, political, and ethical constraints of a global society.

**Professionalism:** ...who use effective communication skills, participation as responsible team workers, professional and ethical attitudes and behavior, and commitment to lifelong learning to succeed in the complex modern work environment.

**Learning Environment:** ...who succeed because of attributes they acquired in a learning environment characterized by an innovative, rigorous and challenging curriculum; by opportunities to acquire leadership, organizational, and teamwork skills; and by faculty and staff who are committed to academic excellence and the inculcation of professional and ethical principles by instruction and example.

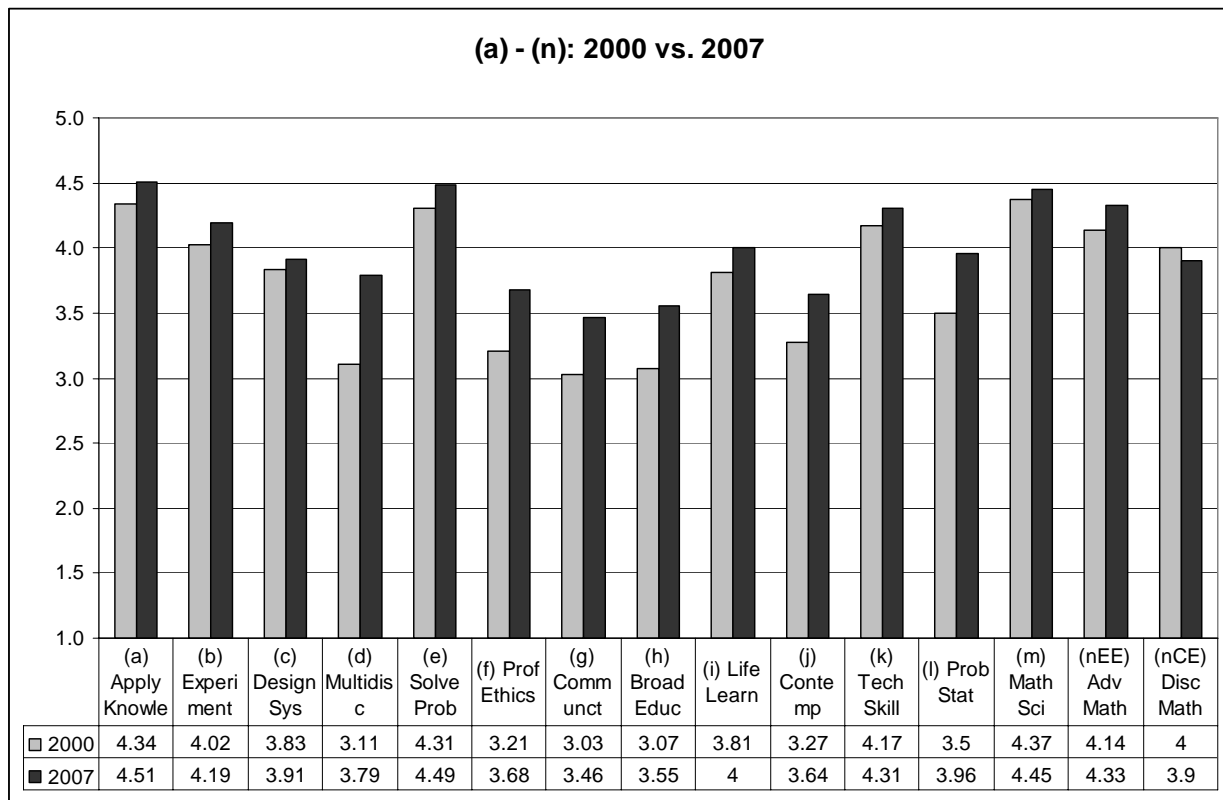


**Figure 1.** ECE alumni who graduated between 1997 and 2006 were asked to assess the department’s success in achieving four Program Educational Objectives: Depth, Breadth, Professionalism, and Learning Environment. The chart shows mean responses on a scale of 1 (“poor”) to 5 (“excellent”). Average scores improved between 2000 and 2007 for every PEO.

## 2. Outcomes (a)-(n): Attributes of an Engineer

Alumni assessed how well the ECE/UIUC undergraduate program helped them develop 14 attributes of an engineer, which correspond to the departmental Outcomes (a)-(n). The outcomes are as follows:

- (a) Ability to apply knowledge of mathematics, science, and engineering
- (b) Ability to design and conduct experiments as well as to analyze and interpret data
- (c) Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) Ability to function on multidisciplinary teams
- (e) Ability to identify, formulate, and solve engineering problems
- (f) Understanding of professional and ethical responsibility
- (g) Ability to communicate effectively
- (h) Broad education necessary to understand impact of engineering solutions in a global, economic, environmental, and societal context
- (i) Recognition of the need for and ability to engage in lifelong learning
- (j) Knowledge of contemporary issues
- (k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (l) Knowledge of probability and statistics, including applications to electrical/computer engineering
- (m) Knowledge of mathematics, and basic and engineering sciences, necessary to carry out analysis and design appropriate to electrical/computer engineering
- (n) Knowledge of advanced mathematics (EE)/discrete mathematics (CE)



**Figure 2.** Assessments of ECE/UIUC success in helping alumni develop Outcomes (a)-(n). Average scores improved between 2000 and 2007 for every Outcome except (nCE)

### 3. Feedback: Long Answers

Following are verbatim long answers in which respondents offer whatever feedback they care to share with the department.

**Table 1. Long Answers**

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Keep in mind that I'm running a software company, not working as a computer engineer, so math and science concepts like discrete math aren't relevant to what I do.

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1. Statistics courses in ECE (313) were terrible when I was on campus 96-00.
  2. No emphasis or breath wasted on social issues of engineering. Large disservice to the engineer I think.
  3. Excellent knowledge of the relevant issues in particular disciplines and advanced knowledge compared to peers.
  4. No training on research or how to apply 'life long learning'. ECE needs a 1-2 credit course solely on IEEE paper research. How to read them, what to look for, how to use authors-citations to understand a particular topic. This is basic library science, but would be a very good course for undergrads. Also a capstone project for the course which would be writing an actual paper based on the research papers. I didn't get this until I started taking master's level courses, but it's imperative for BSEE's to understand how to do this.
  5. Very little guidance on how to sort through all the knowledge imparted as to what's contemporary and relevant until you get into the field.
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Excellent preparation-- in my case for graduate degrees in EE, medical school and finally radiology residency.

Signal processing at UIUC is especially strong.

The ability to engage in public speaking and professional writing are a must in today's world- it would be to the advantage of the undergraduate engineer to have formal training in both. I did it the 'hard way'-- that is, learning on my own through trial and error.

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Illinois graduates need exposure to a broader range of subjects, and would particularly benefit with more knowledge on the social, economic, environmental effects of their work. There needs to be more focus on real-world skills, especially on speaking, writing, and leadership skills.

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Keep the academic ranking at a high level.

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You need to advertise more.. and make this great school more well known !!

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There was very little teamwork or data analysis done. Most of the course is theory and basic calculation (plug and chug, etc). Also, when we go for the 'broad' perspective, we miss a lot of the detail oriented stuff. The problems we do are textbook problems and nothing more in depth. There is nothing like A) design something, B) either build it or have the TA build it, C) it doesn't work. Why doesn't it work? D) Fix it and refabricate.

One thing that would be nice is a year-long course that starts in the fall and ends in the spring. There would be some basic theory, but there would also be some advanced problem solving skills.

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The PhD program prepares you very well if you choose to follow a career in industry. However, it is not as effective in preparing individuals for academic careers.

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I am now a lawyer, and I find that the skills I gained from the ECE program to analyze problems and find innovative solutions is invaluable. Given that there are so many other ways to use an ECE degree beyond being a practicing engineer, I think there should be more effort to inform students about other career opportunities. I would particularly have liked more opportunities to present information in a classroom

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setting and hone my ability to communicate detailed information to a wide variety of audiences. Overall I couldn't imagine better preparation for my current career than what I received at UofI.

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Undergoing the ECE experience at Illinois was humbling.

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Though most instructors performed their teaching duties well, a handful of post-docs teaching for the first time comprised the worst instructors in my educational career. Although the ability to teach effectively is a fine art fine-tuned with experience, it might be better for certain post-docs to have more experience before assuming the role of primary course instructor for a semester.

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UIUC is a very good university for engineering students, and ECE is one of the best departments in UIUC. I do benefit a lot from the studying here. Organization of more collaboration among students from different directions will make it even better.

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Definetly need to have more in the lab/practicale experience

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I am very happy with how the Illinois ECE department has contributed to my overall development and career path.

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When I reflect on the education I received at UIUC, I have very mixed feelings. This is probably most likely due to the fact that I graduated from Computer Engineering but was focused entirely in Computer Science.

I was always interested in software, and actually hated the hardware side of ECE. In hind sight, I should have switched majors into CS.

Even though all of my upper level technical electives were in CS, I still felt that I was unprepared when it came to programming. Advanced algorithms, data structures, and other various techniques were foreign to me when I was interviewing for positions at companies. Although I did end up with a good job, I feel that I missed other key positions because of my lack of programming aptitude.

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I will not be donating to any aspect of the university as long as the chief remains banned.

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Though this is a departmental survey, I will take this opportunity to again make known my displeasure at the Board's decision to discontinue Chief Illiniwek as the University of Illinois mascot. I will no longer support the university monetarily. The university bowed to pressure from a vocal minority to remove a great symbol of the university's heritage rather than standing up itself. This spineless display has demolished my confidence in the university.

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Overall satisfied with my experience (1996 BSEE grad, 97 MSEE) but two big shortcomings as I see it from my current role as a venture capitalist:

1) Very little anchoring of engineering knowledge in practical end-user applications. Would have made it far more meaningful

2) Way too little emphasis on business, and how engineering serves a purpose inside of larger corporation. I don't think I ever heard the WORDS 'Marketing' 'Customers' 'Business Plan' during my 5 years there. Definitely missed opportunity.

Best, Shawn Carolan ([shawn@menloventures.com](mailto:shawn@menloventures.com))

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Excellent curriculum but definitely room for improvement, especially with regards to the Math requirements.

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it was a demoralizing experience to attend UIUC

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Currently I am in graduate business school. ECE did a very good job of preparing me to be a student of difficult subject matter. I am confident that I can learn just about anything I will need know in my career.

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I do have mixed feelings though because I think I could have learned more during my time in ECE if some of my instructors were better teachers. The vast majority of them did put effort into teaching, but many just didn't know how to translate their superior understanding of the material into something that undergraduates could comprehend. I learned how to be successful in engineering classes--how to study, which equations I needed to apply where, and how to show work on an exam that looked like I knew what I was talking about. Lost in all that effort to get good grades and remain competitive however were some fundamental concepts that a better 'teacher' could have explained in about 10 minutes.

Another thought that I have had is in regards to grading and the difficulty of exams. I don't want to advocate grade inflation, but at the same time I think that making exams too difficult has negative consequences. Before I came to Illinois, I expected perfection. If I didn't get higher than a 95% percent on something it just wasn't up to my standards. After a few semesters of ECE though, I began to have to accept less than perfection because it just wasn't attainable. First it was exams--'Oh well, 67% was about the average so I guess I'm doing OK.' Then homework--'I don't have enough time to do this and I don't really care if it's right. I just want to turn it in so I don't get a zero.' I think the difficulty of the grading can perpetuate these 'good enough' attitudes and that is not something that is going to help students impress their boss once they leave campus. Probably an exaggeration, but something that's been on my mind.

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Extra tech electives General science requirements were too much. The ECE required courses are already plenty of science.

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The education I received in the ECE department at UIUC was superb and continues to serve me well as both technical training in ECE basics, computer architecture and software and education in a framework and mindset to approach, dissect and solve any technical problem. The opportunity to be an engineering leader as opposed to simply an engineer is one not to be wasted after leaving campus. The department also does a great job of maintaining contact with alumni after graduation and also providing online opportunities for continued learning.

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Excellent department that was as accomplished in educating undergraduates as providing great research opportunities.

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If I had it to do over again, I would take courses that would have prepared me for working within a corporate environment (like business classes) rather than 'gen eds' and other pointless classes I took. I had to take a number of courses in other departments to fulfill the various campus requirements that I have since only used to answer questions on Jeopardy!. I think it would be more useful to take courses that help you relate to various backgrounds that you are likely to encounter in your professional life. Business courses are an obvious answer, as are non-ECE engineering courses. It wouldn't be too hard to figure out who most ECE grads are going to work with after they graduate.

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I thought my UIUC experience was good overall. It prepared me well for the career I have now, although I don't feel that I have the breadth to move into a career that strays very far from my very specific area. I think the department does a better job in the theoretical areas than in the practical areas -- in other words, I think the department does a better job of preparing people for grad school than for industry. But like I said, the education I got is definitely serving me well in my somewhat narrowly-focused career, and my experience was definitely positive overall.

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I enjoyed my time at Illinois, but as I have progressed through my graduate career, I have definitely found some weaknesses of the ECE curriculum:

1. The big picture. Very few of my classes encouraged us to think about circuits from a broad perspective. 'How would you design a circuit that does X?' 'What are the desirable properties of such a circuit, and what do you need to watch out for?' Instead, we were given a circuit and told 'This circuit does X. What is the current at node 1?' I feel like I rarely saw the big picture in my classes. To fix this, you could have homeworks that were more conceptual ('here's a circuit... what do you think it could be used for') and less crank-through-the-numbers. I would say that the semiconductor classes were an exception to this feedback... they were great.

2. Career advising. I feel that the ECE advising is really good at producing generic engineers to go work at

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Motorola, but not so great for people who want to do something different. Since 'doing something different' is where a lot of innovation and creativity is generated, this really squanders student potential. I wanted to go into molecular bioengineering, and the ECE department was unable to find me a good mentor. As a result, I was largely blindly groping along different paths, and trying (unsuccessfully) to find something that fit while at U of I.

Ofcourse, there were lots of great things about the department, as well! There were great leadership opportunities in the forms of various clubs that interfaced with the department. We had great corporate exposure. Many of the professors legitimately cared about us. We had some good lab classes for hands-on experience. The scholarship system was generous.

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I'm currently finishing a Ph.D. in ECE at a different school.

After leaving UIUC, I realized that though I worked hard and got good grades, I lacked solid intuition about several of the subjects. Though of course I bear most of the responsibility, this partially resulted from the weekly flood of homework sets which makes it hard to stay ahead of the game and have time to sit and think about the material. I don't know how to solve it, but maybe a system in which homework is optional but problems with solutions are given. With this, make more frequent tests/quizzes. Encourage people to just sit and think about the problems until they feel they really understand it.

Probably the most effective approach would be to make ECE a 5-year degree and encourage people to take light loads but gain deep intuition about the material. I remember more from the semester I took 12 hours than the semester I took 18 hours, though I got similar grades in each.

It's difficult to learn if you're always scrambling around. Students should be encouraged to develop deep intuition about a subject since that's what will stick with them after the course.

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U of I has helped me to be able to qualify for a broad range of occupations. The more I work with engineers from other universities, I realize that there are many things I learned or was exposed to at U of I that others were not as fortunate enough to have been exposed to. U of I is a great educational facility.

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I felt well prepared to take on any challenge. College was not like OTJ training, I wasn't ready to 'just work,' but I felt like I could learn anything, and the underlying theory behind what I was actually doing was provided by my education. Good foundation!

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The ECE program at Illinois was excellent in general. I felt sometimes I didn't have enough opportunities to apply the theoretical knowledge I learned. Also, I felt the department did not help undergraduates get involved in research enough.

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From my experiences, (perhaps this has changed since I've left), many of the professors didn't seem to have interest in being good teachers. The classes were very competitive and didn't really foster a shared learning environment - rather how much more you knew than the other people when exam time came around.

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Undergraduates have: Excellent knowledge base,

Average design training,

High potential to grow.

Graduates (masters, phd) are very well prepared.

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The program has great potential, but the overall attitude is very discouraging. So rarely is any appreciation or encouragement given for many hours of work, making motivation a struggle at times.

Many professors seem distracted with their own work to organize classes well. Often it was unknown what was going to be on a test, the professor refusing to give any insight. This was extremely frustrating because then one spends a large amount of time learning things that are trivial / unimportant in case they 'might' be on the test, leading to lack of sleep etc. I understand it's probably difficult to get the vast curriculum consistently organized from class to class, but I know this is how I and many fellow engineers

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felt - unappreciated and discouraged most of the time.

ECE 444 was a good example of what classes can be: The professors care, the equipment is there and a great tool for furthering understanding, and grades were in fair judgment (rather than very low, then later curved to offset them... leading to constant uncertainty of what one has / will have in a class).

Hope this helps.

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There needs to be more of an emphasis on communication, both verbal and written. I took power classes, and they really stressed the need for detailed lab write-ups. The other EE classes did not. In other words the write-ups that would produce an A in 443 would get you about a C- in 469. Also remember that English IS the language, not Hindi or Chinese.

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Got me, myself, and I ready for work

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My education was much more rigorous than the education of my colleagues from other schools in related majors. The two major gaps I see in the program are two-fold. First, the program is missing the ability to teach proper communication skills to most of the students. A majority of them seem to have English as a second language and a large portion of the remainder have very poor social skills. Having been in a management position where I hire these individuals, it is EXTREMELY frustrating that they can not communicate with me clearly to accomplish what I need them to do (and know they can do). Secondly, there should be additional focus on real-world application. I think the program does a satisfactory job of this, but there is still great room for improvement.

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To this day, I'm still very proud of my education from UIUC (BS CompE, '03). I'm currently a staff researcher at Northwestern, and I find myself looking back on my UIUC days with a fondness that only grows stronger the more I realize how well it prepared me to excel at my new career. I've been doing electrical and computer work for the Civil Engineering department, and I've begun to delve into getting a graduate degree in Civil Engineering from NU, and even in that field, I find that the basic skills that I acquired and honed at UIUC keep me well ahead of my colleagues.

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UIUC offers one of the country's best education opportunities in ECE.

My undergraduate course of studies prepared me extremely well for graduate school and beyond.

I am currently a professor at the FSU College of Engineering, due in no small part to my UIUC education.

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The rigorous emphasis on fundamental concepts and development of back of the envelope estimation ability prepares one for a variety of graduate and professional work.

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In general, I think the biggest gap in my engineering education was in producing students with professional communications skills - speaking in particular, but writing as well. I was able to fill this gap through the Technology & Management program, but I think most ECE graduates are weak in these skills.

The majority of courses also were too theoretical and did not always make it clear how skills were applied in the workplace.

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Dear ECE Department,

My experience with ECE is the worst of my entire life.

There are several reasons for this.

First, I felt my high school did not prepare me for the rigors and demands of the ECE curriculum.

Second, I was suffering from severe depression during high school and this carried over into college and was a reason why I did not live up to my potential as a student in ECE. I was unsuccessful in building any positive momentum since the depression had a complete grip over me. As a result, my grades suffered and this cut me out of a lot of internship opportunities with companies like Intel, Motorola, etc.

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And that came as a big surprise to me when they didn't even want to talk to me because my grades didn't meet their minimum 3.0 requirement. And I would think to myself 'but I go to ECE @ UIUC, one of the best programs in the country!'. But, they didn't care about the name/reputation of the program I came from if I didn't meet their minimum GPA.

It didn't matter to them at all. [emphasis added.]

They would rather take someone with a 3.0 or higher from a totally unknown school rather than someone with below a 3.0 GPA (like me) from UIUC.

This was a real shocker to me and completely made me lose respect for the entire ECE department at UIUC. [emphasis added.]

I realized all the rankings and reputation don't really matter if you don't have the grades.

I realized it was one big lie. [emphasis added.]

Employers don't care about any of that: they are only looking to minimizing their risks when hiring a new college graduate and GPA plays the most significant role in that. The name of ECE doesn't really mean that much at all. Sure, it will help, in that the vast network of ECE alums all over the place may help you get in contact with the right hiring people at a company, but when they see your grades, they will most likely become very disinterested very quickly.

And that's just a plain shame.

So, my conclusion is that I no longer buy into any of the hype that these schools like to sell themselves on about how great of a reputation they have, how they have a large percentage of faculty who are IEEE Fellows, etc.

None of that matters to the real world at all. It certainly doesn't matter to me anymore.

So, I really never got a career started in ECE as a result and had to forge my own path.

I started my own company out of college due to fortunate circumstances and learned a ton compared to my peers, most of whom are probably living paycheck to paycheck working for some big corporation wishing they made more money.

I did some engineering consulting work for awhile before heading off to law school to pursue patent law.

Whenever people ask me where I went to school, I tell them, and they seem impressed because of the reputation that the school/department has created for itself, but rest assured, I don't say it with any pride or any sense of satisfaction because, as I said, my days at ECE were the worst in my entire life.

And when I got out into the real world, I realized that engineers are just tools for companies. For the innovations that engineers come up with, it's pathetic that big corporations end up owning all of the intellectual property and engineers really can't do a damn thing about it.

The only real value that I got from the ECE department is that it gave me a technical degree that I can use to get into patent law, where there is a lot more respect for the profession and there is a lot more money to be made. [emphasis added.]

Engineers are horrible at protecting their profession and there is nothing equivalent to a state bar association that engineers must be a member of in order to work in the state. With engineering, you get your degree and are largely on your own. The profession doesn't make sure its members are continually updating their skills that professions like medicine and law require and does nothing to protect their own kind.

So, in a sense, when engineers are the parties that are hurt by all this outsourcing going on, I blame the engineers for not protecting their own kind.

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I really have no sympathy for them whatsoever. [emphasis added.]

They just don't get it.

I'm glad I'm changing careers and getting into patent law where it is not unreasonable for to be making \$500,000 in about 10-12 years after law school

You would never see anything in engineering that would compensate with this kind of money. In fact, I met several individuals with 30 years of experience who were just barely making \$100,000. Not only that, they were constantly worried about getting laid off and were suffering from depression, disgruntledness, and bad attitudes after having been beaten down over the decades.

And this is rather common, too.

And the professors never really cared about teaching. They were all into their own research and teaching was just something they had to do. Only a handful really cared, but they were in the minority.

And most of them never had any real world experience working in teams to get a product designed and manufactured. Most of them are just pure academics who have virtually no practical skills whatsoever.

Not only that, most of them have been straight A students their entire lives and have a very difficult time relating to someone like me who's struggled academically. They just simply don't get it. That's why many were not interested in having me be involved in their research groups because they'd rather minimize their risks by finding someone with better grades.

In that respect, I hardly respect any of the faculty for their accomplishments and for the kind of people they are. They're just working a job like everyone else and advancing their own agenda without really caring about anyone else unless that persons helps them publish more papers, etc.

I think a pertinent example is NN Rao's personal webpage. This is the most ego-driven, eccentric, selfish kind of webpage I have ever seen. It just proves the kind of pompous jerk that he is.

Do you think people really care that his favorite meal is breakfast at 5 a.m.?

After overcoming my depression, I've seen a larger perspective on life and believe I have become a better individual as a result. And it is this experience that taught me to be more effective in all areas of life greatly surpassing that ECE has done for me.

Anyway, I'm glad I'm in a new career where people actually respect me and I get paid much more than anything an engineer would make. I am happier now and am confident that I am making a real difference in my life and others.

To me, ECE was just a hump to get over, and not something to really remembered with any fondness whatsoever.

So, in short, all the ECE alums and faculty can play their own game, and I'll be playing mine.

In the end, I know I'll be victorious.

Regards,

ECE Alum from sometime last century.

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I would have wished to be able to achieve a dual major in Computer Engineering and Electrical Engineer. I had all the required classes for each.

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I did not specialize in an area, per se. I took a variety of courses in ECE....and I'm very glad I had that opportunity! I knew a little about a lot of things. And, in my case it couldn't have worked out more perfectly. I got a job as a manager in manufacturing plant. I was in charge of all eletrical systems on my shift. Now, I'm responsible for all the production, maintenance, and logistics for the warehouse. The engineering degree is great because it helps me to see the effect of a decision, and troubleshooting my equipment.

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I think the department can help other students better who want to work in a manufacturing environment - rather than as a design engineer. So much of the curriculum is geared toward the design engineer. With manufacturing plants getting so much more technical (robots, high-speed sensing, vision systems), a talented troubleshooting, programming, and fire-fighting EE would be great!! I would hire a recent college graduate with that kind of experience without hesitation!

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I feel that my ECE education has left me with a wider breadth of knowledge than depth. This is probably because I did not have the time to go further in depth into an area of study after finishing the required courses. I also found it difficult to understand the real-world applications of many of the concepts we studied, again probably due to the fact that I stayed in many intro-level classes. The senior design project was a great challenge, but I chose a project that wasn't as closely EE-related because I knew I was in no way trained to use my limited skills and knowledge from other classes there.

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The program was very encouraging, but the faculty was not. On numerous occasions, faculty have been rude, offputting, and overall abrasive in their comments and help. More importantly than professors, is the lack of respect the advisers give to their students. Nowhere else have I seen such insulting advising. Especially the head of the department who is supposed to represent success, professionalism and integrity. I'm glad I have a degree, only so that I do not have to deal with the department again.

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I wish the department may improve the following areas particularly for grad students:

1. Cross-team communication and collaboration: One characteristic in UIUC after I have been in other top schools is that in general grad students in different professors' group DON'T have enough chances to work with each other. Learning how to communicate between peers is lacking in ECE grad program. And weekly seminars are also too big for average grad students to actively participate and foster team work.

2. Grad students have less change to listen to and discuss major social challenges and their engineering connections: for example, renewable energy, privacy protection, and global warming. That is where the money may converge in the future when the students graduate

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I write as a former Grad student who graduated with a PhD in ECE in 1999. I found the Department's restrictions on taking courses in other departments such as Physics/Chem/Math baffling to say the least. It undermined the ability of a student to develop a firmer understanding of fundamental principles in basic sciences, out of which spring the various engineering disciplines. It is expecting too much of a student to take a minimum number of course units in ECE (and ECE only). Also, the whole procedure of conducting a qualifying examination -- regardless of the format -- is meaningless. It is best to observe a student's progress for a year or 18 months and either deny him permission to pursue a PhD if found unfit for a PhD, in which case an MS must be given, or let the student continue for a PhD. The passage through a Qualifying Exam does not guarantee a student's ability to do any research, on the contrary it tests a student in taking examinations.

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As a Licensed Professional Engineer who works in the Engineering/Architecture world designing facilities around the world, a knowledge of the NEC (National Electrical Code) is a must. I think Illinois would be well served to have a semester class covering the code as this touches many graduates after they leave school and get into industry.

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The undergraduate education does quite a bit of theory and teaches most of the mathematics needed for the outside world, but it is too broad. A person trying to do a specialty really only takes two to four courses in their 'specialty' and thus is not very well versed in that field.

Also, while the theoretical background is nice and the students can do high level math, the ability to design and conduct of experiments is lacking. Students need to be able to analyze failure mechanisms and/or explore results in the real world. It would be one of those A leads to B leads to C cases (textbook problems always end with A).

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As an engineer in a consulting firm, I'd say it is important to note that there is a lack of focus towards the consulting industry in the undergrad EE curriculum. Often, students have a curriculum that enables them to be successful in the manufacturing industry, but these same students have not been exposed to elements that become essential in a consulting industry (building codes, i.e., National Electrical Code,

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specifications, etc.). I have seen co-workers who come in better prepared to work in a consulting environment, it'd be nice to see some initiative towards broadening the EE curriculum to include material that may help a student better prepare himself for the consulting industry.

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Overall I feel that going to Illinois and earning a BSEE was the best decision that I have made! ECE teaches great problem solving skills. It also gives a great scientific and critical thinking background to understand many different subjects.

I hope that in the future, the ECE department will be able to make allowances for people who are pursuing medical school. I graduated in 4 years with a BSEE in May 2005 and I immediately entered medical school but looking back it was very difficult to be able to complete both the ECE requirements and pre-med at the same time and all while taking only 4 years. I understand that there are certain competencies to be met for ABET but perhaps there could be some special advisors in ECE or the College of Engineering that will be able to assist those engineering students who are pursuing medicine. ECE and engineering graduates are sought after in medical school because they are so unique and have the necessary problem solving skills to be able to make an impact in medicine. The next generation of medical technologies are going to arise from electrical engineers in medicine and thus I think it would benefit the Department of ECE if they were to make strides in promoting these sorts of alternative career options.

I am willing to answer any further questions. E-mail me at [jonathan.frederick.bean@gmail.com](mailto:jonathan.frederick.bean@gmail.com)

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In my opinion, this is the #1 ECE department in the known universe.

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Having attended a different institution for my graduate career, it is clear to me that UIUC's strengths are in teaching fundamentals and teaching them very well. I personally believe that I was much better prepared for graduate school than my peers and that was exclusively due to my work at UIUC. However, weaknesses at UIUC are due to a lack of diversity of learning. The curriculum tends to be so narrow that EEs, for example, cannot elect courses that would probably be very important to their professional careers.

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In general, uiuc provides an excellent theoretical background but lacks in the area of practical design. The core curriculum doesn't provide much opportunity for design. The only EE required course that has true design aspects is senior design. There are elective courses such as ADSL, but practical consideration such as thermal calculations and vibration were never discussed while I was at uiuc. If extra-curricular projects like ACM and IEEE projects for EOH were heavily encouraged, I believe the students would come out more rounded in terms of design and theoretical experience. At my workplace, the students from U of I who tried more design projects (through clubs, classes, and on their own) start out as more productive engineers and continue to experiment and learn faster than their counterparts who only took the required design courses. The only caveat I have is I don't know how much of what I have observed is education/experience and how much is personality. Also, most of this applies to the EE curriculum not the CompE curriculum. I graduated a CompE, but have been working in power electronics, analog circuitry design, and embedded systems programming. The breadth you can get from the ECE program is awesome if you plan for it!

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UIUC and the ECE department needs more professors who are focused on teaching rather than research - it was very evident during my time at UIUC that few professors were truly 'teaching' professors, and it showed in their lack of enthusiasm and willingness to really engage with the students. Stricter English speaking requirements for professors would help as well, some professors were just plain hard to understand.

I am not sure if UIUC or the ECE department can really improve on how well the educational programs transfer to the 'real world', since I believe the main focus of the university environment should be to learn the theory and principles of engineering and other disciplines. However, it does seem that there's some room for improvement for teaching application of the theories that are taught.

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I am very happy with the education I received from the ECE Department as well as UIUC in general. I feel that I have a noticeable advantage over my peers that attended other universities. My studies and experience at UIUC have clearly given me an edge to succeed with my knowledge base, problem solving skills, communications skills, and analytical skills that were developed within the ECE department and

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UIUC as a whole.

I would have like to have taken more business classes (finance, accounting, business management, negotiating, etc.). I think there should be a bigger emphasis on these types of classes within the ECE curriculum as nearly all of us are going to have to deal with, if not manage, the 'business end' of engineering. The financial aspects of our professional career greatly influence the way we proceed with projects and research. These financial aspects need to be studied in much greater detail (as an undergrad) as it relates to the engineering field. Instead of being electives within the curriculum, I think the business classes should be required.

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Communication is vital to engineering. I would of reluctantly enjoyed a course on scientific/engineering writing:

Writing technical memos

Writing technical reports

Writing technical articles

Building scientific/engineering vocabulary and prose

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More projects! Real multidisciplinary design projects with interesting teachers are very important. Senior design does not count, as too many people kludge it by just for the sake of getting the grade.

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Just a note. I think that the survey is a bit to vague. The context for questions 5-19 is ECE/UIUC undergraduate program. I feel that I learned most of the above skills, such as leadership, project planning, and lifetime learning, in my involvement in organizations/projects OUTSIDE of the ECE department. I would also lump question 3 in that category as well.

Overall, I am very happy with the quality of education that I received at UIUC. I would say, now looking back on my journey, that the ECE curriculum provided me with a very theoretical foundation. This suited my first job as an ASIC designer, but made for quite a learning curve with my second job as a software engineer. The first was more research/development where my second was a design/development position. I would like to see the ECE department incorporate more project based classes which are partnered with corporations. I feel that this would expose students to the 'real' world. I've interviewed many students from other schools, and those that have had classes doing projects for companies adapt very quickly to our company.

In addition, I would like to see engineering ethics be a required teaching at UIUC. I believe that there is an optional ethics course, but I believe that it a smaller section of this should be taught in perhaps the ECE110/210 courses. At least, this would expose students to the ethics of engineering AND project management. (Do you lie to meet the schedule??)

Speaking of project management, I would like to see a project based course that provides students with an opportunity to take a project from requirements to delivery, like you would do in the real world. I took the ECE design course (optional for CompEs) and while I got a taste of project management, it could have been done more in depth. I would think that this should be a year long course, not just one semester.

One other thing would be to introduce the concept of a development process. This would include how to gather requirements, what makes a good requirement, how to write architecture documents, how to perform code reviews, testing strategies, etc. Development processes are used extensively in industry. Perhaps they could be incorporated into some of the classes.

Overall, it would be nice to see the ECE department provide opportunities for students to obtain more 'practical' skills in addition to the 'theoretical' skills that the department already instills.

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I wish that the ECE department will further develop channels for alumni networking. For example, an alumni mailing list where alumni all over the world can post information on career opportunities, professional activities, learning activities, etc. Stanford University has excellent alumni networking

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channels, and I would like to recommend the department to look into duplicating some of what Stanford does.

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please have more social & professional networking - both in person and online

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Computer Engineering majors should take courses in either operating system or compiler development since modern embedded platforms require a strong understanding of how these interact with hardware. Old courses (need new numbers) like ECE 291, 312 and 311 are critical to understanding real-world computer engineering applications.

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The sub-par math department at U of I is one of the reasons I cannot give U of I's math education excellent grades. The engineers at U of I should NOT be forced to take math courses from the sub-par U of I math department, which takes away from the entire value of the education.

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I feel that the the departmental curriculum is lacking in rigour, both in encouraging students to take higher math classes, in giving people experience with circuit design, in ensuring that graduates have a sufficiently strong background in most areas of EE. There is also no real effort to make students realize how their work fits into a broader construct both in terms of manufacturing or systems design, or in terms of sustainability and green technology.

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One item that would have been very useful would have been a linkup with Engineers in industry to actually teach a class or two from the point of view of a practicing engineer.

Also, an emphasis on the benefits of gaining PE status would have been useful. Did not see any references / encouragement towards

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## Appendix – Survey Form



### ECE Alumni Survey

This survey is NOT yet live.

#### I. ECE Program Educational Objectives

The ECE department has defined four broad Program Educational Objectives for its degree programs in electrical engineering and computer engineering. For each objective, **assess the department's success in achieving the objective**, based on your experience as a student and your experience since graduating.

	1 - poor	2	3	4	5 - excellent
1. <b>Depth.</b> To produce graduates who apply in-depth understanding of scientific principles, rigorous analysis, and creative design to achieve success in the practice or advanced study of electrical engineering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. <b>Breadth.</b> To produce graduates who apply broad knowledge of electrical/computer engineering to a diverse range of successful public or private sector careers, or in their pursuit of graduate education, within the context of the technological, economic, environmental, social, political, and ethical constraints of a global society.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. <b>Professionalism.</b> To produce graduates who use effective communication skills, participation as responsible team workers, professional and ethical attitudes and behavior, and commitment to lifelong learning to succeed in the complex modern work environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4. Learning Environment.**

To produce graduates who succeed because of attributes they acquired in a learning environment characterized by an innovative, rigorous and challenging curriculum; by opportunities to acquire leadership, organizational, and teamwork skills; and by faculty and staff who are committed to academic excellence and the inculcation of professional and ethical principles by instruction and example.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**II. Attributes of an Engineer**

For each attribute of an engineer listed below, pick the number that best corresponds to how well the ECE/UIUC undergraduate program helped you develop the attribute.

	1 - not well	2	3	4	5 - extremely well
5. Ability to apply knowledge of mathematics, science, and engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Ability to design and conduct experiments as well as to analyze and interpret data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Ability to function on multidisciplinary teams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ability to identify, formulate, and solve engineering problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Understanding of professional and ethical responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Ability to communicate effectively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 12. Broad education necessary to understand impact of engineering solutions in a global, economic, environmental, and societal context                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. Recognition of the need for and ability to engage in lifelong learning   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. Knowledge of contemporary issues   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. Knowledge of probability and statistics, including applications to electrical/ computer engineering  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Knowledge of mathematics, and basic and engineering sciences, necessary to carry out analysis and design appropriate to electrical/ computer engineering | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. <b>(EE majors only)</b><br>Knowledge of advanced mathematics   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. <b>(CompE majors only)</b><br>Knowledge of discrete mathematics  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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**III. General Comments**

20. Use this space to submit any other feedback you may wish to share with the ECE department. Write as much as you like!