**Notes from discussion on Undergraduate Curriculum**

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Table Participants: Gagan Jodhani, Stony Brook U.; Gregory Rohrer, Carnegie Mellon; Victor Vasquez, U. Nevada Reno; Rick Laine, U. Michigan; Luiz Jacobsohn, Clemson U.

***Summary/report out:***

We had people from Materials, physics & chemistry departments at the table.

Nature of materials science is a blessing and a curse. A little bit of everything. Lot of connections with ME, chemistry, physics. Now carve out a space. How to define that? How to say which courses should be taught in materials science? (For example: no mandatory courses in modeling.) How to incorporate new teaching techniques and technologies?

Have huge amounts of flexibility in what we do relative to other ABET-accredited programs, such as ME, because of overlap in disciplines we must encompass.

Important to monitor how UGs do in admission to graduate school and progress in graduate school -- is something missing?

Major crisis is textbooks. Books are decades old and there is little payoff to write a book. About 50 free-standing departments.

***Discussion notes (unsorted)***

@ UConn: physics and materials science dept. work closely together. Some materials students don’t have theory background, need to take quantum mechanics in physics. One or two courses can accommodate what materials scientists need.

Nature of materials science is a blessing and a curse. A little bit of everything. Lot of connections with ME, chemistry, physics. Now carve out a space. How to define that? How to say which courses should be taught in materials science?

There’s a community of people who do materials science & engineering research. Smaller subset of schools that teach materials science & engineering. Ben Black wrote first book in materials science, which came out of Michigan.

@ UMichigan first-year engineering students don’t declare major. Take basic courses in engineering, then decide. See flux of where they go. 60 => 200 students in materials science over the years.

Other issue: accreditation agencies provide barrier; must be ABET accredited.

Problem w/ ABET accreditation. Historically metallurgy. New generation more well-rounded.

Better position than the other disciplines in ABET, such as ME. Have huge amounts of flexibility in what we do. Because of overlap in disciplines we must encompass.

Strength: diversity in materials science depts. Missouri S&T is very different than Penn.

Some schools dropping ABET: MIT, Stanford. Undergrads think they will be licensed engineer, need/want accredited degree. Employers look for this background. Lose accreditation and we’ll be out of business.

Stony Brook: engineering science, chemical engineering.

U.Mich: Set of core courses and “selectives” – basically a major and a minor

@ U.Conn: Major/minor Minor in materials science, engineering physics. Internships in materials.

@ UNevada Reno: Challenges w/ undergrad curriculum in general. New ways to teach. How effective is our teaching? Are the students actually learning?

What about on-line education. A guise for university making more $? On-line assisted learning will be useful. Using technology.

Faculty member with absolutely no experience teaching prior to faculty position. AIP organized physics teacher workshop made huge difference in effective teaching.

That’s why Michigan puts new faculty in as recitation section leaders in the first term.

Michigan: mandated requirement that grad students teach one semester. Chem Dept has one-day teaching course. In materials, instructor teaches students working for the course.

@ Stony Brook grad students must teach 5 semesters. Take course in teaching and mentoring techniques.

Some departments do this. Course on teaching for the faculty.

In Pennsylvania, international students cannot teach w/o being certified. Must take test.

Courses that emphasize biomaterials are heavily enrolled.

Students interested in polymers have to take courses in inorganic materials that have little relevance. Forced to take it but it gives you a larger perspective. In future years, know where to look to find solutions to questions.

Specialized courses. A lot of very senior level people in materials were trained as metallurgists and went into polymers later.

@ U.Nevada Reno: Four core areas, with short list of courses in each area.

@ CMU: Only one path through degree b/c of ABET and elective.

Michigan: has modeling courses, 7 modelers on faculty, but it’s not required for students

*What is missing?*

Major crisis is textbooks. Books are decades old. No payoff to write a book because only about 50 free-standing departments.

UConn: Flipped classroom. Pre-lectures and answer questions on line.

CMU: students objecting to on-line lecture and attending class and doing homework – more hours per week