ChE teaching tips

This one-page column will present practical teaching tips in sufficient detail that ChE educators can adopt the tip. The focus should be on the teaching method, not content. With no tables or figures the column should be approximately 450 words. If graphics are included, the length needs to be reduced. Tips that are too long will be edited to fit on one page. Please submit a Word file to Phil Wankat <wankat@ecn.purdue.edu>, subject: CEE Teaching Tip.

SURVEY: MATLAB & MATHCAD EDUCATION IN BIOCHEMICAL ENGINEERING

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Table 1 shows results of a U.S. nationwide survey conducted by Villanova University on the status of MATLAB and MathCAD training in graduate courses in biochemical engineering.

Although MATLAB & MathCAD modeling techniques are used in mechanical engineering[1] and electrical engineering,[2] Table 1 shows that training in MATLAB and MathCAD is seldom introduced in biochemical engineering. In addition, students with a non-engineering undergraduate degree are taking courses in biochemical engineering, which makes the implementation of MATLAB and MathCAD in these courses more challenging. The survey also shows that instructors nationwide in biochemical engineering have a strong interest in using MathCAD and MATLAB modules in the areas of systems biology and upstream/downstream bioprocessing in their courses.

CONCLUSIONS

Survey results from 29 universities show that the training on modeling skills implemented by MATLAB and MathCAD is not commonly provided in biochemical engineering. There is a need for developing examples and teaching strategies to train biochemical engineering students with MATLAB & MathCAD.

REFERENCES

1. Dabney, J.B., and F.H. Ghorbel, "Enhancing an Advanced Engineering Mechanics Course Using MATLAB and Simulink," *Intl. J. Engr. Educ.*, **21**(5), 885 (2005)
2. DeLyser, R.R.,"Using Mathcad in Electromagnetics Education," *IEEE Trans. Educ.*, **39**(2),198 (1996) ❏

TABLE 1
Questionnaire and results of the survey on MATLAB & MathCAD Education in Bio-Chemical Engineering

	Questions	Number of universities responding with Yes, No, or N/A for each survey item		
		Yes	No	N/A
1	Is MATLAB training provided in any of the graduate (bioengineering) courses in your department?	8	20	1
2	Is MathCAD training provided in any of the graduate (bioengineering) courses in your department?	2	26	1
3	Have you ever had distance (or "e-learning") students in these (bioengineering) graduate courses?	3	26	0
4	Do you ever have students in these (bioengineering) graduate courses that have an undergraduate degree in something other than engineering (*i.e.*, biology, chemistry, etc.)?	26	3	0
5	Would the instructors of these graduate bioengineering courses find it helpful to have access to (for potential use in their courses) MathCAD and/or MATLAB modules in the areas of systems biology, cell culture, and chromatography? These modules would be posted on the Villanova website and would include a problem statement, MathCAD/MATLAB solution, and an explanation of how to deliver the module and use/change the MathCAD/MATLAB program.	21	4	4