It Takes a Math Department

Stephen DeBacker

AMS Committee on Education
A story . . .

Caveats

Placement

Intro Program Courses

Training

Conclusion
A story
A story
A story
Some advice from John Wooden

“Never mistake activity for achievement.”

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Caveat One

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Caveat Two
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Caveat Two, continued

(Nearly) everyone contributes to the success of the undergraduate program; here are some of the many things I won’t discuss:

Michigan has a healthy actuarial program, an Inquiry Based Learning center, a solid secondary teaching program . . .

In any given year, 25% of faculty are involved in advising.

In any given year, 25% of faculty are guiding an REU.

Some faculty create outreach opportunities for students (Math Circle, MMSS, Algebra Project, Future University, . . .)

Some design the contests that they take. Others coach.

Some run/advise the various student clubs/colloquium Douglass Houghton Scholars. etc. . . .
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1. Standard Sequence
2. Honors Seminar Sequence
3. Honors Applied Math Sequence
4. Honors Calculus Sequence
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Placement

Standard Sequence

Math 105: Data, Functions, and Graphs.

First year courses:
- Math 115: Calculus I
- Math 116: Calculus II

Second year courses:
- Math 214: Linear algebra for CS and IOE
- Math 215: Multivariable
- Math 216: Differential Equations for non-math majors
- Math 217: Linear algebra/gateway to mathematical writing

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Proper math placement is very important. Placement at Michigan involves two (or three, depending on how you count) steps:

1. On-line placement exam. (ready/not ready for calculus)
2. Each incoming student comes to campus for three days of orientation

For placement in standard calculus sequence, see GSI.
If extremely interested in math, see a faculty member for placement.

Surprisingly, this works really, really well.
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What do the Introductory Courses look like?

105 and first year courses (Calc I and II):
- Oriented towards concepts/modeling
- Very little lecturing, focus on solving problems
- Professionally coordinated
- Math Lab resource
- Uniform exams and grading "force" instructor into role of coach.
- Many, many moving parts. For example,
  - WebWork
  - Team Homework
  - Instructor graded.
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Second year courses (214, 215, 216, 217):
- Traditional lecture
- Coordinated by faculty
- Math Lab resource
- (Mostly) uniform exams
- Many, many moving parts. For example, WebWork
- Written Homework
- Group work in labs

In addition, for Math 217:
- Peer instruction for proof writing (Kiluk experiment)
- Experimenting with using IBL techniques
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Discuss schedule.
The point: we want buy in. Teaching well is important; once instructors accept this, things generally fall into place.
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- Weekly meetings
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- Classroom visits (at least twice).
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Every year one or two faculty go through training.
A successful undergraduate program requires the efforts of nearly everyone in the department.
Conclusion

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