Texas A&M University - Kingsville

Year 3 - An Autopsy

John Chisholm
Mark Cortez, Lifford McLauchlan, Aden Ahmed

Brief Review

- Objection by Arts and Sciences to creation of 4-hour Engineering Mathematics course claiming it was an attempt to teach mathematics in the College of Engineering.
- Solution
  - The Engineering Mathematics developed as a MATH course in Arts and Sciences.
  - Engine Math would replace pre-calculus in mathematics sequence.

Engineering Math MATH course stalls

- Mathematics faculty reject replacing the pre-calculus course with Engineering Mathematics.
- Arts and Sciences will not schedule a laboratory section to augment MATH 1348
- MATH 1348 taught in Spring 2010 without calculus content or an associated laboratory

Fall 2009

- One section of MATH 1348 was taught with the associated laboratory.
- The three-hour section was limited to the regular material in Pre-Calculus.
- The voluntary Maple laboratory supported the material in Pre-Calculus and lightly touched the calculus.

Fall 2009 MATH 1348

Course	Enrolled	A	B	C	D	F	Q
Engine Math	30	7	10	4	3	4	2
Regular	49	14	14	15	2	1	3

Spring 2010 Calculus I

Course	Percent enrolling in Calculus I	Percent passing Calculus I	Percent who Failed or Dropped Calculus I
Engine Math	79%	84%	16%
Regular	78%	86%	14%

The Revised Plan

Engineering Math Laboratory

- Co-requisite with Pre-Calculus
- Two-hour lab course with 6 contact hours
- MatLab and physics and EE laboratory sessions
- Support Pre-cal subjects
- Cover Calculus & DiffEQ
- Use Summer 2010 to train a fresh cohort of teaching assistants

Why?

- A two-hour laboratory can’t be accused of trying to teach mathematics in the College of Engineering.
- Handled by engineering faculty rather than mathematics faculty.
- Leaves quadratic equations, vector math, complex numbers, and sinusoidal and harmonic signals in Pre-Calculus course supported by MatLab sessions.

Recruiting Strategy

- Presentations in Pre-Calculus
- Argue fast-track to Junior Engineering courses
- Improved performance in Calculus (Do this for your own good.)
  - Minimum buy-in by students.

Fall 2010

- Engineering Mathematics Laboratory
- 4 students
- Grade Calc I PHYS I
- A A B
- C C F
- C F Not Attempted
- F Disappeared

Sustainability Zero

- State mandated degree hour limitation – 120 hours (130 engineering)
- Engine Math Lab not part of any degree. Students were taking two “extra” hours.
- Limited support from engineering faculty advisors
- Ten student minimum for state formula funding

Fast-track to Junior ENGR courses not realized

- Developmental Algebra I
- Developmental Algebra II
- College Algebra Trigonometry
- Pre-Calculus ---→ Eng. Math Lab
- Calculus I Physics I
- Calculus II Physics II
- Cal III, Diff EQ, Jr. ENGR courses

Fast-track to Junior ENGR courses not realized

- Only students benefited by fast-track were:
  - Failed or Q-ed Calculus I
  - Chose to put off their Calculus sequence until later in their academic career.

Benefits of the grant

- Much improved communication with the mathematics department
  - Helped Mathematics with accreditation assessment
  - Higher level of collegiality or at least civility
  - We appear to have won a four-hour load credit for math faculty teaching Calculus
    - Math faculty would attend the recitation sessions
    - Recitations not left to TAs alone

Benefits of the grant

- Mathematics faculty are aware of the modules developed for use in Engineering Mathematics
- We have an … acknowledgement … the Engine Math modules will be incorporated into Pre-Cal, Calculus, and Diff EQ courses.
- We will push for the laboratory experiences to be included also.

Conclusions

- Grants involving curricula changes, especially across colleges, need to be well thought through and ALL affected constituencies need to be online before the grant is submitted.
- Support letters from Department Chairs are not sufficient. The department faculty needs to be committed to support the grant as well.
- Passing any authority involved in implementation to another college doesn’t work.

Epiphany and Epitaph

- Dr. Scott Hughes
  - New Arts and Sciences Dean

- “Why didn’t you call it Engineering Calculations, then no one would have noticed.”