Implementing Engineering Mathematics in the CEAS

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What is GEEN3830: Engineering Math?

- CEAS implementation of the Wright State Model for Engineering Mathematics Education
- Focus on fundamental concepts from Calculus I, II, & III, Differential Equations in one semester, motivated by engineering applications
- One Data Science/C5 activity
- Utilizes hands-on active learning laboratory experiences to immerse students with authentic engineering equipment and practices
- 12+ years of research at Wright State show boosts in student performance and retention, with replication underway at multiple national sites

What is "The Wright State Model for Engineering Mathematics Education,"

"the WSM Model requirements:

1. Comparable First-Year Cohort (Y1) – I really loved that.
2. Engineering Math (MATH1300) towards graduation
3. Engineering Math (MATH1300) as a pre-req to courses in engineering majors

Y1 Fall 2017, 22 completed GEEN3830
Y2 Fall 2018, 99* completed GEEN3830

A. Y2, 36 withdrew
B. Y2, 11 withdrew
C. Y2, 1 withdrew

Y1 Fall 2017 Aggregate GPA: 3.79 for n = 11
Y2 Fall 2018 Aggregate GPA: 3.93 for n = 36

Y1: 20
Y2: 33

Y1: 23
Y2: 22

Y1: 9
Y2: 10

Y1: 0
Y2: 0

Y1: 0
Y2: 0

What is the ethical responsibility for

1. What are the consequences of Mandatory but not Required course status on students, instructors, advisors, etc.
2. How can we sustainably scale a high touch program?
3. Are we mindfully creating counterspaces for our vulnerable populations?
4. What is the ethical responsibility for educational innovators – is this batch-encoding incoming 1st-year students into a 4-credit course "Tai?"
5. Observing differential drop rates for the men vs. women through week 4 of Y1 pilot?
6. Concerns regarding differential course grades for Y2 students consenting vs. non-consenting to research participation: n = 63 consenting (63.9% avg grade) vs. n = 37 declined (74.3% avg grade)

Future Implementation Decisions

1. Course name and course number going forward?
2. Continue to batch-enroll students not placed into Calc I into the course?
3. How to best advise students and message them about a non-traditional, mandatory but not required class to incoming students?

Related Publications


Thank you

Our brave pioneering students & teaching assistants!
CEAS Associate Dean of Education & Undergrad Advisor
Spurs! Innovative Teaching Grant, CEAS
Department of Computer Science & Informatics Tony Wong

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