

ENGR 107

Application of Mathematics to Engineering



Course Goals

- Primary goal – Prepare students to place into first term calculus based on placement exam
- Secondary goal – Prepare students for mathematics applications in engineering mechanics (statics, dynamics, and mechanics of materials)

Curriculum

- Remove some advanced math applications – differential equations and matrix math
- Remove matlab and add excel
- Add more focus on pre-calculus concepts
 - Exponents, logarithms, etc...
- Conduct practice placement exams

ENGR 107 Summer Boot Camp

- 3-unit semester course
- Summer boot camp – 3 weeks before start of fall term
- Get students caught up with calculus cohort

In-Class Peer Tutors

- Use in-class peer tutors during lecture and lab
 - Active learning improved
 - Abundance of social resources
 - Formative assessment
 - Tutoring and 2-sigma finding



Research and Assessment

- Track retention of ENGR107 students
- Mathematics self-efficacy
 - Beliefs and confidence in being successful in mathematics
 - Pre- and post-survey on efficacy
 - Interviews with students:
 - Conclusion of class
 - Two months later
 - Six months later

More Research and Assessment

- Assess conceptual understanding
 - Statics force concept inventory
 - Pre and post statics course
 - Compare performance
 - Student interviews to assess conceptual understanding
 - Students solve engineering mathematics problems during interview with think-aloud protocol

Closing Notes

- Having prepared curriculum is *incredibly* helpful
- Occasional webinars would be helpful for communication between universities