

University of Tulsa

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[Overview]

- Institutional Background
 - University of Tulsa
 - Engineering Department
- Motivation for Involvement
- Class Design Changes
 - ME 1312
 - Other Classes
- Surveys and Institutional Data
 - Pilot Study
 - Future Plans

[University of Tulsa]

- Private, doctoral degree granting, accredited, coeducational
- Smallest Enrollment for NCAA Division 1
 - 4,192 (3,049 undergraduate, 1,143 graduate)
- Selective Admissions (2008 freshman class)
 - Average ACT: 28
 - Average SAT: 1250
- 1 in 10 of all undergraduates, including freshman is a National Merit Finalist

College of Engineering and Natural Science

- Biology
- Chemistry and Biochemistry
- Computer Science
- Engineering
- Geosciences
- Mathematics
- Physics and Engineering Physics

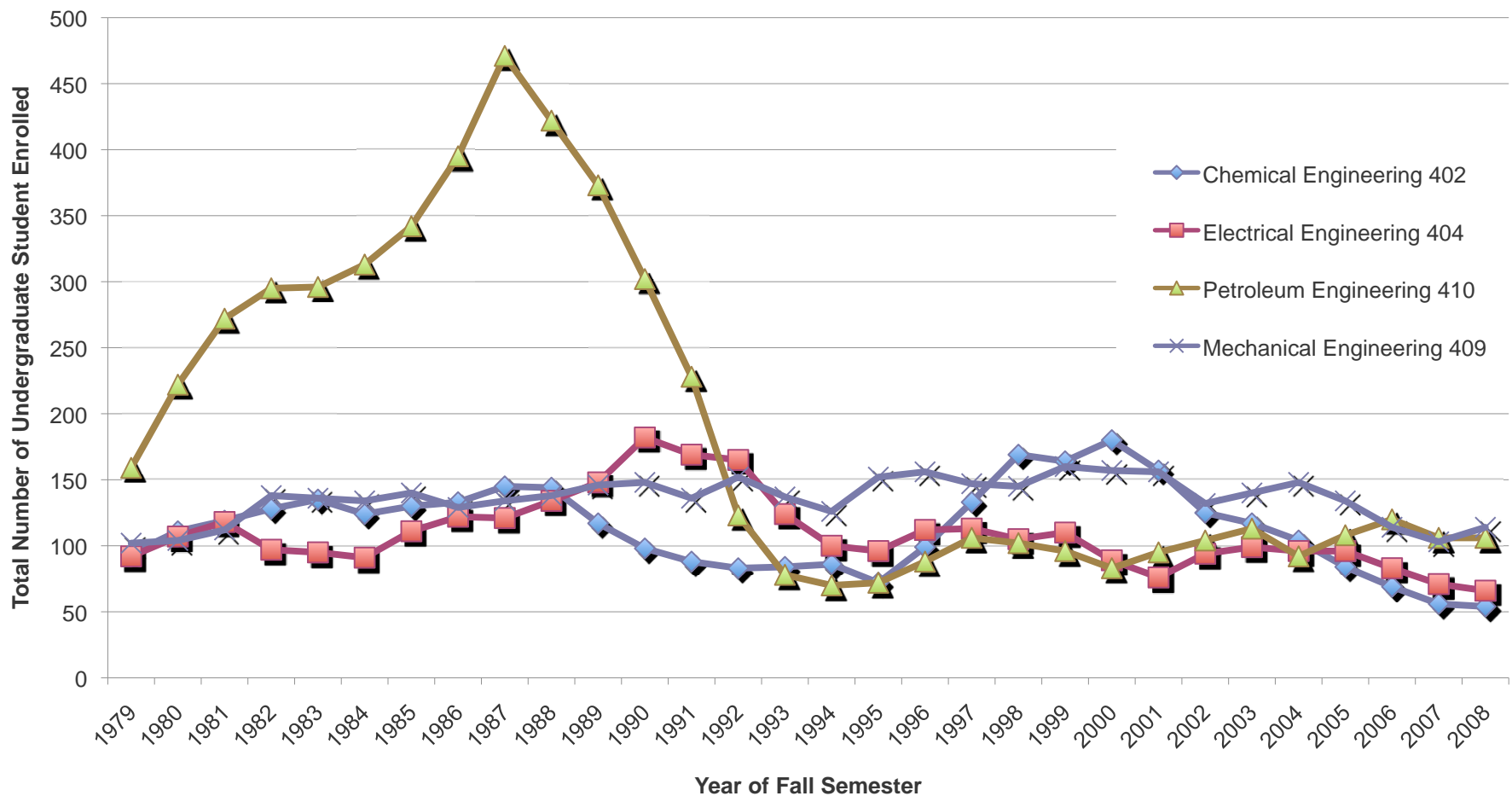
Note: Mathematics is in the same college as engineering

[Mechanical Engineering]

- Stable enrollment of 100-150 students
- 9 Faculty members
 - 6 Full Professors
 - 1 Associate
 - 2 Assistant
- 10-15 Graduate Students
- Average graduation rate (96-09): 52%
 - High: 63%
 - Low: 42 %

Engineering Program

Engineering Enrollment History at the University of Tulsa



Motivation for Involvement

- Diversity of Participating Universities
 - Comprehensive, small, private university
- Actively modifying and improve current courses
 - Increase number of labs
 - Modernizing current labs
- Understand Retention at TU
 - Retention is comparatively high, but there is a desire to do better (60% – 75%)
 - Are students leaving because of the structure of the curriculum?
 - Lack of Engineering concepts in Math instruction
 - Lack of Application of Math concepts in Labs

[Plans – Class Designs]

- Adopt WSU's philosophy for Engineering Freshmen (Provide overwhelming support)
- Implement EGR 101 principles and problems into ME1312: Computer Applications for Mechanical Engineers
- Prepare students for future courses
- Build application-based math foundation
- Extend to other departments

[ME 1312]

- Course underwent recent name change
 - “Microcomputers for Engineers” to “Computer Applications for Engineers”
 - Focuses on Excel and VBA
 - Historically taught basic computer literacy
- Excel and VBA can be used like Matlab is in EGR101
 - Tables, solving systems, plotting, numerical integration and differentiation, matrix calculations
 - VBA has simple GUI implementer
- Students introduced to Matlab or C in required CS course: Scientific Programming
- One 75 minute lecture and one 3 hour lab per week

[Course Curriculum]

- Lecture split between mathematics and programming instruction
- Labs derived from EGR101 handbook
- Some programming-only labs were inter-dispersed
- 2 in-lab quizzes served as “Tests”
- Covered all topics except sinusoids and 2nd order differential equations

[Results – Class Design]

- Student feedback indicated pace was fast
- Students felt that the number of TAs in lab offset some of the pace (2 TAs and instructor for ~20 students in lab)
- Felt that math introduction was not necessarily “deep” enough

[Future Plans – Additional Classes]

- Chemical Engineering
 - CHE 1013: Chemical Engineering Problem Solving
- Electrical Engineering
 - EE 1011: Computer Tools for Electrical Engineers
- Petroleum Engineering
 - No Freshman Level Computer/math course
- Engineering Physics
 - No freshman intro computer course
 - Advanced math course taught by physics

Surveys and Institutional Data – Overview

- Issues in Predicting Retention
 - Multi-causal
 - Dichotomous
 - Sometime Low Base-rate
- Attitude Surveys and Institutional Data
 - Expanded withdrawal measurement
 - Reasons for withdrawal
 - Broader reactions to curriculum

Surveys and Institutional Data – Plans

- Institutional Review Board (IRB)
 - Students are a vulnerable population
 - Want to generalize (publish) results
 - Link surveys to institutional Data
- Data
 - Demographics
 - Interests
 - Abilities
 - Perceptions of Engineering

Surveys and Institutional Data – Preliminary Results

- 14 students
- Students with more withdraw attitudes and behaviors had lower GPAs and ME 1312 grades
- Class grade unrelated to liking the class
- Female students more willing to seek help outside of class
- Liking to build things with hands related to GPA

Surveys and Institutional Data – Future Plans

- Institutional data
 - Tie attitudes to retention
 - See how many students with ability to succeed are withdrawing
- Surveys
 - Refine survey questions
 - Increase survey sample with increases in program implementation
 - Link class to engineering curriculum attitudes and program retention

[Questions?

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