First Year Results
ENGR-1113 Foundations of Engineering Math

Robert Mitchell, Byron Newberry &
Richard Miller*

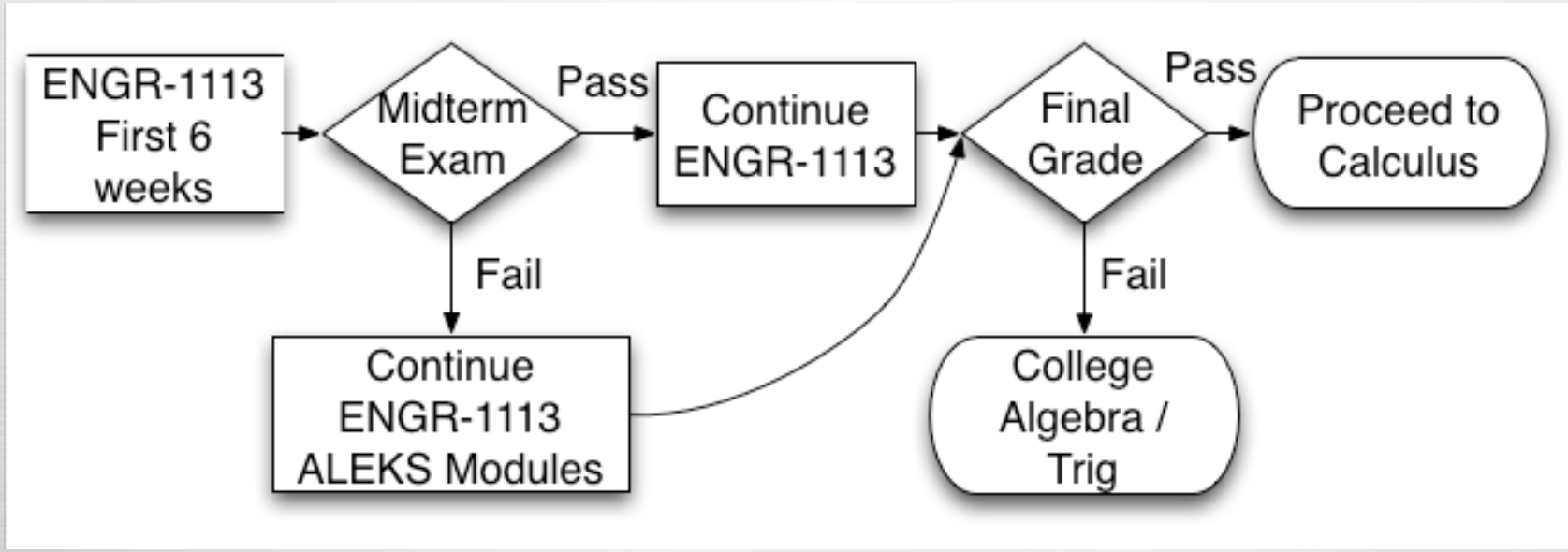
OKLAHOMA CHRISTIAN UNIVERSITY
FAITH [fully]

Overview of the Fall 2009 class

- 70 Students
  - 1 lecture section (2 times per week)
  - 4 lab sections (1 time per week)
- Taught exclusively by Newberry
- Labs taught by both Newberry and Waldo
- Generally successful for a first offering with the following exceptions …
  - *Student satisfaction comments indicate that the more prepared students viewed the class as remedial and resented being required to take it*
  - *The coverage of differential equations at the end of the class (especially 2nd-order systems) was almost universally considered to be too much, too fast.*

OC Oklahoma Christian University
FAITH fully

Course Flow for Fall 2009



OKLAHOMA CHRISTIAN UNIVERSITY
FAITH fully

The Fall 2009 Schedule

Week	Monday	Wednesday	Laboratory
1	Algebra Foundations		Install Matlab and PreTest #1
2			Algebra Lab #1 and PreTest #2
3			Algebra Lab #2
4	Trigonometry Foundations		**NO LAB**
5			Trigonometry Lab #1
6	**Review**	**Exam #1**	Trigonometry Lab #2
7	**Matrix Method Foundations**		**NO LAB**
8	Calculus Foundations		Matrix Math Lab
9			**Advisement & Enrollment**
10			Differentiation Lab
11	**Differential Eqns Foundations**		Integration Lab
12	**Review**	**Exam #2**	1st-order ODE Lab #1
13	No Class	Thanksgiving	**NO LAB**
14	**Differential Eqns Foundations (cont.)**		1st-order ODE Lab #2
15	**Comprehensive Review**		2nd-order ODE Lab
16	**Final Exam (See Univ. Schedule)**		

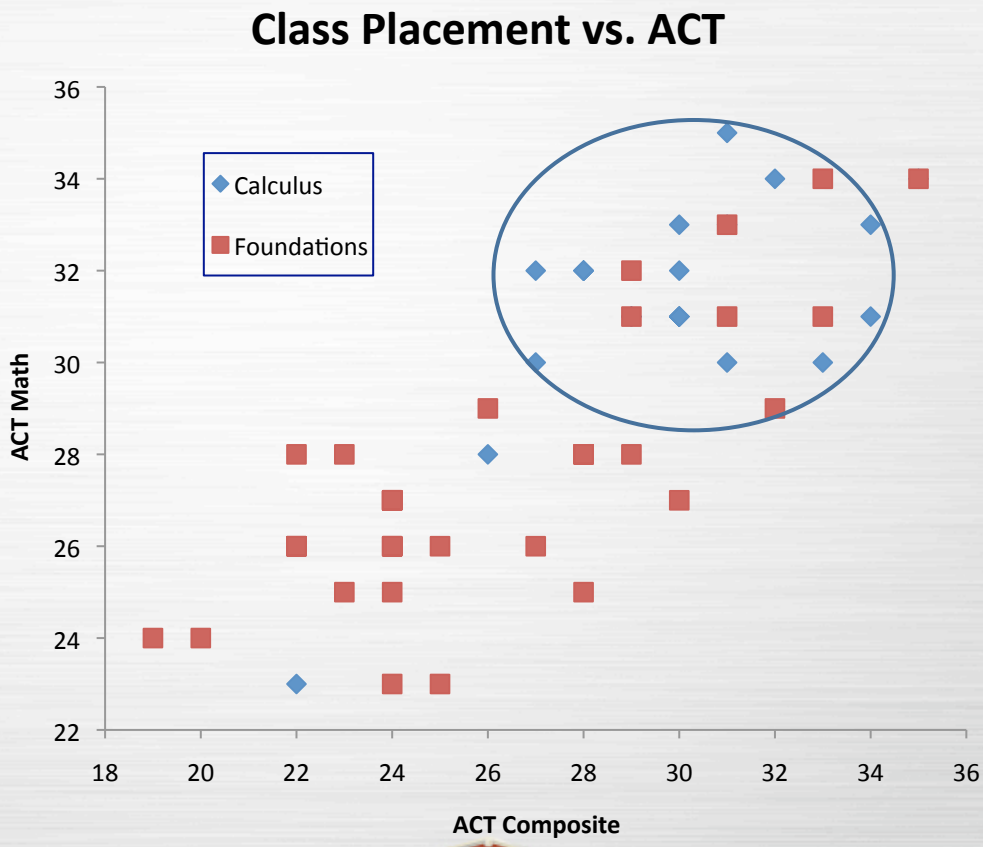
Though only 2 weeks were dedicated to ODE's, the basics of both 1st and 2nd order constant coefficient linear equations were introduced.

The pace was very rapid and the schedule limited the available time for examples (beyond the labs).

OC Oklahoma Christian University
FAITH fully

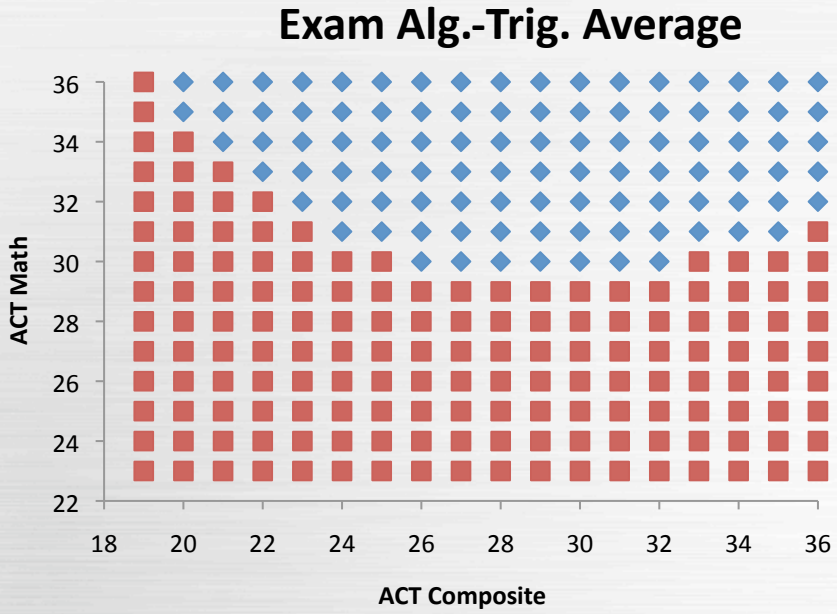
Foundations-Calculus Distinction

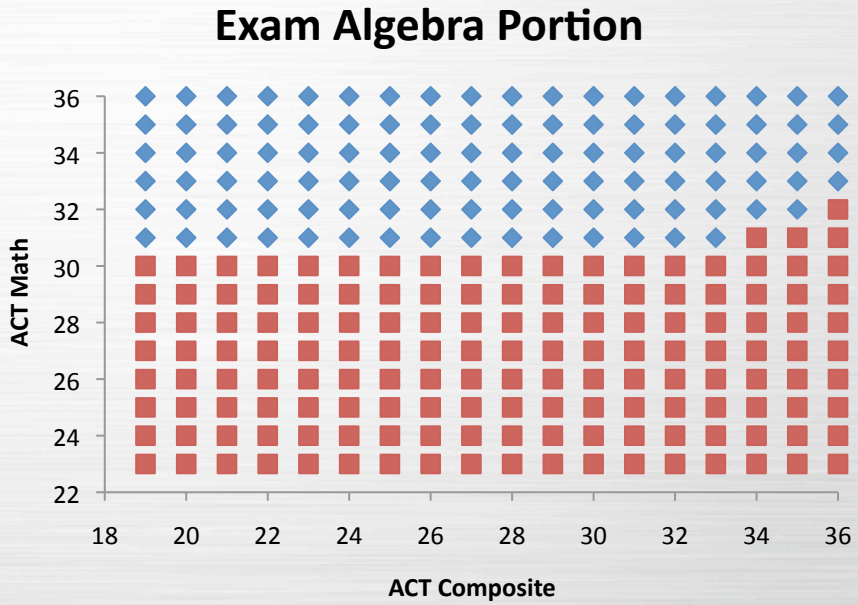
- Students took Calculus readiness test at midterm.
- Grade above 85% is considered ready for calculus. Below need Foundations.
- Calculus-ready students grouped by ACT scores.
- Foundations students scattered.



OKLAHOMA CHRISTIAN UNIVERSITY
FAITH fully

Application of Discriminate Analysis



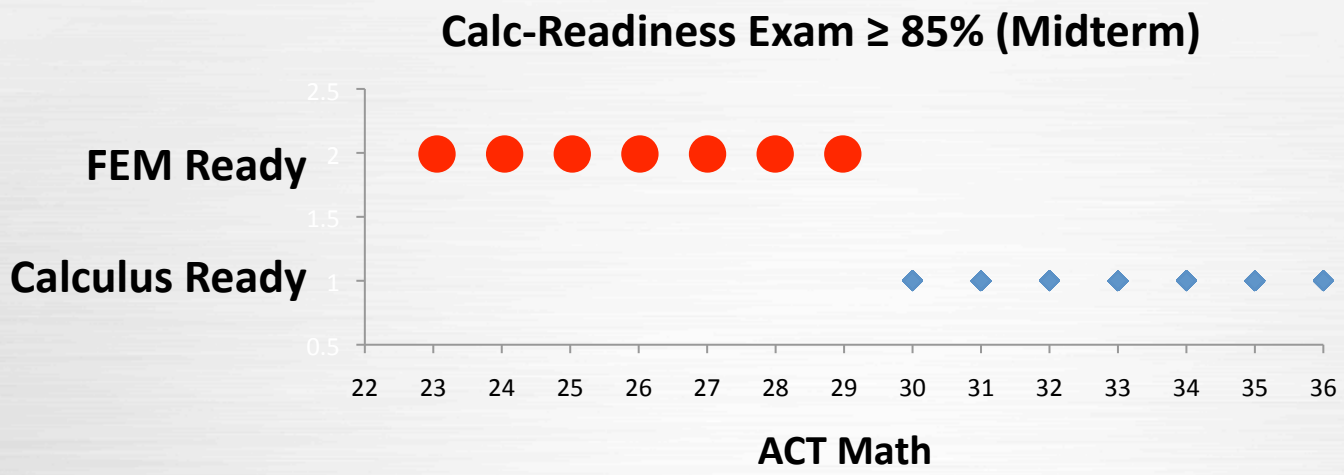


- ACT Math dependence much stronger than ACT Composite (see right).

- The model using the Alg.-Trig. average (midterm) had more unusual features than use of algebra alone.

OC Oklahoma Christian University
FAITH fully

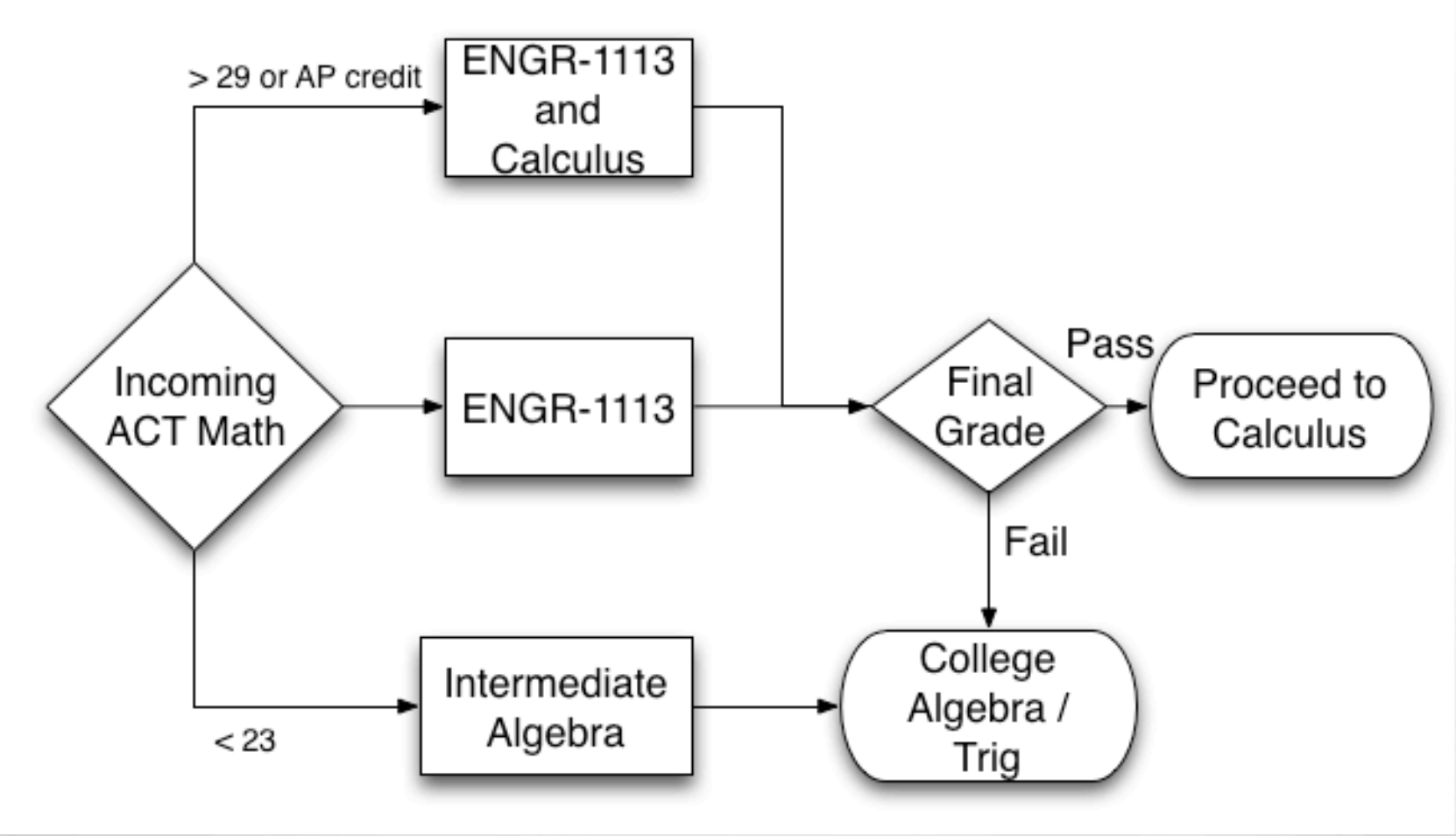
Class Placement by ACT Math



- Suggests that an ACT math score of 30 indicates Calculus readiness.
- Model has 84% predictive accuracy (checked against FA09).
- This prediction does not consider if the student has taken an AP class or not.

OC Oklahoma Christian University
FAITH fully

2010 Path to Calculus



OKLAHOMA CHRISTIAN UNIVERSITY
FAITH fully

Plans for Fall 2010 class

- 70+ Students
  - 1 lecture section (2 times per week)
  - 4 lab sections (1 time per week)
- Lectures co-taught by Newberry and Miller
  - Single grader for all students
- Labs taught by both Newberry and Miller
  - 2 sections per instructor
  - Grad assistant to observe one section from each instructor
  - Mastery approach in labs
- Exam performance has increased grade impact

OC Oklahoma Christian University
FAITH fully

Fall 2010 Schedule

Week	Monday	Wednesday	Laboratory
1	Algebra Foundations		Matlab Training 1 of 2
2			Matlab Taining 2 of 2
3			Algebra: R Circuit
4	Trigonometry Foundations		Algebra: Series/Parallel R's
5			Trig: 1 and 2 Link Arm
6	Review	Exam #1	Trig: Forced RC Circuit
7	Matrix Method Foundations		Matrix: Multi-loop Circuit
8	Calculus Foundations		NO LAB (Fall Break)
9			Diff: Free-fall
10			Advisement & Enrollment
11	Differential Eqns Foundations		Integration: Centroid
12	Review	Exam #2	Make-up Lab
13	No Class (Thanksgiving)		NO LAB (Thanksgiving)
14	Differential Eqns Foundations (cont.)		1st-order ODE: RC Circuit
15	Comprehensive Review		1st-order ODE: Cooling
16	Final Exam (See Univ. Schedule)		

While the time spent on ODE's will remain at 2 weeks, only 1st order systems will be covered.

New MATLAB Training sessions have been added early in the class to facilitate the labs.

OKLAHOMA CHRISTIAN UNIVERSITY
FAITH fully