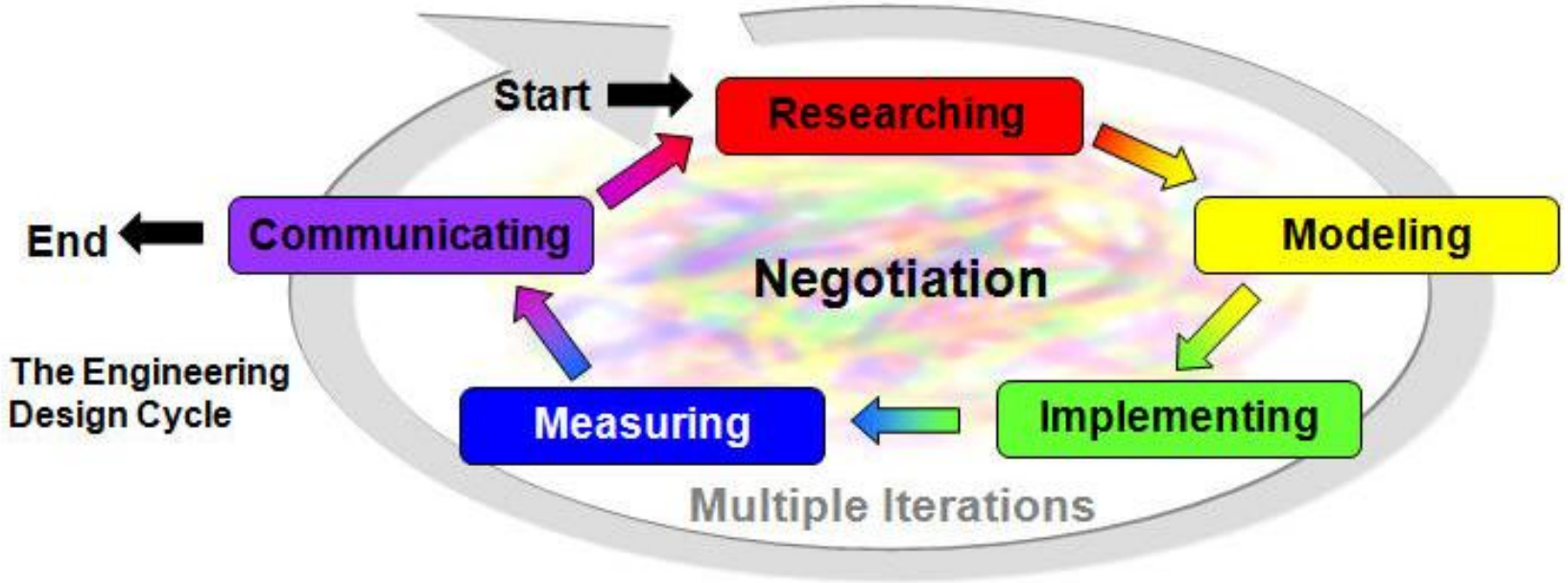
Engineering Mathematics The "Wright State Model"

Oklahoma State University
Karen High
Alan Cheville

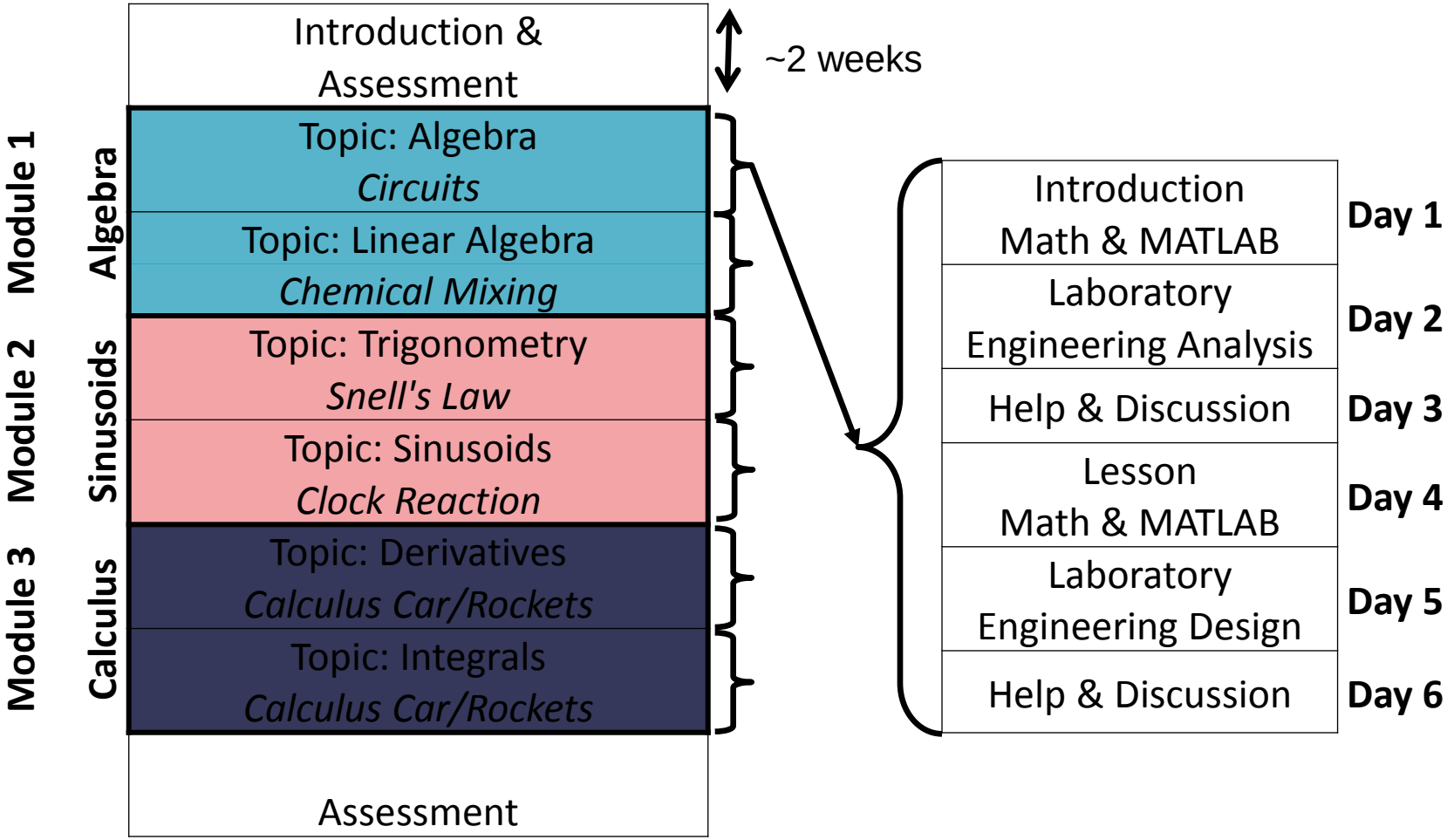
OSU Implementation

- Design Cycle
- Course structure
- Writing Reflections/Reports
- Assessment data from three years
- Where do we go from here?

Design Cycle



Course Outline



Writing Reflections/Reports

1. How do your current interests, knowledge, and skills fit with becoming an engineer?
2. What are the similarities and differences between your past design experiences and what you are learning about engineering design in this class?
3. How and why has your understanding of engineers' use of math changed this semester?

Writing Fellows to help students revise work (2008 and 2009)
Team Reports
Posters

Project Information

- 2008 cohort
  - Students mostly weak in math skills
- 2009 cohort
  - Students with weak, medium and high math skills
  - Most positive attitude
- 2010 cohort
  - Students with weak, medium and high math skills
  - Graduate student left
  - Statistician left
- 2011
  - Analyzing data, new statistician May
  - New instructor Fall 2011 – EXCEL focus
  - KAH in Texas Fall 2011

Assessment

- Comparison groups
  - Engineering 1111 – One credit “Introduction to Engineering Class”
  - Chemical Engineering 2033 – Three credit sophomore class
  - Should be ENGR 13x2 – Two credit “Engineering Design Class”

Main Assessment Items

- Cognitive (content knowledge):
  Pre/post math test (2009, 2010)
  Grades in future math classes (2008-2010)

- Affective (motivation, attitudes):
  Pre/post math attitude survey (2008-2010)
  Pre/post Pittsburgh Freshmen Engineering Attitude Survey (PFEAS) (2008-2010)

- Longitudinal rates:
  Retention (2008-2010)

Math Content Test

		N	Pre %	Post %
2009	1113	39	43.0	51.6
	1111	*16*	*62.8*	*63.6*
2010	1113	45	53.7	66.2
	1111	*38*	*51.0*	*59.2*
2010	CHE 2033	40	67.2	68.0

Math Test Confidence

		N	Pre	Post	Diff			
2010	1113	45	53.7	66.2	12.6	%		
			3.2	3.9	0.7	1 to 5 with 5 being most confident		
	1111	38	51.0	59.2	8.2	%		
			3.1	3.5	0.4	1 to 5 with 5 being most confident		

Math Attitude Survey

		Fall 2008	Fall 2009	Fall 2010
21	This course has increased my motivation to study engineering.	3.0	3.7	3.4
22	This course has increased my chances of success in engineering.	3.0	4.0	3.4
23	This course has increased my motivation to study math.	2.9	3.7	3.3
24	This course has increased my chances of success in future math courses.	3.0	3.8	3.2

Where do we go from here?

- Course/project assessment completed
- Labs and course “published”
- Course sustainability