

University of San Diego

Rick Olson and Susan Lord



Nat'l Engr. Math Consortium - June 16, 2009

Who Are We?

USD

- Private, Independent, Catholic, Liberal Arts University
- ~ 5000 Undergraduate Students
- Small Classes
- Ethical Conduct & Compassionate Service are Core Values

Engineering at USD

- Undergraduate Programs in EE, ISyE, and ME
 - ~ 147 Semester Units with 40+ Units of Liberal Arts Classes
 - Dual BS/BA degree
 - Common First Two Years
- ~ 220 students, 15 faculty
- Ranked 21st by US News and World Report

Our Students

Similar to the rest of the University

	Verbal			Math		
	25%ile	Mean	75%ile	25%ile	Mean	75%ile
USD	540	588	630	560	602	650
Engineering	545	582	620	605	646	680

Highly attracted by the Liberal Arts aspect of the University

Students do not apply to specific majors

No penalty for taking a chance on engineering

First-Year Sequence

Engineering 101 – Introduction to Engineering

- 60 – 80 Students (~ 90% Incoming Freshmen)
- Lecture/Lab
- Survey of Engineering and Disciplines
- Problem Solving w/Excel
- Introductory Graphics
- Weekly LEGO NXT-based Design Lab
- Service Learning Project

Neither class has a
high math content

Engineering 102 – Introduction to Design and Practice

- Biweekly 2 hour labs
- Topics in EE, ISyE, ME
- Semester-long NXT Design Project w/Documentation

First Math Taken By USD Engineers

AY 2008-09

First Math Class	# of Students	Course Grade					GPA	No Math
		A	B	C	D	F/W		
Coll. Alg./Precalc	2	0	1	1	0	0	2.5	0
Calc I	27	6	2	12	2	5	2.1	0
Calc II	15	3	10	1	1	0	2.9	0
Calc III	7	2	1	2	0	0	3.0	2

W's counted as 0 in GPA calculations

2 students deferred Calc III – one switched to Business

Why (we think) We Lose Students

- Don't like Engineering
- Engineering takes too much time
- Can't afford USD
- **Struggle in math, chemistry, and physics classes, leave after grades don't improve.**

**What can we do to help these students hang on...
and others to thrive?**

How We Fit Into CCLI

How can WSU's materials...

- Be used to supplement existing courses
- Complement tutoring performed by undergraduate students.

AY2008-09

- Establish an *Engineering Core Tutoring Center*.
- Staffed 12 hours/wk by undergraduates
- Tutors worked to identify the most common math difficulties for USD students

How We Fit Into CCLI

AY2009-10

- Offer two, one-unit, elective courses
 - One in Fall, One in Spring
- ~~USD's math placement exams will be used to identify at risk students~~ *Placement exams have been replaced by SAT score and HS math*

Track

- Retention and matriculation into Junior year
- Nature and amount of tutoring use

Is there enough promise to propose (another) revision of the First-Year curriculum?

What Did We Officially Learn This Year?

Where did USD students have difficulties?

- 39% Modeling an Engineering Scenario
- 27% Understanding an Engineering Concept
- 25% General Math Problem Solving
- 9% Performing Math Operations

Where were Math problems?

- 51% College Algebra/Trig
- 16% Calc I
- 16% Calc II and III
- 16% Applied Engr Math (Diff-eq/Linear Algebra)

What Did We Really Learn This Year

Our Students Don't Seek Help!

- Knowledgeable and personable tutors? ✓
- Signs in hallways? ✓
- Visits to class at beginning of semester? ✓
- Convenient location near Engineering classes? ✓
- Regular afternoon hours? ✓
- Email to faculty teaching Engineering Core? ✓
- Random drop-in visits to the labs? ✓

Long lines of students eager to learn? ✗

Seeking creative strategies to
get students to participate!