

Developing Globally-Minded Engineers Through Academic Specializations and Minors

Global E3 Annual Meeting 2015

Presenters

- Rachel Armstrong, College of Engineering Honors Program, University of Michigan
- Teresa Finis, International Programs in Engineering, University of Illinois Urbana-Champaign
- Amanda Hammatt, International Engineering Studies & Programs, University of Wisconsin-Madison
- Pedro Linares, Universidad Pontifica Comillas
- Elizabeth Mekaru, International Programs in Engineering, University of Michigan

Introduction

Engineering Global Leadership Honors Program
College of Engineering Honors Program, University of Michigan

Certificate in International Engineering
International Engineering Studies & Programs, University of Wisconsin-Madison

International Minor for Engineers
International Programs in Engineering, University of Michigan

International Minor in Engineering
International Programs in Engineering, University of Illinois at Urbana-Champaign

International Track
Universidad Pontificia Comillas



Agenda

- Description of academic specializations, minors, and certificates
- Elements that make these programs unique: addressing challenges
- Student Recruitment and Retention
- Co-Curricular Experiences
- Development
- Questions to the Panel
- Small Group Discussion



International Minor in Engineering-UIUC

● History

- Established in 1983
- Started as an Int'l Certification in 1981
 - more than 80% of engr. Freshmen completed two or more years of language in high school
 - Provide an opportunity for students to prepare for the int'l world in which they live
- Graduated 1st Int'l Minor in Engr-Germanic Studies 1983



International Minor in Engineering-UIUC

- Desired Learning Outcomes
 - Achieving proficiency in a foreign language
 - on-campus courses
 - courses and residency abroad
 - Experience of living in the region/country of focused Minor
 - Developing a cultural awareness would not otherwise gain
 - Having an overall understanding of country/region
 - language
 - cultural
 - poly sci/econ
 - residency



International Minor in Engineering-UIUC

UIUC International Minor in Engineering: Enrollment Numbers Compared to other College Minors

Academic Year 2014	Students
Total International Minors	44
Total Other Minors	820
Academic Year 2013	
Total International Minors	48
Total Other Minors	818
Academic Year 2012	
Total International Minors	59
Total Other Minors	753
Academic Year 2011	
Total International Minors	79
Total Other Minors	629
Academic Year 2010	
Total International Minors	91
Total Other Minors	514

UIUC International Minor in Engineering: Graduation Numbers by Area Focus

Minor	All degrees ever	Degrees in last 5 years
IE in Latin Amr/ <u>Carrib</u> Studies	80	8
<u>Int Engr</u> in Australian Studies	1	0
<u>Int Engr</u> in <u>Britian</u> Studies	4	2
<u>Int Engr</u> in Chinese Studies	48	9
<u>Int Engr</u> in E European Studies	4	0
<u>Int Engr</u> in French Studies	83	12
<u>Int Engr</u> in Germanic Studies	80	15
<u>Int Engr</u> in Italian Studies	15	4
<u>Int Engr</u> in Japanese Studies	114	14
<u>Int Engr</u> in Middle Eastern <u>Std</u>	10	3
<u>Int Engr</u> in Slavic Studies	3	0
<u>Int Engr</u> in South Asian <u>Std</u> s	1	0
<u>Int Engr</u> in Spanish Studies	56	13
International Engineering	16	5
Grand Total	515	85

Certificate in International Engineering

A large, jagged iceberg with a blue-tinged surface floats in calm water. In the background, snow-covered mountains rise under a clear sky. The scene is serene and cold, with the ice reflecting the light.

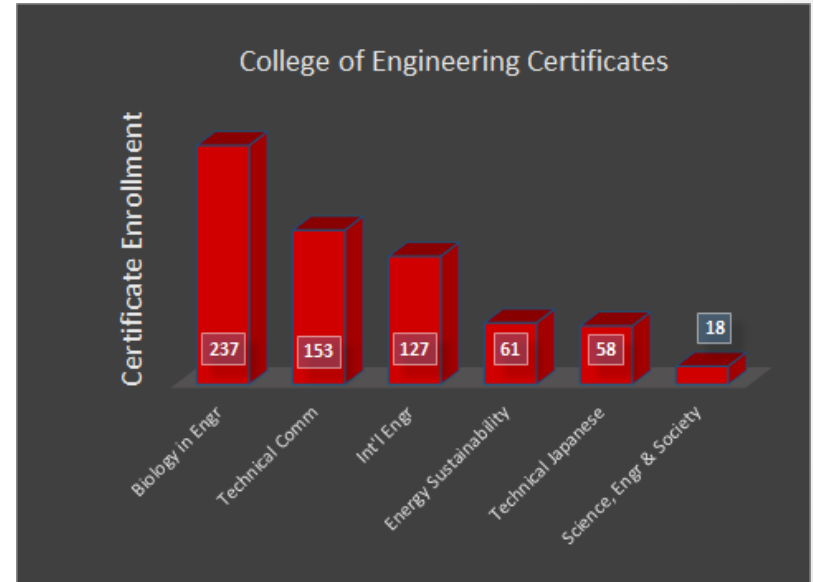
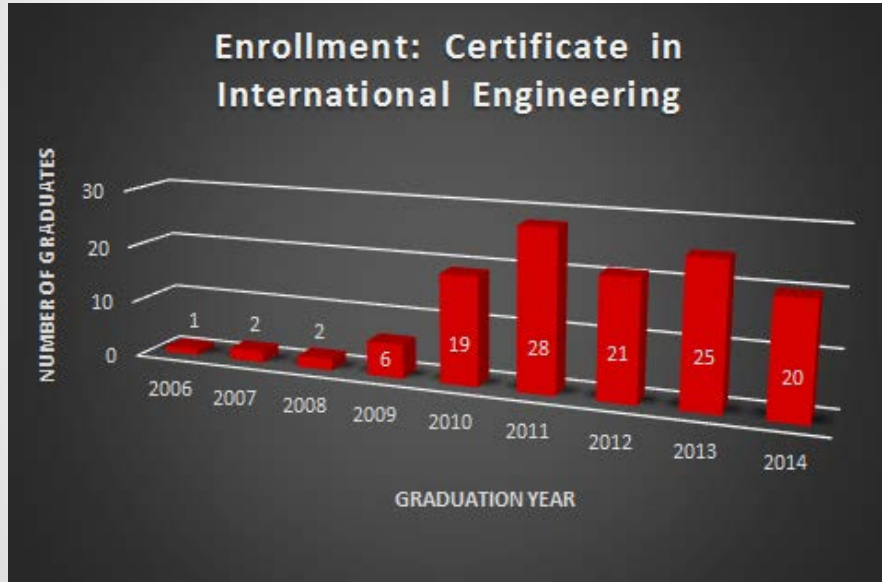
- **History**

- Established in 2005

- **Desired learning outcomes**

- International Engineering Ethics
- Role of engineering in the US and in other cultural contexts
- Global Engineering Challenges from different national perspectives
- Reflection of US (engineering) culture from outside the US

Certificate in International Engineering



International Minor for Engineers

- History

- Established in 2008
- First academic minor in the College of Engineering

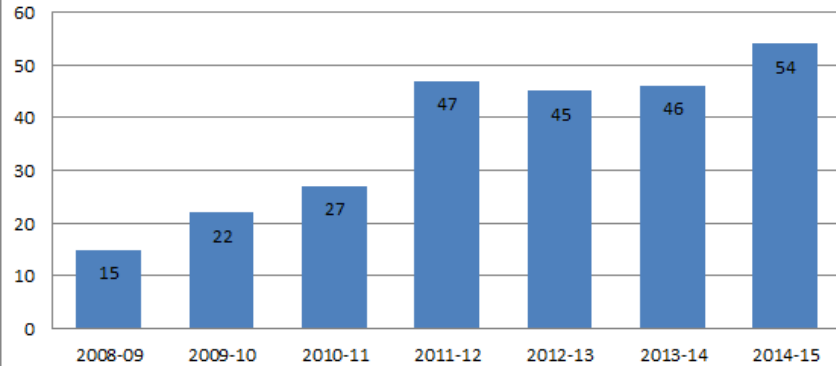
- Desired learning outcomes

- Foreign language proficiency
- Knowledge of non-U.S. cultures/societies
- Intercultural communication skills
- Awareness of global trends in engineering/business

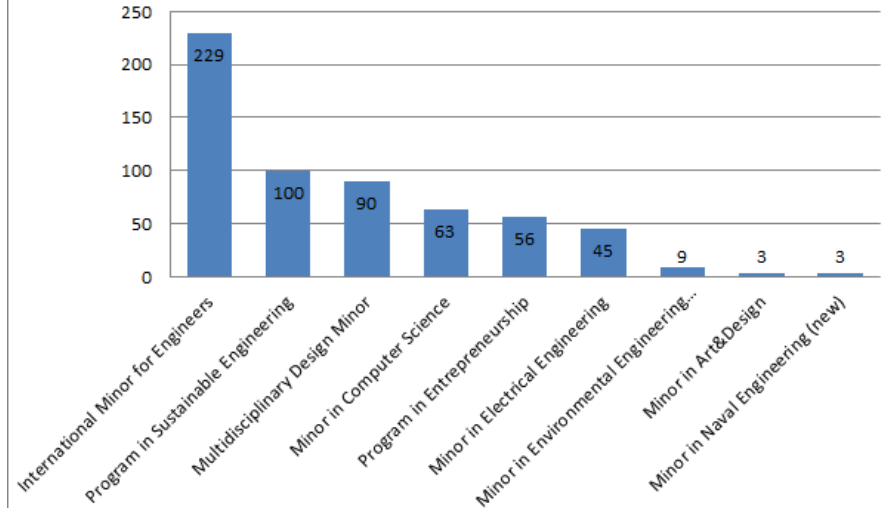


International Minor for Engineers

**International Minor for Engineers Graduates
per Academic Year**



**Enrollment in CoE Minors and Academic
Programs as of May 2015**



Engineering Global Leadership Honors Program

- Specialization within College of Engineering Honors Program
 - Apply sophomore or junior year; interview required; minimum 3 terms during undergrad
- EGL's 4 pillars
 - Engineering Excellence - Bachelor's and Master's in CoE, 3.6 GPA
 - Global Education - International Minor for Engineers, Volunteer Abroad
 - Business Acumen - 15 credits in Ross School of Business
 - Leadership - Topics in Leadership, and Leadership Advantage
- 110 students (sophomore through master's)
- Support: Program Officer, Advisor, active EGL Society, Admin

International Track

- History

- We had an international track
- Which quickly became the preferred option
 - And the non-international students felt Downgraded in class
 - Or felt they had less job opportunities
- So now the international track has become the only track



International Track

- Desired Learning Outcomes: Elements of a Globally-minded engineer (in Spain)
 - International academic experience
 - International internship
 - Language skills
 - Business skills (separate diploma)



International Track

The Current Situation at ICAI

- All students are guaranteed at least a 6-month international experience
 - 100% credits transferred, no loss of time
 - Typically no language requirements
 - Pre-set times (senior yr or 2nd year Master)
 - 90% do this
- Some of them go for a double Masters degree
 - Typically within the TIME network, but not only
 - Pre-set times (2nd year + 1 semester)
- International Internships (still in progress)
 - 2nd semester, 2nd year Master

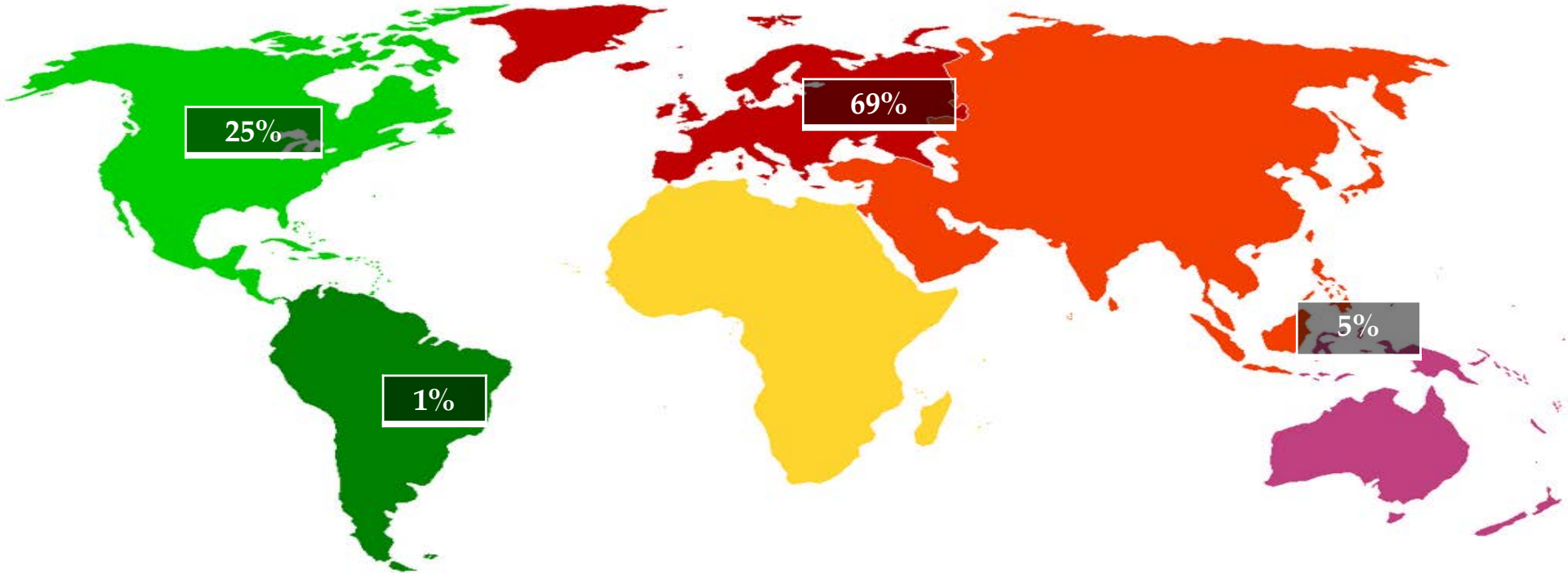


International Track

- In-House International Experience
 - The SAPIENS program might allow Spanish students
 - Although sometimes it is difficult to make syllabus compatible
 - Buddy program
- Language Requirements
 - All students must achieve a minimum language level (C1)
 - First English
 - Then third language



International Track: destinations



Comparing Program Requirements

Comparing Program Requirements

	University of Illinois-UC	UW-Madison	University of Michigan	UP Comillas
Required GPA	With normal other degree reqs.	2.75 (cumulative)	2.0	No
Number of credits	21	16	16	
Duration abroad	6 week minimum	5 week minimum	6 week minimum	1 semester minimum
AP/Retro/Transfer credits accepted?	Yes-all	Yes- all	Yes- all	Yes - all
Language Requirement (to enter program)	No	No	2nd semester language as pre-req	No
Language Level (required to complete)	Up to 12 credits	After first eight credits	4th semester proficiency	C1
Need to be declared in a major?	Yes: James Scholars can also use this as an approved Scholar program	Yes	No	
Regional focus	Yes; determined by student	Yes; determined by student	Not required	Not required
Advising	Housed in int'l engr office	Housed in int'l engr office	Housed in int'l engr office	Housed in int'l engr office
Tracking	Built into University audit	Manual	Built into University audit	
Can courses fulfill multiple requirements?	Yes	Yes	Yes	
Required Capstone course?	No	Yes	Yes	

Challenges

- Perception of students that international experiences are not as valuable as work/internships
- Competition with other co-curricular options and minors
- Pressure not to “waste time”
- How to “Fit it In”
- Time to include an international experience
- Volume of students applying
- Credit transfer
- Affordability



Elements That Make These Programs Unique

- Institutionalized Status: ties to academic curriculum
- Pathway toward tangible goals
- Flexibility
- Specificity to Engineering
- Advising/Home Department
- Tied to other programs
- Requirements match credits students might already have/need
- Utilizing proficiency credit from high school language
- Tied to degree (gen ed) requirements



Co-Curricular Experiences

EGL requires International Minor for Engineers + co-curricular experiences for global education:

- Honors Seminars
- Topics in Leadership
- Leadership AdvantageSM

Optional encouraged experiences:

- Volunteer Abroad
- Cultural Dinners
- Global Bonanza



Recruitment and Retention

Recruitment strategies

- Highlight unique elements
- Targeted e-mails
- Outreach in first year classes
- Participation in campus fairs and events
- Study abroad program creation

Retention strategies

- Effective advising
- Progress reports
- Targeted e-mails
- Involve the recruiters
- Recognition at graduation
- Building community



Program Development

- Addressing the need: the industry, the college, the students
- Benchmarking
- Creating goals/requirements: how do you determine what's important?
- Buy-In: who needs to support it?
- Where should the program live? Who advises for it?

Questions for the Panel



Small Group Discussion

Institutions with programs like this

- What challenges do you see to the continued growth and success of your program?
- What ideas do you have to improve your current program?

Institutions without programs like this

- Could such a program work on your campus? Why or why not?
- What are some of the barriers you see at your institution? How could you draw on the strengths of your campus to meet the same goals?
- If you were to create a program like this; what elements would you include?