

# Innovative Interdisciplinary Curriculum for Engineering Students

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THE LANGUAGE FLAGSHIP

*Creating Global Professionals*



# Session Overview

- International Engineering Program
- Chinese Language Flagship Program
- Curriculum for Engineering Students

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# International Engineering Program at URI:

- Gateway to global communities: bilingual, cross-culturally savvy engineers
- 5-year dual-degree program
  - B.S. in an engineering discipline
  - B.A. in French, German, or Spanish; Minor in Chinese
- Fourth year: 12 months abroad
  - Semester of study
  - Six-month professional internship
- Optional immersion opportunities prior to the fourth year
- Optional research experiences during semester of study

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# Our Students

- **230 Undergrad IEP Students** (120 German; 45 Spanish; 35 French; 30 Chinese)
- **20% of all engineering undergrads** at URI are in the IEP. All will study and intern abroad, and earn a second degree in a foreign language.
- **30% are women** (as compared to 17% of all College of Engineering undergrads)
- **55% are Centennial Scholars**
- **300 Graduates**

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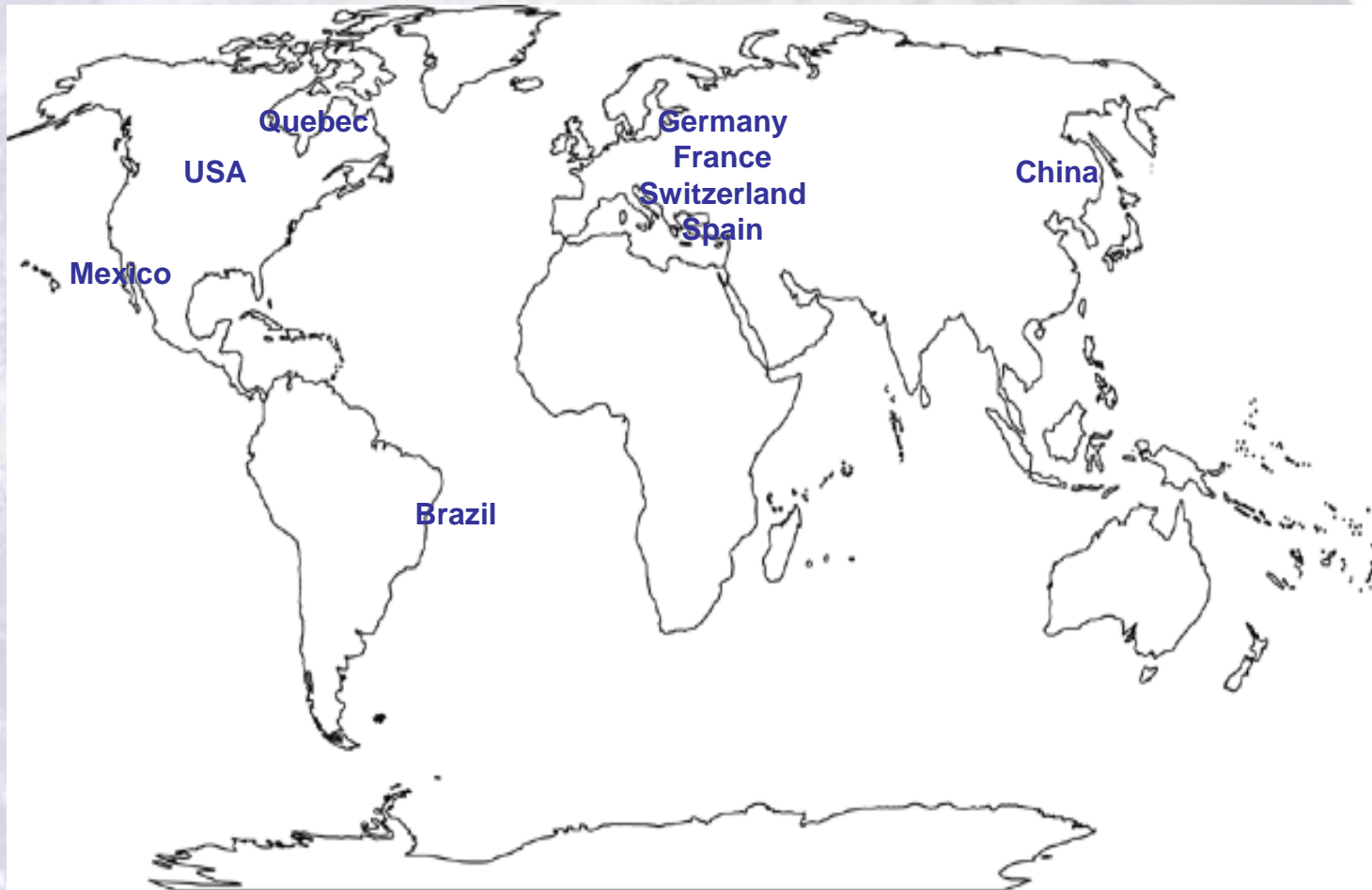
# University Partners Abroad

- Reciprocal exchange model
  - Technische Universität Braunschweig (Germany)
  - ITESM Monterrey Campuses (Mexico)
  - Universidades de Zaragoza, Navarra, Cantabria & Valladolid (Spain)
  - Université de Technologie de Compiègne (France)
  - Université Laval (Canada)
  - Zhejiang University (Hangzhou, China)
- At Bachelor, Master's, and Ph.D. levels

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# Internship Placements



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# Flagship Grant

- URI received the Flagship grant in 2008 to develop Chinese program.
- Our strength is the successful IEP model at the University of Rhode Island.

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# IEP AWARDS

- 1992: ABET Education Innovation Award to the IEP
- 2006: Global Engineering Technology Award, ASEE, to John Grandin for the IEP
- IEP awards in 2011-12
- 2011 Senator Paul Simon Spotlight Award
- for campus internationalization,
- 2012 Andrew Heiskell Award for Innovation
- in International Education



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# Challenge: combine the Flagship goal with IEP Model

- Innovative Interdisciplinary Curriculum
  - a. Advanced Technical Chinese Course (CALLM)
  - b. On-line learning Module
  - c. Internship Placement
  - d. Independent Study
- Supportive learning community

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# CALLM (Chinese Academic Language Learning Modules ) Project

- University of Rhode Island (URI), in collaboration with:
- The University of Oregon (UO),
- San Francisco State University (SFSU),
- Western Kentucky University (WKU)

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## Content-based course

- Second language acquisition research strongly supports content-based instruction (CBI). This interwoven with the academic or professional instruction in the target language is a proven way to present language in natural contexts that enhance the language learning (Curtain & Pesola 1994; Genesee 1994).

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# Advanced Technical Chinese: Part 1

- Cross listing CHN /EGR413, 3 credits
- video- and/or audio-recorded lectures,
- authentic readings
- Team work by Engineering and Language faculty
- Offered first in Spring 2011 to 8 CIEP and Chinese Flagship students

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# Structure of the Course: Three Modules

## Module #1 Fundamentals of Technical Chinese

- Aim: learn the basic Chinese technical expressions, engineering terminologies and graphics.
- The core skills: communication and analysis skills.

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# Module #2 Development of Technical Chinese

- Aim: learn engineering principals as well as applications in various engineering fields.
- writing simple project proposal, applying engineering principles, and present results.
- The core skills: communication, analysis and critical thinking..

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# Module #3 Advanced Technical Chinese

- Aim: read and listen to the selected technical publications and presentations.
- Follow-up written summary and verbal discussions
- The core skills: communication, analysis and critical thinking skills.

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# 目录 sample content

- 1. 数学
  - 1.1 课文: 数学简介 课文练习
  - 1.2 阅读: 数学运算符号的由来
  - 1.3 阅读: 平面直角坐标系简介
  - 1.4 阅读: 常用数学运算符号
- 2. 物理 课文: 物理简介 课文练习
- 3. 化学 课文: 化学简介 课文练习
- 4. 工程学
- 5. 电学
- 6. 实验报告
  - 6.1 课文: 怎样撰写实验报告 课文练习
  - 6.2 阅读: 实验报告样本-气体密度法测定二氧化碳分子量
- 7. 前沿科学技术

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## Advanced Technical Chinese: Part 2:

- On-line Module: **Green Energy**
- A theme of common interest
- higher-level thinking tasks, and interactive
- Open to other Flagship institutes

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# Course objectives

- This course surveys green energy technologies and provides a multi-disciplinary overview of the concepts, principles, classifications, technology prospects of several typical green energy technologies, including solar, wind, geothermal, and ocean energies.
- The course is open to students from a variety of technical fields outside of power engineering, such as natural sciences, management economics, or other engineering disciplines, who have taken a general, college-level physics course.

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# Delivery Method

- This course is delivered on the LMS XXXX and will enable students to complete academic work in a flexible manner, without campus visits. Videos, textbooks, articles, and access to an online course platform will be made available to each student.
- Online assignments include Discussion questions (accomplished in cohort groups through threaded Discussions), blog assignments (to be reviewed by classmates and monitored by the Faculty Member), individual assignments (submitted for review to the Faculty Member), wiki group work, and podcast for presentation. Assigned faculty will support the student throughout this course.

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# Sample lesson (video)



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• 视频:《能源概论Ch1》

### • 练习1.听力

• 看《能源概论Ch1》这段视频前, 请先浏览以下问题要求。读懂后, 再带着问题开始观看视频。请于周五之前, 把问题答案以“能源概论视频1练习1”为题发表在工具箱的博客区。

• 老师提到“*发展绿色能源技术是唯一的也是必要的*”, 为什么?

### • Assessment

• Interpretive Listening-Advanced Low: I can take notes while listening to an academic lecture.

This is the goal. ( ) I can do it with help. ( ) I can do it. ( )

Please go to [LinguaFolio](http://LinguaFolio) website to upload this evidence of learning

### • 练习2.写作

• 在视频中, 老师提到人们生活水平提高和能源的使用成正比关系, 而生态环境质量与能源的使用成反比关系。

你同意老师的观点吗? 请举例说明你同意或者反对的原因。请在周X之前以“生活水平与能源的关系”为题在讨论区发一个帖子总结你的看法。至少300字。

### • Assessment

• Presentational Writing-Advanced Mid: I can write an essay to explain my personal point of view on the relationship between energy consuming and quality of life.

This is the goal. ( ) I can do it with help. ( ) I can do it. ( )

Please go to [LinguaFolio](http://LinguaFolio) website to upload this evidence of learning

### • 练习3.口头报告

• 视频及阅读中都有提到人类在大量使用化石燃料发展经济的同时, 带来了严重的环境污染和生态系的破坏, 主要有十大问题。请从这十大问题中选出5个你现在居住地方所面临的问题, 然后做一个3-5分钟的口头报告。报告内容应该包括:

• 1. 你所选择的5个问题。

• 2. 分别说明这5个问题然后给例子。

### • Assessment

• Presentational Speaking-Advanced Low: I can present to my classmates on an environment issues.

This is the goal. ( ) I can do it with help. ( ) I can do it. ( )

Please go to [LinguaFolio](http://LinguaFolio) website to upload this evidence of learning

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# Outcomes

- Assessment
- **Can-do** statements: listening, speaking, reading and writing
- For example: Speaking

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# Speaking

- Advanced Low:
  - I can adapt my presentation to a specific audience.
  - I speak using different time frames and appropriate mood with good control.
  -
- Advanced Mid:
  - I can communicate my ideas on a variety of topics with accuracy, clarity, and precision.
  - I can adapt my presentation to meet unexpected needs.
  -
- Advanced High:
  - I can present and defend a viewpoint on an academic or professional issue.

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# Chinese IEPers' internship in China 2012

- 2013 Ruben Auer CHN & MCE (who worked for Sensata),
- 2013 Alissa McKechnie CHN & MCE (Hasbro),
- 2013 Chris Andraka CHN & CHE (Bayer),
- 2014 Christian Marks CHN & CMP (Hexagon)
- 2014 Jimmy Li CHN & ELE (ZF)
- 2013 Elena Dempsey CHN & BUS (Hasbro)
- 2013 Patrick Slavin CHN & BUS (HengTian, a financial software company for the financial industry)

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# Hexagon Metrology

Christian Marks '13

Sean Taylor '13

Summer after 3<sup>rd</sup> year  
Internship with Hexagon  
Metrology in North  
Kingstown, **Rhode Island**

Fall of 4<sup>th</sup> year  
Studying computer  
engineering at Zhejiang  
University in **Hangzhou**

Fall of 4<sup>th</sup> year  
Studying mechanical  
engineering at Technische  
Universität **Braunschweig**

Spring of 4<sup>th</sup> year  
Internship with  
Hexagon Metrology in  
**Qingdao, China**

Spring of 4<sup>th</sup> year  
Internship with  
Hexagon Metrology in  
**Wetzlar, Germany**

5<sup>th</sup> year at URI

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# Build up the learning community

learning Community in 101

Chinese Language Wing at IEP and TI houses

Individual and group tutoring hours

Independent Study

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*“Language skills, ..., have a critical role to play in the development of a truly globalized workforce. The challenge we face as business people, as educators and as government leaders is to make sure that Rhode Islanders have the skills and mind-set they need to successfully meet increasing demands from the global marketplace as well as the demands from an increasing diverse and multi-lingual clientele in Rhode Island.” \**

**\*Tom Wroe, CEO Sensata Technologies Rhode Island  
Language Summit Dec. 7, 2011 Providence**

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# Thank you! Questions?

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