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Industrial Outreach Program in Mexico

Mechanical, Aerospace, Electrical, Civil, Industrial, Engineering Summer 2016

http://www.mae.statler.wvu.edu/





Industrial Outreach Program in Mexico



Objectives

- To add value to engineering education and to produce top quality engineering graduates with global competencies, by providing a meaningful industrial experience in a multicultural and multilingual professional environment.
- To bring value to industry through the projects assigned to the participating students, who apply practical engineering skills, interpersonal and communication skills and ultimately leadership skills to attain deliverables.
- To bring faculty members and engineers from industry together to share expertise, capacities and experiences in formulating and solving meaningful engineering problems.



Industrial Outreach Program in Mexico



Global Competencies

- Capability of working effectively with people who define problems differently without losing own perspective.
- The ability of working effectively in teams with people of different backgrounds and disciplines.
- The ability of effective communication in spite of language and cultural barriers.
- Cultural adaptability and sensibility in the work environment.
- The ability to identify and resolve cultural issues that may affect professional work.



Global Competencies Pyramid

Success

Desire to Succeed
Self driven to learn

Human Dimension
Professional Dimension

Integration Skills
Applications Skills

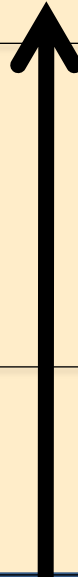
Ability to use tools
Fundamental knowledge

LEADERSHIP
COMPETITIVENESS

PROFESSIONAL
ATTITUDE

EFFECTIVE
SKILLS

COMPETENT
KNOWLEDGE





Industrial Outreach Program in Mexico



Components to the Program

- Projects in Industry. A meaningful engineering project of value to the industry with elements of engineering systems design, systems analysis and/or failure prevention and troubleshooting. With specific constraints and deliverables (6 Credits).
- Intermixed Teams. All participants are assigned to work in intermixed teams comprised of Mexican students and USA students of similar level and background, under the advice of an engineer from industry and a faculty advisor.
- Weekly and Final Reports. All participants produce a summary report and a progress presentation every week. A final report, presentation and poster are delivered at the end.
- Full professional immersion. Participants observe industrial discipline by working full time on a designated industrial site for 8 weeks. Students deliver a professional project report, a final presentation and a Poster presentation.
- Full cultural immersion. Participants are housed with local families who provide, safe, clean and friendly family environment .
- Culture Class. Course in Mexican Culture “in context” with guided cultural field trips to museums, archeological sites, villages, markets etc. (3 credits).



Industrial Outreach Program in Mexico



Logistics to the Program

- Daily transportation. Students are provided daily transportation to and from the industrial site to their host family home.
- Housing. All participants are placed with local families (carefully screened by CONCyTEQ) in an upper middle-class neighborhood, all within few-minutes walk distance.
- Project facilitation. Each industrial site provides the information and materials needed to conduct each project with an industrial liaison acting as advisor-facilitator for the project.
- WVU Faculty Advisor (24/7). Helps select projects from Industry and leads the activity in Mexico. Faculty leader provides, advice, assistance and counseling to students (USA and Mexican) aimed at achieving goals of the program.
- CONCyTEQ Support. The Council provide support for transportation, communication with industries, screening of local families, support for social and professional events, and inter-institutional agreements for Program operation.



Industrial Outreach Program in Mexico



Mexican and American students
visiting industries in Queretrao



Industrial Outreach Program in Mexico



WVU Group
12 Students

CU Group
12 Students

Queretaro, UAQ, ITQ,
ITESM, IPN
12 Students

CONCyTEQ
Queretaro, Qro.
Mexico

32 hrs-week of industrial
exposure being a member
of a team

V. Mucino (WVU)
J. Summers (CU)
Carlos Lopez (UAQ)
Gilberto Munoz (ITQ)

Program Structure

CASE NEW HOLLAND
(Agricultural
Tractors)

TREMEC (DANA)
Automotive
Transmissions

GE-Aircraft
Engines (CIAT)
Energy

Bombardier
Harnesses

Messier Services
Landing Gear
systems

CONDUMEX
Superconductors

MABE
(GE-Appliances)

VRK
Automotive
structures



Industrial Outreach Program in Mexico



Profile of Participants

- WVU Student participants. Junior/Senior students in Mechanical, Aerospace, Industrial, Electrical and Civil Engineering . Other disciplines could be included in the future (Chemical, Mining, Petroleum, Agricultural). Students are best prepared for this program at the Junior or Senior level for participation in their “last summer” before graduation.
- Queretaro Students. Senior level students who have been selected through a competitive screening to spend the “Spring Semester at WVU” prior to the Summer Program in Mexico.
- Faculty Members. Several faculty members from the participating institutions conform the body of faculty advisors. Advisors conduct weekly visitations to the industrial sites to provide advise as the need arises and to evaluate the weekly presentations and final reports and from all participants.
- Industrial Liaisons. Provide advice, mentorship and facilitate projects for students groups. Industrial liaisons are typically experienced engineers who have a vested interest in the outcomes of the project at hand.



Industrial Outreach Program in Mexico



Typical Companies and Areas



Company	Areas of activity	Project Areas				
		Mechanical	Aerospace	Electrical	Civil	Industrial
General Electric	Aviation and Power	X	X	X		
Bombardier	Aircraft manufacturing	X	X	X		X
Case-New Holland	Agricultural machinery	X		X		X
Delphi-CIDEC	Automotive Electronics	X	X	X		
CIDEC-ConduMex	Technology Development	X		X	X	X
CENAM	Metrology – (Like USA NIST)	X		X		X
IMT	Transport Research Institute	X		X	X	



Industrial Outreach Program in Mexico



Other Companies in Queretaro

- Siemens (Power systems)
- Bugatti-Messier Services (Aircraft landing gear systems)
- Tremec (Automotive transmissions)
- DANA Corporation (Automotive drivetrain components)
- Arvin Meritor (Automotive parts)
- VRK- Automotive Structures (aluminum and steel structures)
- Eaton Automotive (Heavy duty components)
- Scania (Transportation Units)
- ITR-Turboreactors (Aircraft Engines)
- Kelloggs Corporation (Cereals)
- Nestle (Processed dairy products)
- Gerber (Baby foods)
- Agros (Industrial greenhouse produce)
- CIATEQ (Technology development support for industry)

SIEMENS



TREMEC
TRANSMISSIONS

ArvinMeritor



Kellogg's



SCANIA



Industrial Outreach Program in Mexico



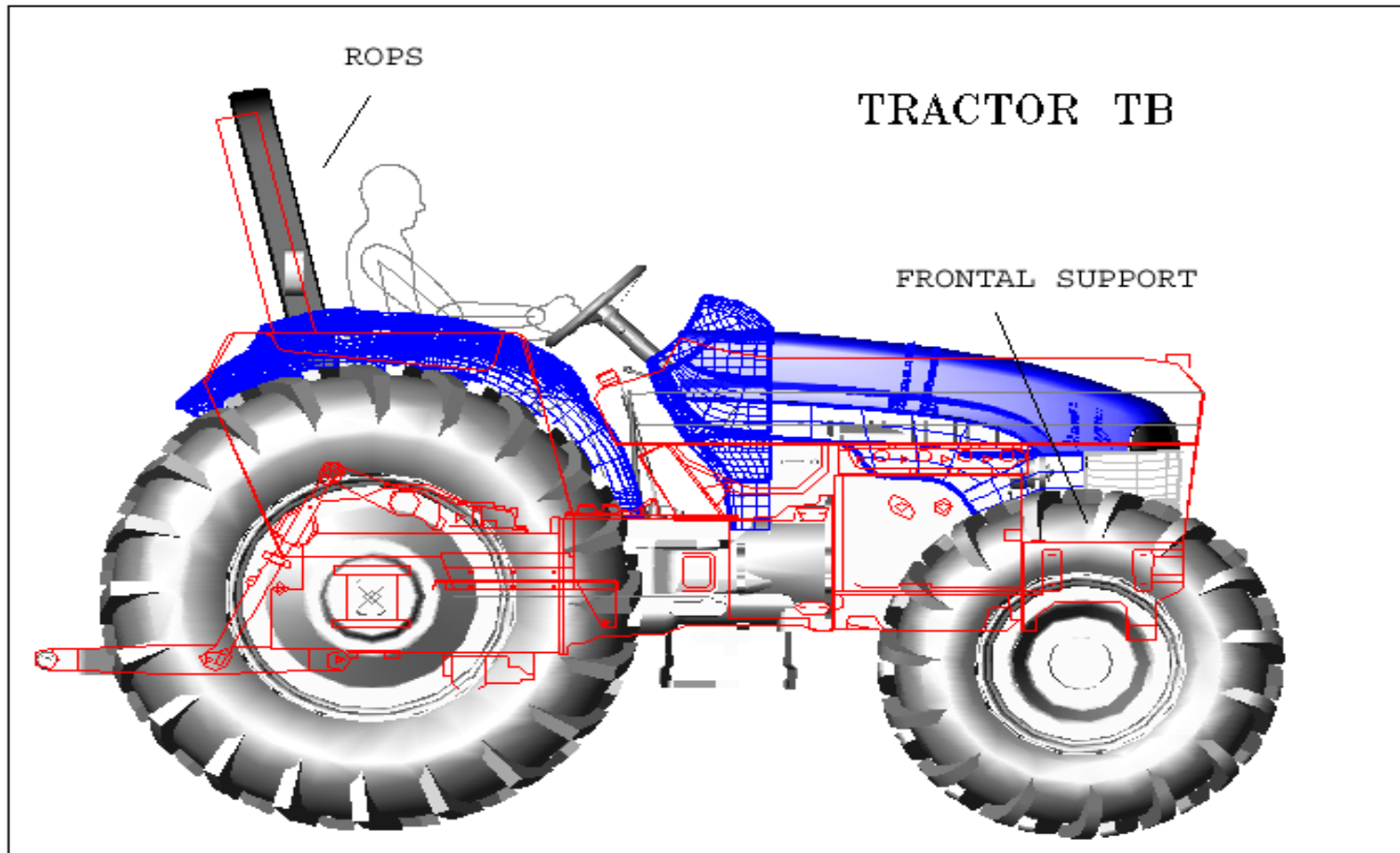
Universities in Queretaro

- Aniversidad Autonoma de Queretaro
- Instituto Tecnologico de Queretaro
- Universidad Aeronautica en Queretaro
- Instituto Tecnologico de Estudios Superiores de Monterrey – Minterrey Tech.
- Institutio Politecnico Nacional -CICATA
- Universidad Autonoma de Mexico- CEFATA
- Universidad Tecnologica de Queretaro
- Universidad Politecnica de Queretaro
- Instituto Tecnologico de San Juan del Rio
- Universidad Tecnologica de San Juan del Rio





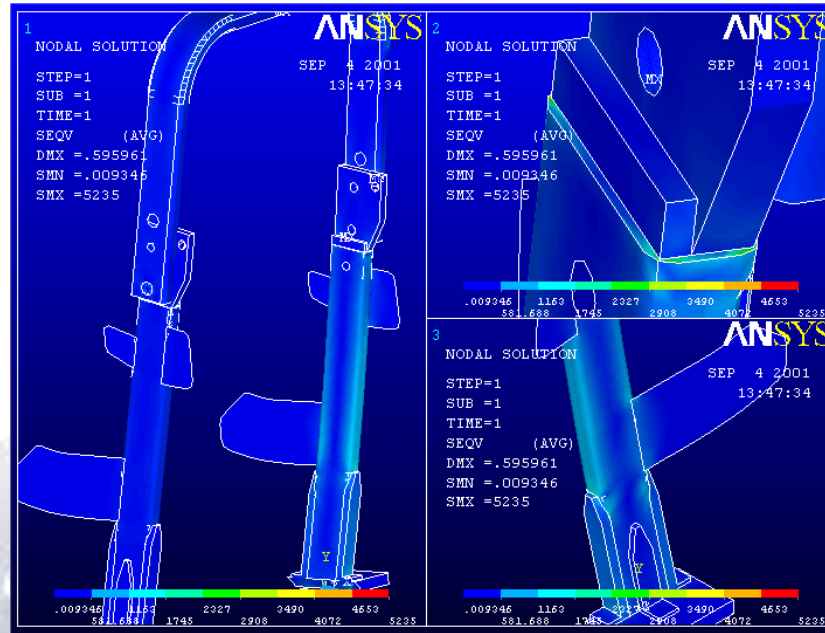
NEW HOLLAND TEAM ROPS Impact Analysis





NEWHOLLAND

PEOPLE YOU CAN TRUST

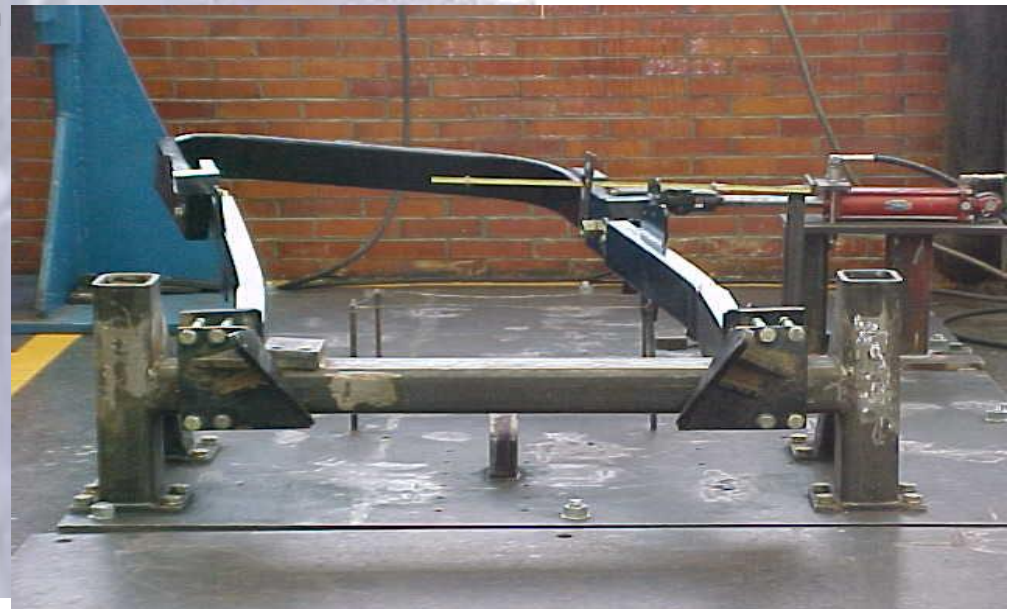


Stop the test when:

a) The strain energy absorbed by the structure is equal to or greater than the required input energy E_{in} or

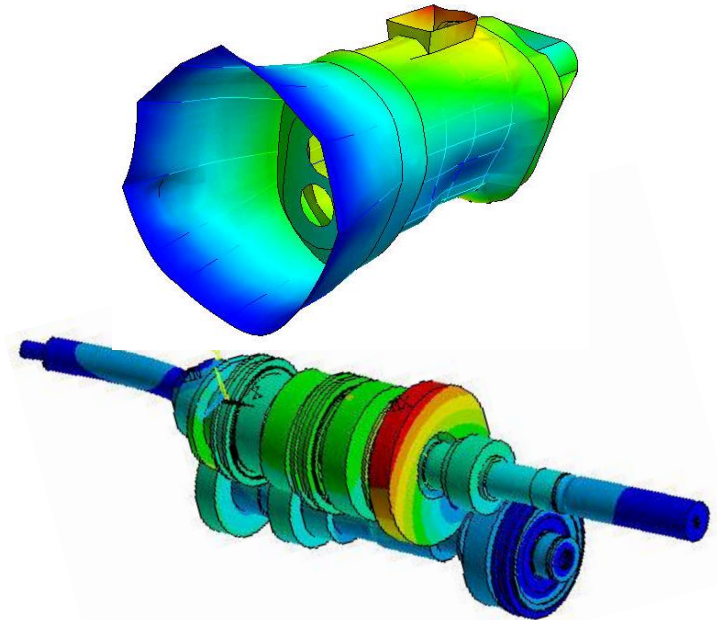
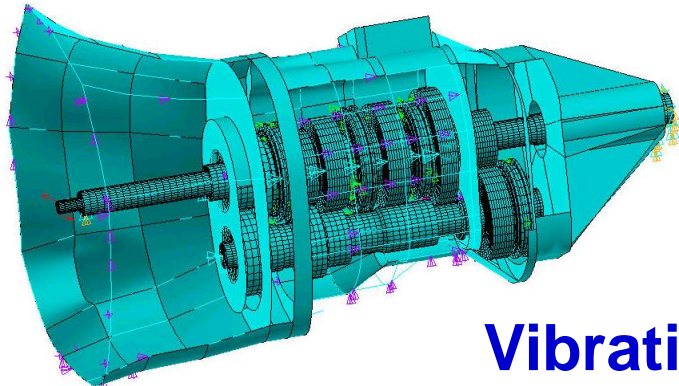
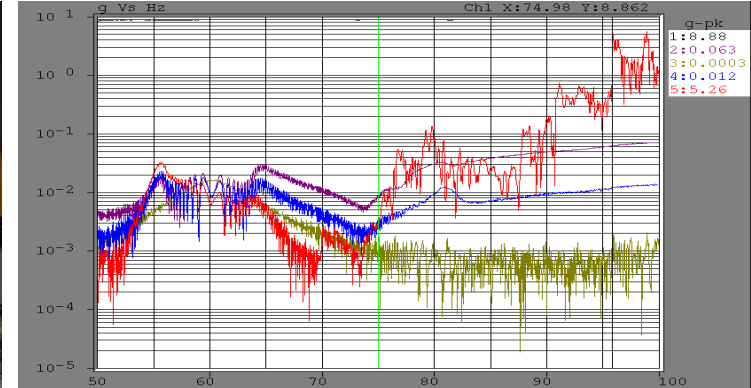
b) Deflection of the structure exceeds the allowable deflection.

Side load test





Industrial Outreach Program in Mexico



Vibration analysis on the gear train



Industrial Outreach Program in Mexico



Design of a composite material pultrusion machine



Industrial Outreach Program in Mexico



Outcomes of the Program

- WVU Students:
 - Meaningful industrial practical experience
 - Enhanced Communication skills (presentation, written and verbal)
 - Experience of teamwork with diverse background team members
 - Reaffirmed Engineering skills
 - Professional Reporting skills
 - Professional work organization skills
 - New technical skills (computational, instrumentation, equipment and tools)
 - Cultural knowledge through cultural immersion
 - 9 Credits towards completion of Program requirements
- Queretaro Students
 - Same as above plus a Spring Semester Abroad
 - Credit for Professional Practicum requirement in their Program (in lieu of the 9 credits for WVU Students)
 - Great opportunities for Graduate Study Abroad for Mexican Students after Program



Industrial Outreach Program in Mexico



Outcomes of the Program

- WVU Faculty:
 - Extended Network with Universities in Queretaro
 - Extended Network with Industry in Mexico
 - Opportunity to extend Network with industry in the SSA.
 - Close encounter with industry
 - Opportunity to showcase research background to industry
 - Opportunity to identify talent for graduate programs
 - Faculty Development opportunity
- Queretaro Faculty”
 - Extended Network with WVU
 - Extended Network with Industry in Mexico
 - Close encounter with industry
 - Opportunity to showcase research background to industry
 - Opportunity to identify talent for graduate programs
 - Faculty development opportunity



Industrial Outreach Program in Mexico



Outcomes of the Program

- **INDUSTRY:**
 - Projects leave value for companies in solutions, models, data developed etc.
 - Mexican students are potential employees of those companies.
 - Industrial Liaisons develop a network and exposure to faculty members expertise.
 - Companies contribute to the education mission of the State of Queretaro.
 - Industry has the opportunity to have its voice heard by Academia.
- **UNIVERSITIES:**
 - WVU has established itself a leader in International Education.
 - Graduates from this program report in all cases the positive impact in job interviews.
 - WVU has a Certificate of Global Competency for graduates of this program.
 - Queretaro Universities have distinguished themselves by embracing international collaboration and by having top students spend a semester abroad.
 - Academia has the opportunity to have its voice heard by industry.



Industrial Outreach Program in Mexico



Institutions Involved	Student Participants	Faculty from both countries	Industrial Liaisons	Industries/Research Centers	Projects developed
Local Institutions: <ul style="list-style-type: none"> • CONCYTEQ • University of Guanajuato • University of Queretaro (UAQ) • Institute of Technology of Queretaro (ITQ) • Tech. University of San Juan del Rio. • ITESM (Tec. De Monterrey) • CICATA (IPN) • Aeronautical University in Queretaro (UNAQ) • Polytechnical Univ. of Queretaro (UPQ) • UNAM • Tech. Inst. Of San Juan del Rio • Technological University of Qro (UTEQ) • Universidad Politecnica de Santa Rosa de Jauregui 	158 (WVU) 10 (UG) 71 (UAQ) 62 (ITQ) 31 (ITESM) 7 (CICATA) 9 (UTEQ) 6 (UPQ) 22 (Clemson) 6 (UTSJR) 6 (ITSJR) 7 (UNAQ) 1 (UNR) 2 (UPSRJ)	9 (WVU) 2 (UG) 5 (UAQ) 6 (ITQ) 4 (ITESM) 2 (CICATA) 2 (UTEQ) 1 (UPQ) 2 (Clemson) 2 (UTSJR) 2 (ITSJR) 2 (UNAQ) 1 (UPSRJ)	(2) GM (Gto) (4) TREMEC (Qro) (2) Transm-TSP (Qro) (1) Micro-Troq. (Qro) (3) IMT (Qro) (2) LAPEM (Gto) (2) I. Turbo Reactores (1) Terramite (WV) (3) KOSA (4) Case- New Holland (3) InMec (8) CENAM (2) ANSYS Mexico (1) Irving de Mexico (1) Crown Mexico (10) Mabe-GE Appliances (2) CIDECE-ConduMex (2) Arvin-Meritor (2) Gabriel (5) CIAT-GE Aircraft E. (3) VRK (Automotive) (2) CIATEQ (2) Bombardier (2) Messier Services (3) Brose (3) CIDECE-Delphi (2) CIDESI	GM TREMEC Transmisiones-TSP Micro-Troquelados IMT* LAPEM* ITR (TurboReactores) Terramite Corp.** KOSA New Holland InMec CENAM* Group SSC (ANSYS) Irving- Composites Crown Mexico MABE CIDECE-ConduMex CIDECE-Delphi Arvin Meritor Gabriel CIAT-GE Aircraft E. VRK Automotive CIATEQ*(B. Quintana) Bombardier Messier Services CIDECE-Delphi BROSE CIDESI * Research Centers ** From West Virginia	(1) GM Mexico (13) TREMEC (4) SPICER-TSP (1) Micro-Troq. (5) IMT (2) LAPEM (2) I. TurboReactores (1) TerramiteCorp.** (3) KOSA (9) Case-New Holland (1) InMec (11) CENAM (1) Irving (1) Crown (8) CIAT-GE (17) CIDECE-ConduMex (21) Mabe (2) Arvin Meritor (2) Gabriel (6) VRK Automotive (6) CIATEQ (2) Messier Serv. (4) Bombardier (2) CIDECE-Delphi (2) Brose (1) CIDESI ** From West Virginia
17 Institutions	399 Students	40 Faculty	77 Liaisons	28 Companies	128 Projects

Nineteen year summary table for the Industrial Outreach Program in Mexico



Industrial Outreach Program in Mexico



First Year of Program WVU in Guanajuato-Queretaro, 1997

First Agreement signed 1999 WVU-CONCYTEQ

New Agreement WVU-CONCYTEQ Industrial Outreach Program , August 2012

Queretaro Institutions UAQ, ITQ and UNAQ with Secretary of Education



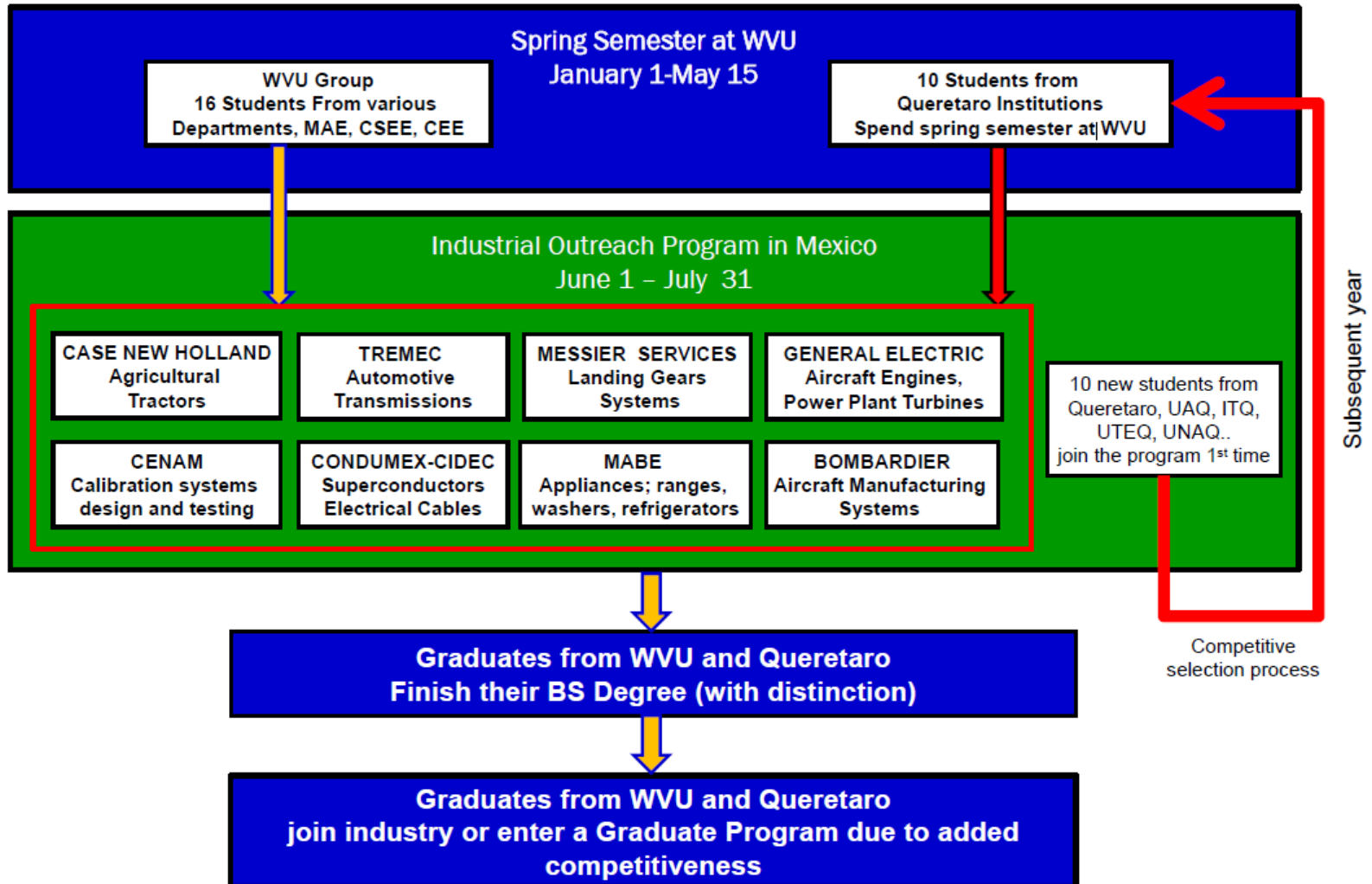
Queretaro Students at WVU, Spring Semester
2013



WVU Students, faculty and Government Officials
in Closing Ceremony in Queretaro, Summer 2013



Industrial Outreach Program in Mexico





Industrial Outreach Program in Mexico



ASME Best Paper Award 2013



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Print page

APPLY
NOW

Dr.Mucino and his Co- authors Won the Process Industries Division – Best Paper Award 2012

Dr.Mucino and his co-authors won the Process Industries Division – Best Paper Award 2012. Their paper (IMECE2012-86444 Bridging Academia and Industry Gap, Through Global Competencies: Industrial Outreach Program US-Mexico) was selected as last year's IMECE winner, among all the papers submitted to one of the Process Industries Division sponsored tracks.

The Process Industries Division Best Paper Award – is awarded yearly for notable contribution to the field of Process Industry, published in the International Mechanical Engineering Congress and Exposition proceedings.

Dr.Mucino and his co-authors were invited to the Executive Committee meeting in San Diego for the award ceremony.

11/20/2013



Industrial Outreach Program in Mexico



Conclusion

This Program is more than just a “study abroad program” and more than just an “internship abroad program.”

It is study abroad, with practical experience, with meaningful academic credit, with a cultural immersion and with a professional development component in which benefits all:

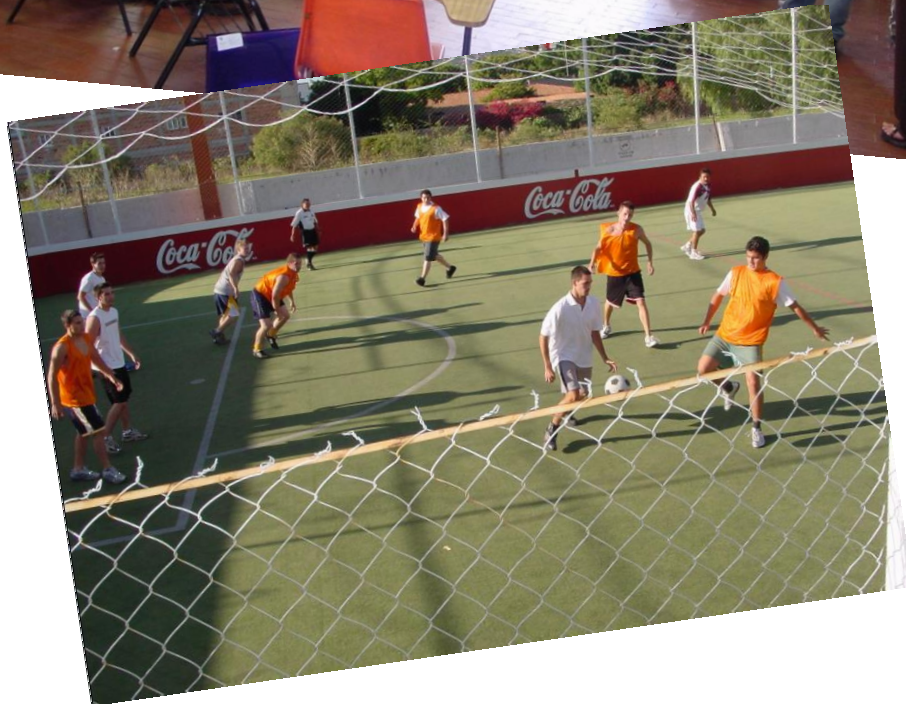
- Students from WVU and Queretaro
- Industry from Queretaro (and USA)
- University Professors from WVU
- University Professors from Queretaro
- WVU and USA institutions
- Universities of Queretaro



Industrial Outreach Program in Mexico



Friday afternoon
“report session” in
Spanglish after:
soccer, basketball etc.





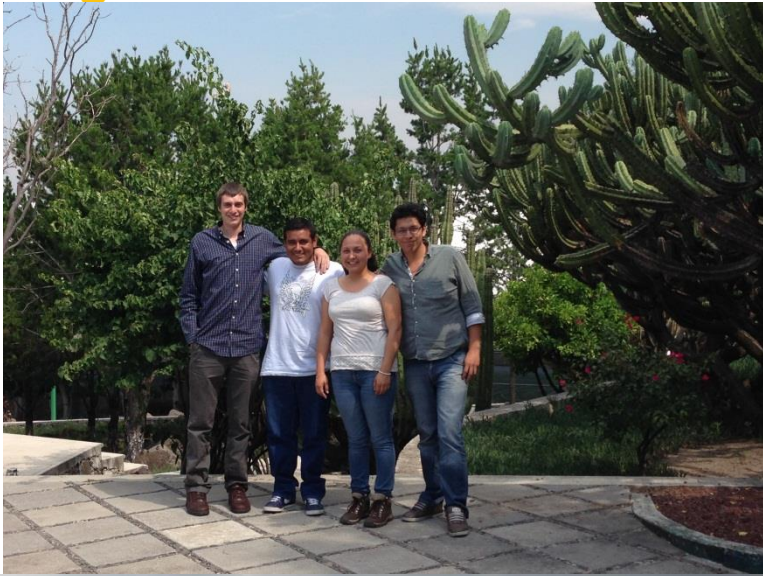
Industrial Outreach Program in Mexico



Weekend sightseeing opportunities around Queretaro









Industrial Outreach Program in Mexico



Socializing with
Mexican Families

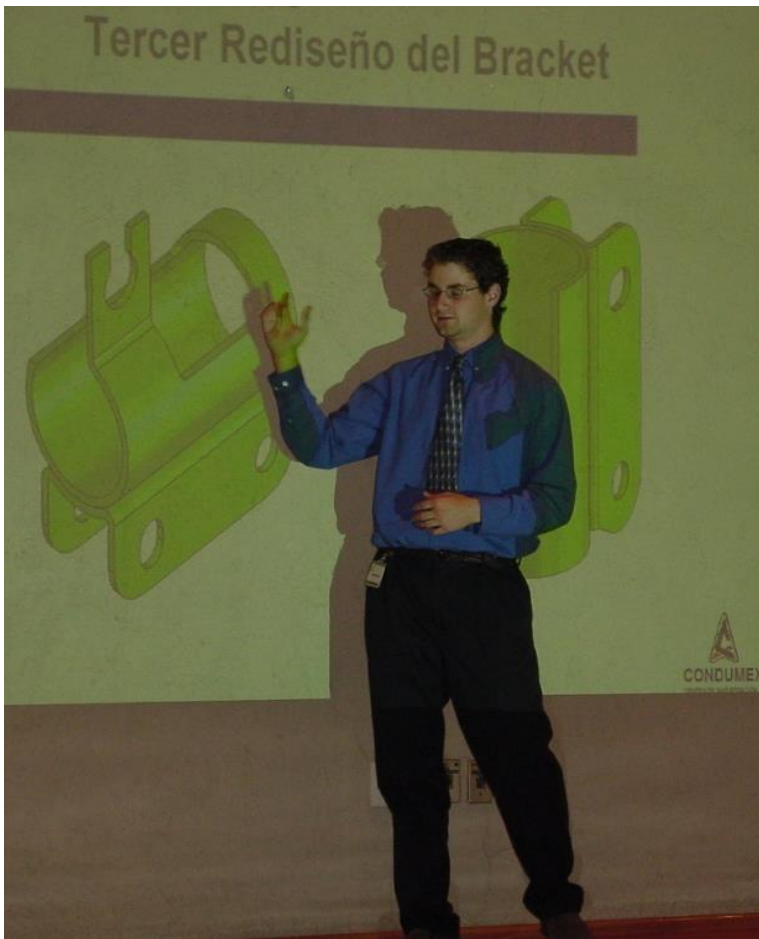




Industrial Outreach Program in Mexico



Delivering results with formal presentation to industry





Industrial Outreach Program in Mexico



Transportation on University of Queretaro Bus







Industrial Outreach Program in Mexico



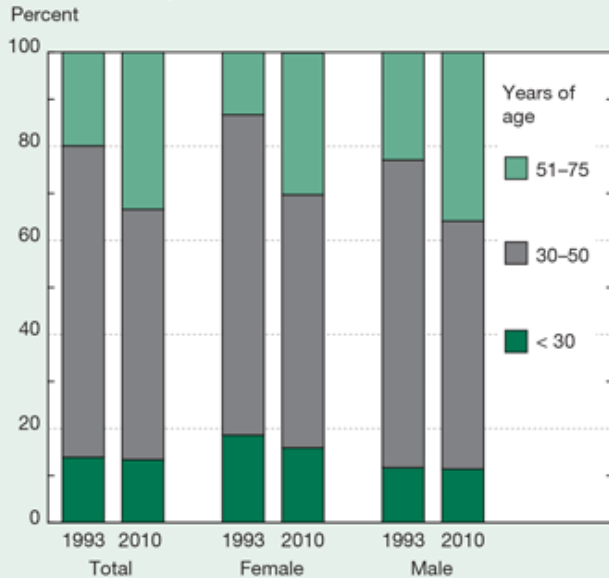
Thank you



Industrial Outreach Program in Mexico



Figure 3-25
Age distribution of scientists and engineers in the labor force, by sex: 1993 and 2010

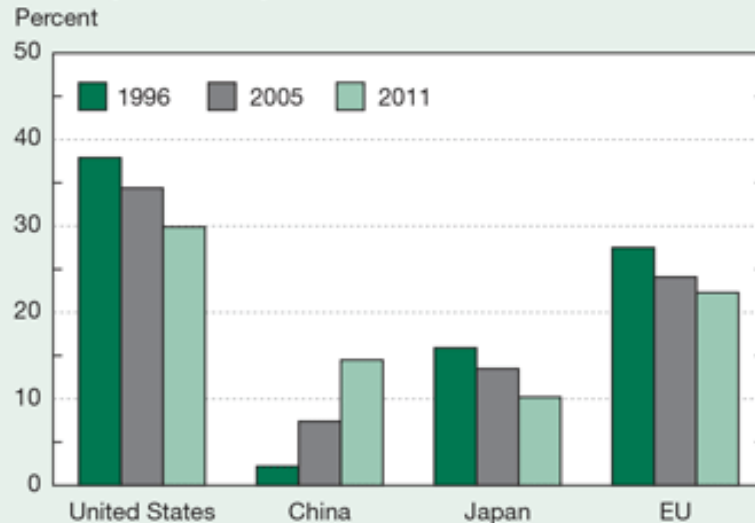


NOTES: For 1993 data, scientists and engineers include those with one or more S&E degrees at the bachelor's level or higher or those who have only a non-S&E degree at the bachelor's level or higher and are employed in an S&E occupation. For 2010 data, scientists and engineers include those with one or more S&E or S&E-related degrees at the bachelor's level or higher or those who have only a non-S&E degree at the bachelor's level or higher and are employed in an S&E or S&E-related occupation. The Scientists and Engineers Statistical Data System (SESTAT) does not cover scientists and engineers over age 75.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, SESTAT (1993, 2010), <http://sestat.nsf.gov>.

Science and Engineering Indicators 2014

Figure O-6
Global share of expenditures on R&D, by selected country/economy: 1996, 2005, and 2011



EU = European Union.

SOURCES: National Science Foundation, National Center for Science and Engineering Statistics, estimates (August 2013), based on data from the Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (2013/1); and the United Nations Educational, Scientific and Cultural Organization Institute for Statistics, <http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx>, table 25, accessed 2 August 2013.

Science and Engineering Indicators 2014

Engineering Workforce of the USA is aging up...!!!



http://www.numbeo.com/crime



- Cost Of Living ▾
- Property Prices ▾
- Crime ▾
- Health Care ▾
- Pollution ▾
- Traffic ▾
- Quality Of Life ▾
- Travel ▾

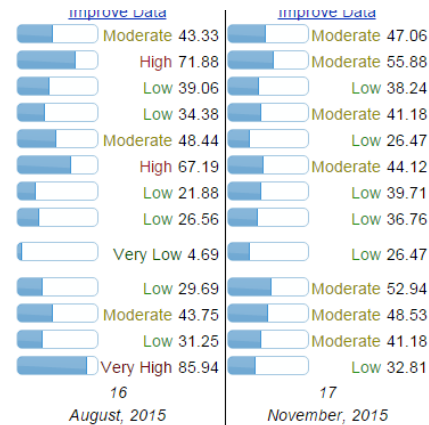
Numbeo > Crime > Comparison > Mexico vs United States > Queretaro vs Pittsburgh, PA

Crime Comparison Between Queretaro and Pittsburgh, PA

Like 0 Tweet 0 G+1 0

- Level of crime
- Crime increasing in the past 3 years
- Worries home broken and things stolen
- Worries being mugged or robbed
- Worries car stolen
- Worries things from car stolen
- Worries attacked
- Worries being insulted
- Worries being subject to a physical attack because of your skin colour, ethnic origin or religion
- Problem people using or dealing drugs
- Problem property crimes such as vandalism and theft
- Problem violent crimes such as assault and armed robbery
- Problem corruption and bribery

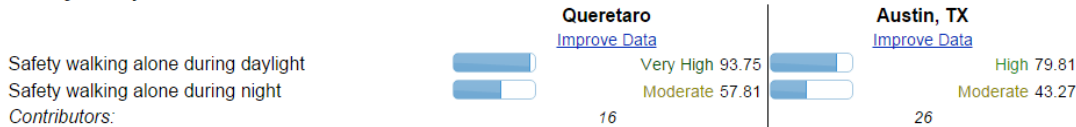
Contributors:
Last Update:



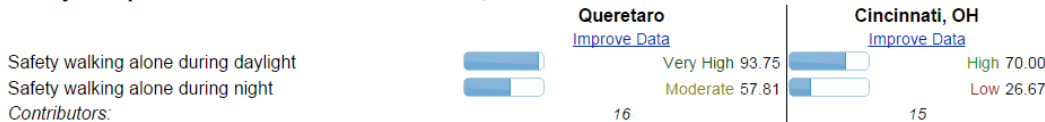
Safety comparisons Queretaro vs Pittsburgh, PA



Safety comparisons Queretaro vs Austin, TX



Safety comparisons Queretaro vs Cincinnati, OH



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Summer in Argentina



Spend a summer in lovely Buenos Aires, Argentina! Learn Spanish, explore Latin America, and get to know a unique country and city. Buenos Aires is considered the "Paris of South America" and you can see why with its shady, tree-lined boulevards, plethora of cafes and eateries, and vibrant social and cultural scene.

Home > Summer Abroad > Summer in Argentina

Why CISabroad
 Program
 Highlights

Did you know that 70% of all CISabroad students receive scholarships or grants to study or intern abroad? You can get a grant for something as simple as applying early, or a scholarship for blogging.

Program Video



Term: Summer 2016 Language and Cultural Studies	
Arrival	Late June
CISabroad Orientation	Late June
Classes Start	Late June
Classes End	Late July
Departure	Late July
Application Deadline	April 15
4 weeks..!!	
Prices	
Term: Summer 2016 Spanish Intensive Language	Price: \$4,190 - \$4,490 more info
Term: Summer 2016 Language and Cultural Studies	Price: \$6,490 more info

Airfare and credits NOT included

MEXICO







INDUSTRIAL OUTREACH PROGRAM IN MEXICO

SUMMER 2017,

For Mechanical, Electrical, Civil and Industrial Eng. Students

International Internships Summer 2017

- Earn 9 credits towards your engineering degree (MAE471, MAE472 & FCLT260 - Obj.3&9)
- Travel to Queretaro for 8 weeks
- Gain industrial experience with world-class companies
- Team up with Mexican students
- Live with a local family
- Long weekend in Cancun or Ixtapa at the end
- Eligible for CEMR Certificate of Global Competency

Approximate Cost 8 weeks

- \$ 7,500 (all inclusive, tuition, room & board, airfare, admin, transportation, excursions, most meals)

Information: Dr. Victor Mucino (vhmucino@mail.wvu.edu), ES8341













Airfare and credits included



INDUSTRIAL OUTREACH PROGRAM IN MEXICO 2017



INDUSTRIAL INTERNSHIP WITH STUDY ABROAD CREDIT

Program Description

Travel to Queretaro, Mexico for **eight weeks** to **earn nine credits** towards your engineering degree by teaming up with Mexican students of similar disciplines and level. **Gain industrial experience** working full time on meaningful engineering projects with multinational companies in Queretaro. Student teams work under the advice of engineers from industry and faculty members from Mexico and the USA. Local families provide room and board in a safe, healthy and friendly environment for a full cultural immersion. The program ends with a long weekend in Cancun or Ixtapa. **This Program is eligible for the CEMR Certificate of Global Competency.**

Objectives

- Add value to students education through international experiential learning
- To solve meaningful engineering problems of value to industry
- To bridge the gap between academia and industry in an international setting

Courses with credit:

- MAE 471 Principles of Engineering Design (3 cr) – Capstone Design Course
- MAE 472 Engineering System Design (3 cr) – Project Technical Elective
- GEC (UAQ Spanish and Mexican Culture) (3 cr) – GEC Equivalent to FLCT260



Calendar Jan 16, 2017 Pre-Registration Feb 13, 2017 Meet Mexican students at WVU March 13, 2017 Deposit \$ 1,000 April 3, 2017 Deadline for registration May 1, 2017 Predeparture Meeting June 3, 2017 Travel to Mexico, Queretaro June 5, 2017 Start Project in industry full time July 29, 2017 Fly to Ixtapa or Cancun August 1, 2017 Return to USA		Expenses covered • Airfare; Pitt-Mexico City-Cancun-Pitt • Insurance for Study Abroad • Room and Board with a Local Family • Daily transportation to and from workplace • Excursions (transportation and hotels) • Administrative Fees (tuition 9 cr/hr) • Daily meals with host family and industry Total \$ 7,500* (aprox) * Statler College provides aid of (\$ 200 for eligible students) Program is eligible for financial aid.
Information Seminars: (Room TBA) • Nov 16, 2016 • January 16, 2017 • February 13, 2017 • March 13, 2017 • April 3, 2017 Deadline for registration		Information with Program Director Dr. Victor H. Mucino (vhmucino@mail.wvu.edu) Professor and Associate Chairman Mechanical and Aerospace Engineering ESB 841B, (304) 293-3150

Join us in Queretaro June and July of 2017 !!

This Program is open for junior/senior students eligible for Capstone Design in MAE, CEE, IMSE & CSEE