

TO: Liberal Arts Curriculum & Standards Committee
FROM: Larbi Oukada, Acting Chair, World Languages and Cultures
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SUB: New Dual Degree Program Proposal in Spanish and Engineering
(Amendments to March 2003 Dual Degree Proposal German/Engineering)
DATE: November 20, 2008

Dual Degree Program Proposal

Bachelor of Arts in Spanish /Bachelor of Science in Engineering

Offered jointly by the IU School of Liberal Arts at IUPUI and the Purdue School of Engineering and Technology at IUPUI

Statement of Purpose

This is a proposal for a new dual degree in Spanish and Engineering. The proposal follows the model provided by IUPUI existing dual programs in German and Engineering and in French and Engineering.

Two separate educational currents have been slowly converging in recent years. On the one hand, the traditional liberal arts curriculum with its strong emphasis on critical thinking, linguistic and intercultural communication is being redirected toward practical applications in professional careers. On the other hand, professional schools such as engineering and technology or business are experiencing a growing need to redesign their general education requirements to include more emphasis on interpersonal and intercultural communication as well as issues of ethical and global responsibility.

To be employable in the 21st century, the Bachelor of Arts graduate needs to not only demonstrate the results of a broad liberal arts education, but to also develop practical skills directly applicable to a future career. Similarly, today's engineering graduates require not only solid, cutting-edge technical expertise in their field, but must also acquire international and intercultural skills that will enable them to interact smoothly and efficiently in an increasingly interconnected world.

These two merging educational currents have spurred a growing interest in interschool linkages and dual-degree programs. Engineering schools in the country have been at the forefront of this new development and have established several dual-degree programs. Such programs, which integrate language, intercultural and engineering studies have been very successful in attracting highly gifted and motivated students and in placing them in top-level positions after graduation.

Following the curriculum model of the International Engineering Program at the University of Rhode Island, the faculty of the Schools of Liberal Arts and Engineering at IUPUI have worked together and developed our current five-year dual degrees in Engineering and German, and Engineering and French. At the completion of their undergraduate studies, IUPUI graduates of the Dual Degree Program in International Engineering receive a Bachelor of Science Degree from Purdue University and a

Bachelor of Arts degree in German or French from Indiana University. **This proposal adds Spanish language to the current dual degree program offerings at IUPUI.**

The curriculum framework adopted in March 2003 by the Liberal Arts Faculty Assembly is amended in the enclosed document to apply to the Dual Degree combining Spanish with four Engineering disciplines (biomedical, computer electrical, and mechanical engineering).

Dual Degree Program Requirements:

The requirements for the dual degree include the following three components:

1. the degree requirements for Biomedical Engineering, Mechanical Engineering, Electrical Engineering or Computer Engineering with one course modification
2. the combined common general education core approved by the Liberal Arts and Science faculties which overlap the general education courses approved by the Engineering departments with one course modification
3. the major requirements for the B. A. degree in Spanish with several modifications linked with their application to Engineering

Dual Degree Modification approved by the School of Engineering:

All the degree requirements for each Engineering department are reproduced in the dual degree program, with one exception. One part of the international internship experience was approved by two Engineering departments to count as a Technical elective. Only 2 of the 3 credits can be applied to graduation. This does not interfere with completing the program.

Dual Degree Requirement Modifications approved by the Liberal Arts Faculty:

1. The SLA-SS common general education core requirements all have counterparts in the general education requirements of the Engineering departments [see Appendix I]:
 - First-year Experience Course: Introduction to the Engineering Profession: ENG 195 (1 cr.)
 - English Composition and Communication Skills: COMM R110 and W131. See Modification #1 for second composition course
 - Humanities, Social Sciences, and Comparative World Cultures
 1. Hist H114 = Humanities/Social Science Elective 1
 2. One Humanities Course = Humanities/Social Science Elective 2
 3. One Social Sciences Course = Hum./Social Science Elective 3
 4. One Comparative World Culture Course = Hum./Soc. Sc. Elec. 4
 - Junior/Senior Integrator = Humanities/Social Science Elective 5
 - Physical and Biological Sciences (12 cr.) = Physical Sciences requirements
 - Mathematical Sciences (6 cr.) = Mathematical Sciences requirements
 - The Foreign Language requirements, if required, by completion of the first-year course sequence, or by Placement.

SLA-SS Core Curriculum Proposal:

The SLA-SS common core requirements instead of the regular SLA general education requirements, used for the School of Science B.A. was adopted for the dual degree, as they include only one History course and a total of three courses in Humanities, Social Sciences and Comparative World Culture, thus reducing the total number of credit hours toward graduation by 6 credits. (IUPUI Campus Bulletin 2006-2008, pp. 488-9)

Core Requirement Modification:

The discipline-based equivalency for the Second Composition Course was adopted, to be fulfilled by a combination of the Communication in Engineering Practice course, TCM 360 (2 cr.) plus the Senior Design Course which includes a research project in one Engineering discipline.

2. The applied Spanish Major Program for Engineers differ from the traditional major in the following way:
 - During the fourth year of the program, each student in the dual degree program is required to participate in a five-month international internship to be arranged by the School of Engineering. The international internship experience comprises a key component that will help dual degree students acquire the necessary linguistic and cross-cultural experience to become active participants in the global market place.

Major Requirement Modification #1:

Waiver of one culture course requirement for the five-month life experience abroad. The total number of major credit hours would be reduced from 30 to 27 hours.

Major Requirement Modification #2:

The applied major course requirements would include two internship projects to be undertaken by each dual degree student during the five-month internship for a total of 6 cr. hrs.

The remaining courses for the major will be distributed in a manner similar to the traditional Spanish language major.

Appendix 1: Combined SLA-SS and Engineering General Education Requirements

Appendix 2: Modified Spanish Major requirements for Dual Degree Program.

**APPENDIX I: Dual Degree:
B.A. Spanish/B.S. Engineering
Combined SLA-SS/Engineering Gen Ed Requirements**

SLA-SS Gen Ed Common Core Requirements	Engineering Gen Ed Requirements
First-Year Experience (1 c)	ENG 195 (1 cr.)
Composition/Communic	Commun/Ethics
COM R110 (3 cr.)	COMM R110 (3 cr.)
Eng W131 (3 cr.)	Eng W131 (3 cr.)
2. Comp course (3 cr.)	TCM 360 (2 cr.)
	ME/ECE 462 Sen Design (3)
Foreign Language Prof	
First-year language (10 cr.)	
Hum/Soc Sci +World C	Hum/Soc Sci Electives
1. Hist H114	1. HSSE (3 cr.)
2. Humanities Course (3 cr.)	2. HSSE (3 cr.)
3. Social Science (3 cr.)	3. HSSE (3 cr.)
4. Comp World Cult (3 cr.)	4. HSSE (3 cr.)
Jun/Sen Integrator (3 cr.)	5. HSSE (3 cr.)
	Math/Phys Sciences
Phys/Biol Sciences (12 cr.)	Chem C105 (3 cr.)
	Phys 152 (4 cr.)
	Phys 251 (5 cr.)
1. Math (3 cr.)	Math 163/164 (5-5 cr.)
2. Comp Science (3 cr.)	Math 261/262 (4-4 cr.)

***Appendix 2: Dual Degree Program Proposal
Bachelors of Arts in Spanish/Bachelors of Science in Engineering***

The regular Spanish major consists of a minimum of 30 credit hours in courses at the 300- and 400-level.

The combined Dual Degree requires 27 credit hours of Spanish at 300-, 400-level.

Regular Spanish Major	Combined Spanish/Engineering
S311 (Spanish Grammar)	S311 (Spanish Grammar)
S313 (Writing Spanish)	S313 (Writing Spanish)
S320 (Spanish Pronunciation and Diction)	S320 (Spanish Pronunciation and Diction)
S360 (Introduction to Hispanic Literature)	S360 (Introduction to Hispanic Literature)
S363 (Introduction to Hispanic Culture)	S363 (Introduction to Hispanic Culture)
one 400-level course in literature	one 400-level course in literature
S426 (Introduction to Spanish Linguistics)	S426 (Introduction to Spanish Linguistics)
one 400-level course in culture and civilization	Waived for experience abroad
one 400-level elective course	S493 Internship in Spanish
S498: Capstone Seminar in Spanish OR S487: Capstone Internship in Spanish	S487: Capstone Internship in Spanish
Total # of credits: 30	Total # of credits: 27

Dual program:

- Third-year proficiency is required at the beginning of the program. This requirement may be satisfied by taking first and second-year Spanish (S117-S118-S119 OR S131-S132 AND S203-S204). It may also be satisfied by placement.
- The 400-culture course required for the regular Major is waived, understanding that students will gain cultural knowledge through their five-month internships abroad.
- During their international experience students will gain credit for two Internships: S493 and S497, a total of 6 credits. S493 will focus on technical translation, S497 will focus on culture and cross-cultural issues.
- For students who start the program with third-year proficiency, requirements for the Spanish Major may be completed in four years taking one course per semester. The two Internships would be conducted abroad during the fourth-year.

International Engineering-EE-Spanish

First Semester	FIRST YEAR		
First-Year	ENGR 195	1	Intro to Engin Prof
	ENGR 196	3	Intro to Engineering
	CHEM C105	3	Princ of Chemistry I
	MATH 163	5	Calculus/Geometr I
	SPAN S203	4	Second-Year Span I
	Total:	16	
Second Semester	FIRST YEAR		
	ENG 197	3	Intro Progr Concept
	ENG W 131	3	Elementary Comp I
	MATH 164	5	Calculus/Geom II
	PHYS 152	4	Mechanics
	SPAN S204	4	SecondYear Span II
	Total:	19	
Third Semester	SECOND YEAR		
	ECE 201	3	Linear Circuit Ana I
	ECE 207	1	Electr Measurement
	MATH 261	4	Multivari Calculus
	PHYS 251	5	Heat, Elec, Optics
	SPAN S311	3	Spann Grammar
	Total:	16	
Fourth Semester	SECOND YEAR		
	ECE 202	3	Circuit Analysis II
	ECE 264	2	Adv. C Program
	ECE 266	3	Digital Logic Desig
	ECE 267	1	Dig Logic Des Lab
	MATH 262	4	Lin Alg Diff equ
	SPAN S313	3	Writing Spanish
	Total:	16	
Fifth Semester	THIRD YEAR		
	ECE 301	3	Signals & Systems
	ECE 311	3	Elec & Magn Fields
	ECE 362	4	Microprocessor
	Sci/Math Ele	3	
	SPAN S320	3	Span Pron Diction
	Total:	16	
Sixth Semester	THIRD YEAR		
	ECE 302	3	Probabilistic Meth
	ECE 340	3	Simulation, Model
	ECE 255	3	Elect. Anal. & Des.
	COMM R110	3	Fund Speech Comm
	SPAN S360	3	Intro Span Lit
	ECE 208	1	Elect. Anal Des Lab
	Total:	16	

Seventh Semester	FOURTH YEAR		
INTERNSHIP/	Tech Elect	2	
Mexico or Spain	SPAN 493/487	6	Internship in Span
	Total:	8	
Eighth Semester	FOURTH YEAR		
	TCM 360	2	Comm in Engineer
	ECE 440	4	Int Comm Syst An
	ECE Elective I	3	
	Hist H114	3	Western Civil II
	SPAN S363	3	Intro Span Culture
	ECE 382	3	Feedback System
	Total:	18	
Ninth Semester	FIFTH YEAR		
	ECE 400	1	Senior System
	ECE elect. II-III	6	
	Huma Course	3	
	Soc Sci Course	3	
	SPAN S4XX	3	400-elective S lit
	ECE 496	1	
	Total:	17	
Tenth Semester	FIFTH YEAR		
	ECE 492	3	Senior Design
	ECE Elec IV	3	
	ECE 401	1	Engr. Ethics/Prof
	SPAN S426	3	Span linguistics
	Comp World C	3	
	Integrator	3	
	Total:	16	
	5-year total	158	

International Engineering-BME-Spanish

First Semester	FIRST YEAR			NOTES
	ENGR 195	1	Engr Seminar	
	ENGR 196	3	Intro to Engineering	
	CHEM C105	3	Prin. of Chemistry I	
	CHEM C125	2	Experim Chem I	
	MATH 165	4	Calc/Anal Geom I	
*Summer I Option	SPAN S203	4	Second-Year Span I	
	Total:	17		
Second Semester	FIRST YEAR			
	ENGR 197	2	Intro Computing (C)	
	BIOL K101	5	Concepts Biology I	may swap w/Chem C106
	MATH 166	4	Calc/AnalGeom II	prereq for Math 261
	MATH 171	3	Multidimens Math	prereq for Math 261
	PHYS 152	4	Mechanics	
*Summer II	SPAN S204	4	Second-year Span II	
	Total:	22		
Third Semester	SECOND YEAR			
	CHEM C106	3	Prin. Chemistry II	may swap w/Biol K101
	PHYS 251	5	Elec, Heat, Optics	
	MATH 261	4	Multivar Calculus	
	BME 222	4	Biomeasurements	
	SPAN S311	3	Span Grammar	
	Total:	19		
Fourth Semester	SECOND YEAR			
	MATH 266	3	Diff Eqns	
*Summer option	ENG W 131	3	Elem Comp I	
	BME 241	4	Int Biomechanics	
	ENGR 297	1	Intr Prog MATLAB	
	BIOL K324	3	Cell Biology	only offered in Spring
	BIOL K325	2	Cell Biology Lab	only offered in Spring
	SPAN S313	3	Writing Spanish	
	Total:	19		
Fifth Semester	THIRD YEAR			
	BME 331	3	Biosignals & Syst	
	BME 334	3	Biomed. Computing	
	BME 381	3	Implantable Materials & Biological Response	
	BME 383	1	Problems in Implantable Materials & Biological Response	
	COMM R110	3	Speech Comm	
	SPAN S320	3	Span Pron Diction	
	Total:	16		

Sixth Semester	THIRD YEAR		
	BME 322	3	Prob & Statistics
	BME 352	3	Tissue Behavior /Prop
	BME 354	1	Problems in TBP
	CHEM C341	3	Organic Chemistry
	BME/Sci/Tech	3	Depth Area elective
	CHEM C343	2	Organic Chem Lab
	SPAN S360	3	Intro Span Lit
	Total:	18	
Seventh Semester	FOURTH YEAR		
INTERNSHIP/ Mexico or Spain	BME/Sci/Tech	2	Tech Elective
	SPAN S493/487	6	Internship in Span
	Total:	8	
Eighth Semester	FOURTH YEAR		
	BME/Tech	3	Depth Area elective
	BME elective	3	Depth Area elective
	TCM 360	2	Communi in Engr
	Soc. Sci. Course	3	
	J/S integrator	3	SLA integrator
	SPAN S363	3	Intro Hisp Culture
	BME project	1	For tech elective
	Total:	18	must be cohesive w/2-credit intern. experience
Ninth Semester	FIFTH YEAR		
	Hist H114	3	Western Civ
	BME 491	3	Biomedical Design I
	BME 411	3	Quant Physiology
	BME 461	3	Transport Proc BME
	SPAN S4XX	3	400-Span lit elec
	Huma Course	3	Humanities
	Total:	18	
Tenth Semester	FIFTH YEAR		
	BME 492	3	Biomed Design II
	BME 442	3	Biofluid/solid Mech
	BME 402	1	Senior Seminar
	BME 404	1	Ethics for BME
	SPAN S426	3	Spanish linguistics
	Comp Wo Cu	3	World Cultures
	Total:	14	
	5-year total :	169	

International Engineering-CmpE-Spanish

First Semester	FIRST YEAR		
	ENGR 195	1	Intro to Engin Prof
	ENGR 196	3	Intro to Engineering
	CHEM C105	3	Princ of Chemistry I
	MATH 163	5	Calculus/Geometr I
	SPAN S203	4	Second-year Span I
	Total:	16	
Second Semester	FIRST YEAR		
	ENG 197	3	Intro Progr Concept
	ENG W131	3	Elementary Comp I
	MATH 164	5	Calculus/Geom II
	PHYS 152	4	Mechanics
	SPAN S204	4	SecondYear Span II
	Total:	19	
Third Semester	SECOND YEAR		
	ECE 201	3	Linear Cicuit Anal I
	ECE 207	1	Elec Measur Tech
	MATH 261	4	Multivari Calculus
	PHYS 251	5	Heat, Elec, Optics
	SPAN S311	3	Span Grammar
	Total:	16	
Fourth Semester	SECOND YEAR		
	ECE 202	3	Linear Circuit An II
	COMM R110	3	Fund Speech Com
	ECE 264	2	Advanced C Prog
	CSCI 242	2	Computing II
	MATH 262	4	Lin Algeb Diff equ
	SPAN S313	3	Writing Spanish
	Total:	17	
Fifth Semester	THIRD YEAR		
	ECE 208	1	Elec Des Dev Lab
	ECE 255	3	Electr Anal Design
	ECE 266	3	Digital Logic Desig
	ECE 267	1	Dig Logic Des Lab
	Soc Sci Course	3	
	SPAN S320	3	Span Pron Diction
	Math/Sci Elect	3	
	Total:	17	
Sixth Semester	THIRD YEAR		
	CSCI 265	3	Advanced Program
	ECE 301	3	Signals and Systems
	ECE 362	4	Microprocessor Sys
	Comp World Cul	3	

	SPAN S360	3	Intro Span Lit
	Total:	16	
Seventh Semester	FOURTH YEAR		
INTERNSHIP/	Tech Elect	2	
Mexico or Spain	SPAN 493/487	6	Internship in Span
	Total:	8	
Eighth Semester	FOURTH YEAR		
	ECE 369	3	Math for Comp Eng
	TCM 360	2	Communi in Engr
	ECE 359	3	Data Structures
	ECE 302	3	Probabilistic Meth
	SPAN S363	3	Intro Hisp Culture
	Huma Course	3	
	Total:	17	
Ninth Semester	FIFTH YEAR		
	Hist H114	3	Western Civ
	CmpE Electives	6	
	ECE 365	3	Intro Comp Design
	Integrator Co	3	Lib Arts
	SPAN S4XX	3	400- Span Lit Elec
	Total:	18	
Tenth Semester	FIFTH YEAR		
	ECE 400	1	Senior Seminar
	Cmp E Electives	6	
	ECE 401	1	Ethics
	ECE 492	3	Senior Design
	SPAN S426	3	Spanish linguistics
	ECE 496	1	
	Total	15	
	5-year total	159	

International Engineering-ME-Spanish

First Semester	FIRST YEAR		
	ENGR 195	1	Intro to Engin Prof
	ENGR 196	3	Intro to Engineering
	CHEM C105	3	Princ of Chemistry I
	MATH 163	5	Calculus/Geometr I
	SPAN S203	4	Second-Year Span I
	COMM R110	3	Fund Speech Comm
	Total:	19	
Second Semester	FIRST YEAR		
	ENG 197	3	Intro Progr Concept
	ENG W131	3	Elementary Comp I
	MATH 164	5	Calculus/Geom II
	PHYS 152	4	Mechanics
	SPAN S204	4	Sec-Year Spanish II
	Total:	19	
Third Semester	SECOND YEAR		
	ME 270	3	Basic Mechanics I
	MATH 261	4	Multvar Calculus
	PHYS 251	5	Heat, Elec, Optics
	SPAN S311	3	Span Grammar
	Total:	15	
Fourth Semester	SECOND YEAR		
	ME 200	3	Thermodynamics I
	ME 274	3	Basic Mechanics II
	ECE 204	4	Intro to Elect Circuit
	MATH 262	4	Lin Algeb Diff equ
	SPAN S313	3	Writing Spanish
	Total:	17	
Fifth Semester	THIRD YEAR		
	ME 272	4	Mech of Materials
	ME 310	4	Fluid Mechanics
	ME 330	3	Dynamic Systems
	ECON E201	3	Microeconomics
	SPAN S320	3	Span Pron Diction
	Total:	17	
Sixth Semester	THIRD YEAR		
	ME 344	3	Intro Engr Materials
	ME 314	4	Heat Mass Transfer
	ME 340	3	Dyn Systems/Meas
	ME 262	3	Mech Design I
	SPAN S360	3	Intro Span Lit
	Total:	16	

Seventh Semester	FOURTH YEAR	
INTERNSHIP/	ME Elect I	2
MEXICO or SPAIN	SPAN 493/487	6
	Internship in Span	
	Total:	8
Eighth Semester	FOURTH YEAR	
	ME 482	3
	Control System AD	
	TCM 360	2
	Communi in Engr	
	ME 372	4
	Mech Design II	
	Science elective	3
	ME elect II	3
	SPAN S363	3
	Intro Hisp Culture	
	Total:	18
Ninth Semester	FIFTH YEAR	
	Hist H114	3
	Western Civ	
	ME elect. III	3
	ME 414	3
	Thermal-Fluid Des	
	Integrator Co	3
	SPAN S4XX	3
	400-Span lit	
	Huma Course	3
	Humanities	
	Total:	18
Tenth Semester	FIFTH YEAR	
	ME 491	1
	Design Project	
	Stat elect.	3
	ME 462	4
	Senior Design	
	ME 401	1
	Eng Ethics	
	SPAN S426	3
	Spanish linguistics	
	Comp Wo Cu	3
	World Cultures	
	Total	15
	5-year total	162