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**Department of Electrical and Computer Engineering
EEL-4920 – Senior Design I**

Catalog Description: Beginning of the Major Design Experiment of the Professional ethics, oral communications, project feasibility study, proposal writing, system design methodology, human factors, intellectual property, liability and schedules.

Course Description:

The main objective of the course is to prepare students for the realization of a Capstone Project. Emphasis is placed on Successful Design, an idea that involves Local and Global acceptance. Local Acceptance is achieved by careful analysis client and user needs and Global Acceptance by taking into account the input from persons of different countries and cultures plus International Technical Standards eliminating barriers to trade. Rules of the World Trade organization (WTO) are used to illustrate issues impacting international trade.

In EEL-4920 students engage in a close to real life project design and management experience. Early in the semester students must organize in teams on their own. The requirements are that teams must be multidiscipline and contain a minimum number of 3 students per team. Usually the typical number of members is 4 or 5. Each team selects a team leader and finds 3 potential topics of interest. Armed with these topics the team finds a Mentor and negotiates the topic of the design. After this point teams must engage in proposal preparation for the project that will be carried during EEL-4921C. During the proposal preparation students must clarify the need including the mentor (The Client) point of view, the results from a survey (The Users), and the brainstorming of the team (The Designers). The Proposal also includes a Feasibility and Risk Analysis, a survey of related projects and patents plus Theory Model Analysis of potential Ethical Dilemmas of the project, Health, Safety, Sustainability, Standards and Globalization issues.

Prerequisite: Senior standing.

Corequisite: N/A

Textbook: (1) Ref: CLIVE I. DYM & PATRICK LITTLE. (2004). ENGINEERING DESIGN. (2ND. Ed.). John Wiley & Sons, Inc. (ISBN: 0-471-25687-0)

Course Objectives:

- Develop the ability to outline and plan an engineering project with several phases and participants from distinct disciplines
- Conduct a team-based project
- Perfect communication and analysis of technical concepts and alternatives

Global Learning Objective:

- Use a global a *global standpoint* to achieve a design that will have Global Acceptance and minimal barriers to trade.

Topic Covered:

1. Introduction/Teamwork
2. Components
3. Problem Statement, Need Analysis and Assumptions and Limitations.
4. Feasibility Analysis, Operating environment,
5. Intellectual Property
6. Intended user(s) and intended use(s), Background

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7. Globalization and Standards
8. Health and Safety Considerations
9. Manufacturability Considerations
10. Environmental Considerations
11. Ethics
12. Concept Development, End Product Description and other Deliverables
13. SOW/GANTT CHARTS
14. Oral Presentation Skills
15. Functions and Specifications
16. Electric Grounds
17. Power Supplies

Class Schedule: Twice a week 75 min each session.

Contribution of course to meeting the professional component:

Engineering Science

Relationship of course objectives to program *outcomes*:

In this course students will be evaluated on the following program outcomes

- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (j) a knowledge of contemporary issues

Relationship of course objectives to Global Learning *outcomes*

- (i) an ability to demonstrate ***global consciousness*** about local, global, international, and intercultural issues that may affect a successful design.
- (ii) an ability to conduct a ***global standpoint*** analysis leading to understand the needs of local, global, international, and intercultural markets.
- (iii) an ability to demonstrate ***global commitment*** by taking actions towards a global, international, and intercultural successful design.

Required Reading

Globalization and Technical Standards [1]

Recommended reading

1. The WTO In brief [2]
2. UNDERSTANDING THE WTO [3]
3. Standards Education [4]
4. IEC Lecture series I (2005) [5]
5. UNIDO Role of Standards [6]

References

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- [1] W. Arellano, "EEL 4920," *Globalization and Technical Standards*. [Online]. Available: http://web.eng.fiu.edu/~arellano/4010/F2007/Globalization_and_Technical_Standards.pdf. [Accessed: 09-Apr-2012].
- [2] "WTO | The WTO in brief." [Online]. Available: http://wto.org/english/thewto_e/whatis_e/inbrief_e/inbr00_e.htm. [Accessed: 09-Apr-2012].
- [3] "WTO | What is the WTO? - What we stand for." [Online]. Available: http://wto.org/english/thewto_e/whatis_e/what_stand_for_e.htm. [Accessed: 09-Apr-2012].
- [4] "IEEE - Standards Education." [Online]. Available: http://www.ieee.org/education_careers/education/standards/index.html. [Accessed: 09-Apr-2012].
- [5] "IEC - Academia > Lecture series." [Online]. Available: http://www.iec.ch/about/globalreach/academia/lecture_2005.htm. [Accessed: 09-Apr-2012].
- [6] "unido.org: Publications," *Role of standards*. [Online]. Available: http://www.unido.org/fileadmin/media/documents/pdf/tcb_role_standards.pdf. [Accessed: 09-Apr-2012].

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Department regulations concerning incomplete grades:

1. Must not be able to complete the course through documented circumstances beyond his/her control.
2. Must be passing the course prior to that part of the course that is not completed.
3. Must contact the instructor or the secretary immediately before or during the part missed, so the instructor will be aware of the circumstances causing the incomplete.
4. Must make up the incomplete work through the instructor of the course and should not be allowed to sit through another entire course to make up the incomplete.
5. Must make proper arrangements with the instructor to complete the course before the last two weeks of the second term.

EEL 4920 – Senior Design I
Sections U02
Instructor: Professor Wilmer Arellano
e-mail: arellano@fiu.edu

Spring 2012, MW 7:50 – 9:05 PM
Room: EC-1111

Office: EC 3834

Office Hours: MW 9:10 – 10:25 PM
By appointment

Phone: (305) 348-4905
Fax: (305) 348-3707

Website: <http://web.eng.fiu.edu/~arellano/>

Grading Policy:							
Quantity	Description	Value	Total	A	95-100	C	73-75
2	Research Projects & Presentations	20%	40%	A-	90-94	C-	70-72
				B+	86-89	D+	66-69
2	Test	10%	20%	B	83-85	D	63-65
1	Final Demonstration	15%	15%	B-	80-82	D-	60-62
1	4921C Proposal*	10%	10%	C+	76-79	F	0-59
1	Class Participation	15%	15%				
<p>Instructor reserves the right to use a curve for grading. Such curve might lower the grading thresholds but would leave the original grades unchanged.</p> <p>*A signed EEL 4921C proposal is required to pass</p> <p>No Late Assignments</p> <p>All notifications or changes will be emailed only to your FIU email address and or will be posted in the Course Web Site. Please make sure that instructor has your correct email address and check the Website frequently.</p>							

Learning Activities:

1. **Project Conception and Management**
 - a. **Students form in multidiscipline teams**
 - b. **Members of each team select a team leader**
 - c. **Teams find 3 potential topics of interest**
 - d. **Teams negotiate with potential mentors their mentorship and the topic. Mentor and topic are selected.**
2. **Communication**
 - a. **Teams prepare a Project Proposal with two partial deliveries with revisions.**

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- b. Teams present to the class their project in two deliveries.
 - c. Teams specifically present why their team is multidiscipline.
 - d. Teams specifically present their Global Content as Impact of Standards on Trading in a Global Market, acceptance of their project in a different culture and collaboration tools.
3. Global Positioning
- a. Students upload to youtube.com a presentation on their project where they introduce their team and provide demonstrations and explanations about the starting project.
 - b. These videos are accessible to people in any country with no internet restrictions.
 - c. Samples can be found in Google with keywords: “youtube FIU senior design projects”

Lecture Schedule:

Day	Lecture	Day	Lecture
1	Introduction	2	Need Analysis
3	Specifications	4	Feasibility Analysis
5	Teams	6	Collaboration Tools
7	Style (proposal Writing)	8	Intellectual Property
9	Test 1	10	Preparing Oral Presentations
11	Positive use of Body Language	12	First Round of Students' Presentation
13	Second Round of Students' Presentation	14	Third Round of Students' Presentation
15	Concept Generation – End Product Description	16	Statement of Work
17	Globalization and Standards	18	Ethics
19	Sustainability	20	Health and Safety
21	Test 2	22	Fourth Round of Students' Presentation (Global Learning assessment)
23	Fifth Round of Students' Presentation (Global Learning assessment)	24	Sixth Round of Students' Presentation (Global Learning assessment)
25	Power Supplies	26	Design For Manufacturability / Final Details

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Presentations Rubric:

Date						
Topic						
Team						
		Deductions				
Members		Team Member 1	Team Member 2	Team Member 3	Team Member 4	Team Member 5
Problem Background	25%					
Command of Subject Matter	20%					
Command of Language	30%					
Visuals	15%					
Equal Participation by each member	5%					
Appropriateness of Dress	5%					
TOTAL	90%					

Grading: 4=Excellent, 3=Good, 2=Fair, 1=Poor, 0=Noncompliance		
Global awareness: Was the team able to identify, analyze and integrate international standards effects in multiple markets and cultures?	10%	
Global perspective: Did the team demonstrate an ability to conduct a Global Perspective analysis leading to understand the needs of local, global, international, and intercultural markets		
Global engagement: Were the students able to demonstrate Global Engagement by taking actions towards a global, international, and intercultural successful design.		
COMMENTS:		

Examination Policy:

1. Make-up tests will be given only with official written confirmation of reasons.
2. Inform Instructor about the problem to make special arrangements by next class. You may inform instructor about your problem by:
 - a. Sending an email to arellano@fiu.edu
 - b. Leaving a message at 305-348-4905
 - c. In Person
 - d. By means of a messenger

Failing to follow notification guidelines will make you non eligible for a make-up exam. All excuses must be submitted in original and include contact information for verification purposes.
3. Make-up test will be comprehensive
4. Cheating in an examination will result in "F" in the course.