

**EML 4905  
SENIOR DESIGN PROJECT**

**COURSE SYLLABUS**

**Course Description:**

**Synopsis:** Project statement, in-depth survey, conceptual and structural design, analysis, statistical and cost analyses, ethical, societal and environmental impact, evaluation and revision of design for the global arena with multi-cultural and multi-national perspective, prototype construction, final presentation.

**EML 4905 Senior Design Project is the continuation of EML 4551 Ethics and Design Project Organization.** Although there are no formal lectures in this course, GL attributes developed in EML 4551 will be integrated into senior design projects and the GL content will be directly assessed by the Industrial Advisory Board (IAB) and departmental faculty at the end of the semester by using an assessment form called Senior Design Presentation Evaluation Form.

**Development of Senior Design Projects in Relation to Global Learning.** As senior design project problems and solutions are developed, student teams will employ a global perspective. For this purpose, relevance of engineering problems and solutions will be researched and evaluated in terms of different regions, ethnic or cultural settings. For instance, major regional samplings will include the USA, South America, Eastern Asia, Middle East, Europe, and Africa. Each team will also be able to target different regions, ethnic or cultural groups as appropriate to the specific project.

Student teams will analyze and evaluate their proposed solutions for multiple markets and cultures. If necessary, modification strategies will be developed for targeted cultural, ethnic or geographical settings to approach the “global design” concept. Student teams will also analyze design alternatives relative to the (1) available technology in different parts of the world, and (2) economic development of regions; select the best concept for each targeted region; and then evaluate whether a globally-unified design or a regionally-adjustable design offers the most viable solution.

Each design team will identify its contributions in solving the targeted engineering problem in terms of the global issues addressed and the possible global impacts. Hence, this is a global learning course that counts towards the global learning graduation requirement.

**Course Objectives:**

- Completion of structural design, system analysis, and design optimization
- Integration of global design components defined in EML 4551 into the senior design project

While taking EML 4551 in the previous semester, each team will develop a specific plan for global design components that will be studied in its senior design project. These plans

will be approved by the departmental faculty and Industrial Advisory Board in the previous semester. These approved GL plans will be executed in EML 4905 and evaluated by the faculty and IAB at the end of the semester.

- Economic analysis of the design, global and environmental implications

Economic analysis of the developed design and its global and environmental implications – as defined in the previous course EML 4551 – will be completed, documented in the final report and final presentation. Faculty and IAB members will assess the economic analysis, global and environmental content in the assessment form, which uses a 5-point rubric.

- Prototype construction
- Design of experiments, and testing
- Comparison of theoretical results against experimental data
- Design improvements
- Completion of final senior design report
- Team presentation to the Industrial Advisory Board and departmental faculty

**Assessment:** Faculty and IAB members will assess the above content in an assessment form that uses a 5-point rubric: Expert=5, Proficient= 4, Apprentice=3, Novice =2, Non-responsive=1. Minimum criteria for success will be to maintain an average score of 3.00 or better on a 5-point rubric. (EML 4905 Senior Design Presentation Evaluation Form is attached.)

### **Course Learning Outcomes:**

#### **I. Global Learning Course Outcomes:**

1. Students will be able to identify, analyze and integrate ethics similarities and differences in multiple markets and cultures.
2. Students will be able to conduct an analysis of an engineering problem and its global impact by identifying different factors such as technology, economics and society, and their contributions to the problem and/or solution.
3. Students will be willing to work in teams to develop solutions and action plans to address local, global and/or international engineering problems.

#### **II. SACS Learning Outcomes - ABET Program Outcomes Supported by the Course:**

Mechanical engineering departmental program outcomes supported by this course:

- (a) Ability to apply knowledge of mathematics including statistics, multivariable calculus and differential equations, science including physics, and engineering
- (c) Ability to design a system, component, or process to meet desired needs
- (d) Ability to function on multi-disciplinary teams
- (e) Ability to identify, formulate and solve engineering problems
- (f) Understanding of professional and ethical responsibility
- (g) Ability to communicate effectively
- (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context

- (i) Recognition of the need for, and a ability to engage in life-long learning
- (j) Knowledge of contemporary issues
- (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice

**Assessment:**

Each of the three Global Learning Course Outcomes (Global Awareness, Global Perspective, and Global Engagement) will be assessed in the assessment form “EML 4905 Senior Design Presentation Evaluation Form” by the faculty and IAB members.

Every team in the class will be evaluated. Minimum criteria for success will be to have an average score of 3.00 or better on a 5-point rubric. As stated in the assessment form, the following scale will be used: Expert=5, Proficient= 4, Apprentice=3, Novice =2, Non-responsive=1.

**Textbooks:**

No textbooks are required for this course.

**Prerequisites:**

EML 4551 and permission of the advisor. Co-requisites: EML 4501, EML 4706.

**Lectures:**

There are no formal lectures for this course. Each team meets with its Senior Design Project Advisor at least once a week to review progress and receive guidance from the advisor. The day and time of the meetings are determined by each team and faculty advisor as their schedules allow.

**Organization of the Course:**

As stated above, each team meets with its faculty advisor at least once a week. Departmental Undergraduate Program Director (UPD) organizes the class to collect 50%, 75% and 100% Senior Project Reports. UPD also organizes team rehearsal presentations and final presentations made to the departmental faculty and IAB members. 50% and 75% reports are reviewed by the UPD and returned to teams to provide feedback to students for further improvement.

**Attendance:**

Since the class does not meet formally, there are no attendance requirements.

**Reading Materials and Assignments:**

As there are no formal class meetings for this course, there are no reading material assignments, homework, case study assignments, or in-class discussions.

Undergraduate Program Director (UPD) collects the 50%, 75% and 100% senior design reports, for which due dates are announced well before the semester starts. The report due dates and other critical deadlines are sent to the entire class and faculty via email, posted in the department as well as broadcast at the internally broadcasting Mechanical Engineering HD Television (MME TV). In case a team does not turn in its 50%, 75% or 100% report in time, the UPD contacts the team and its faculty advisor to collect the missing item.

### **Plagiarism Prevention at Turnitin.com**

Each team is responsible to submit its 50%, 75% and 100% reports to [www.turnitin.com](http://www.turnitin.com) to be evaluated against plagiarism.

The site compares the submitted document for similarities against the works published by others and assigns a similarity index. Lower similarity percentages (0 to 10%) usually indicate less similarity and are interpreted as good. Higher percentages mean that plagiarism is likely and your report grade will be adversely affected.

Each team is required to upload its reports by one team member since multiple entries of the same report result in very bad similarity indices for later submissions. In order to improve the similarity index, the same team member will be permitted to resubmit the revised report before the deadline expires.

### **Ethics:**

All work prepared and submitted in this course in the form of reports and presentations are expected to be original and produced by the submitting student. Any portion that may have been borrowed from a previous work must be clearly identified and referenced to indicate the original author along with the title of the work, and where and when it appeared. It is extremely important to realize that not doing so may result in an accusation of plagiarism.

Projects must contain the following statement and include each team member's signature:

Authors' Ethics Statement:

The work submitted in this project is solely prepared by NAME LASTNAME 1, NAME LASTNAME 2, and NAME LASTNAME 3, and it is original. Excerpts from others' work have been clearly identified and listed in the list of references. All of the engineering drawings, computer programs, formulations and related files submitted on the accompanying CD are also original and prepared by NAME LASTNAME 1, NAME LASTNAME 2, and NAME LASTNAME 3.

NAME AND LASTNAME OF EVERY TEAM MEMBER AND  
THE FACULTY ADVISOR

(Include Signature of Each Team Member & Faculty Advisor)

### **Correspondence via E-mail:**

Each student is required to provide a reliable e-mail address for correspondence. Various announcements and reminders will be sent via e-mail throughout the semester.

Students are expected to check their e-mail regularly and make sure their inboxes are not full as the bounced mail messages will not be sent again.

### **Incomplete Grades:**

A grade of “incomplete” will not be assigned to replace an unwanted grade. In order to be eligible to receive “incomplete,” only a single component of the entire coursework needs to be missing. The reason for failure to fulfill the requirement in time must be officially proved by the student (e.g., a medical doctor’s official letter), and verified by the Department in order to receive an “incomplete” grade.

The University requires that a student must fill out an “Incomplete Grade Form” before the incomplete grade is assigned. The form will be signed by the student and the professor before such grade is assigned.

### **Grading System:**

The following grading scale will be used to assign final letter grades.

<b>Letter Grade</b>	<b>Score Range</b>
A	90 - 100
A-	86 - 89
B+	82 - 85
B	78 - 81
B-	74 - 77
C+	70 - 73
C	67 - 69
C-	64 - 66
D	61 - 63
F	0 - 60

**Academic Misconduct:**

Academic dishonesty is a serious offense and will be treated according to the University policy as outlined below.

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning.

Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

**Milestones:**

<b>SENIOR DESIGN ACTION ITEM</b>	<b>DEADLINE FOR SPRING 2011</b>
<p><b><u>Final Report (50% completed):</u></b> Includes Final Design (100% completed) GL content (50% completed) Prototype Assembly (50% completed)</p>	<p><b>Wednesday February 23, 2011</b></p>
<p><b><u>Final Report (75% completed):</u></b> GL content (100% completed) Includes Prototype Assembly (100% completed) Testing of Prototype (50% completed)</p>	<p><b>Wednesday March 23, 2011</b></p>
<p><b><u>Final Report (100% completed):</u></b> Final Report (PDF file and 1 hardcopy) Draft Final Presentation (PowerPoint file)</p>	<p><b>Wednesday April 6, 2011</b></p>
<p><b><u>Presentation Rehearsals to MME Faculty:</u></b> Senior Design and Senior Design Org students are required to attend Presentation Rehearsals and fill out Team Presentation Evaluations</p>	<p><b>Wednesday April 13, 2011 Room: EC 2300</b></p>
<p><b>Senior Design Organization Project Feasibility and Senior Design Final Presentations to IAB and MME Faculty - Formal Attire Required</b></p>	<p><b>Wednesday April 20, 2011 Room: EC 2300</b></p>