IEE 4190 (1+3 Cr. Hr.); IEE Senior Design

Course Syllabus

Catalog Data: This course is the capstone industrial engineering course. This course will require application of several IE design principles to a project. The projects are chosen by students or assigned by faculty. All students are required to present their projects at the Senior Design Conference hosted by the College of Engineering and Applied Sciences.

Prerequisite Courses: IEE 4010, IEE 4160 (can be concurrent). Students MUST register in this course in two consecutive semesters. They can only register for the first one credit-hour of the course one year prior to their scheduled graduation dates, and only after all the required prerequisites have been met. Students must register for the next 3 credit hour course, immediately following the semester at which they registered for the first course. Summer sessions are not counted toward this requirement.

Credit/Contact Hrs: This course is taught in two semesters. In the first semester, students are expected to register for one (1) credit hour of IEE 4190, and in the second semester, they are expected to register for three (3) credit hours. This course is a required course in the IEE Program and is scheduled for 1+3 lab and class discussion.

Course Coordinator and Instructor: Dr. Azim Houshyar, Professor

Textbook: Houshyar Notes which will be e-mailed to students in class.

Attendance Policy: Attendance is mandatory. The student will receive a score of zero for any assessment item not submitted because of absence. Extreme circumstances will be considered on an individual basis, however, when possible arrangements must be made prior to the due date, and supporting documentation is necessary. Moreover, you are expected to actively participate in the discussion.

Academic Honesty Policy: The Faculty Senate's Professional Concerns Committee recommends all instructors include the following paragraph in each syllabus they prepare.

"*You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. [The policies can be found at http://catalog.wmich.edu under Academic Policies, Student Rights and Responsibilities.] If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test*."

Computer Usage: Software used in prerequisite courses can be employed to solve design problems.

Teams: The design projects take place in teams of 2 to 3 students. The members of the team will be selected by the instructor based on the overall academic performance of the members, with an input from the students and other IEE faculty. The same team of students is expected to work on their project in both semesters, unless the faculty member notices unsatisfactory performance.

First IEE 4190 (1 credit hour); IEE Senior Design

Evaluation for the First IEE 4190: Your final grade will be based on the following:

    (1) Conference/Meeting Participation   *5%*
    (2) Selection of an appropriate Proposal   *30%*
    (3) Monthly Progress Report and Presentation   *45% (3 X 15)*
    (4) Final Report   *20%*

Grading Scale: 93 - 100   A   88 - 92   BA   83 - 87   B   78 - 82   CB
                          73 - 77   C   68 - 72   DC   60 - 67   D   Below 60   E

Course Learning Objectives: By the end of the semester the student should be able:

1. To apply IEE design skills to identify a complex design problem encountered in professional practice.
2. To work on an engineering team.
3. To prepare a professional engineering written and oral proposal.
4. To participate in several Professional Meetings.

Topics and Schedule:
The teams will meet regularly with the faculty and industrial sponsors. On the Friday before the dates of presentations, each team is responsible to submit a copy of their *Progress Report* and **PowerPoint Presentations** to me by 5:00 pm. The following is a schedule of the joint meetings for all teams.

We will meet only on the dates indicated below. The rest of the class times MUST be used by the teams to get together and work on their projects. They MUST also setup a weekly appointment with their Technical Adviser. All the teams are expected to keep log of their meetings and submit the logbook along with their final report to me at the end of semester. We will start the session with the 2nd term teams presenting their projects for which the IEE faculty is invited to attend, followed by the 1st semester students. All 1st semester students are expected to be in for all presentations.

General Organizational Meeting. Formation of teams and description of the characteristics of the IEE problems to be identified.

Identifying a candidate real-world problem to be investigated. Each team will have up to five minutes to make a formal PowerPoint presentation. You are expected to discuss:

    1) The title of the project; name of the company, the industrial supervisor, and the academic supervisor.
    2) A slide or two on the nature of the problem.
    3) A slide or two on the significance of the problem.
    4) A slide or two on the potential IEE tools that you anticipate will be used to solve the problem.
    5) A time-line of the activities that you will pursue in the immediate future and prior to our next formal meeting in November.
    6) A time-line of the activities that you will pursue in this semester.

Preparation of the list of all the data that needs to be collected. Each team will have up to five minutes to make a formal PowerPoint presentation. You are expected to discuss:

    1) The title of the project; name of the company, the industrial and the academic supervisor.
    2) One slide on a clear and concise definition of the existing problem.
    3) One slide on the significance of the project in attempting to resolve the problem.
    4) One slide on the OBJECIVES of the research study.
    5) One slide on the potential IEE tools that you anticipate will be used to solve the problem.
    6) Several slides identifying all the factors that impact the system under consideration and the means to gather accurate and detailed information (data) related to those factors.
    7) A time-line of the activities that you will pursue in the immediate future and prior to our next last meeting in December.
    8) A time-line of the activities that you will pursue in this semester.

Preparation of the list of all the IEE tools that they are planning to use, and their possible outcome. Each team will have up to ten minutes to make a formal PowerPoint presentation. You are expected to discuss:

1) *The title of the project; name of the company, the industrial and the academic supervisors.*
2) *One slide on a clear and concise definition of the existing problem.*
3) *One slide on the significance of the project in attempting to resolve the problem.*
4) *One slide on the OBJECIVES of the research study.*
5) *One slide on the potential IEE tools that you anticipate will be used to solve the problem.*
6) *One slide identifying all the factors that impact the system under consideration and the means to gather accurate and detailed information (data) related to those factors.*
7) *Several slides identifying all the IEE tools that could be used to generate alternative and evaluate solutions, and select the best one for implementation.*
8) *A time-line of the activities that you will pursue next semester.*

Final submission of the written proposal to initiate the project, along with the logbook of their activities during the semester and a copy of all the reports on their participation in professional activities. As the first term student in IEE 4190, you are expected to:

1) *Submit a hard copy of your final report to me and to your academic adviser*
2) *Submit an electronic version of your final PowerPoint by the same deadline.*
3) *Submit an electronic report of every conference, workshop of professional meeting that you have attended.*
4) *Bring your log book for me to see by the deadline*
5)

Make sure that all your submissions follow the format listed in last page of this syllabus.

Second ME 4190 (3 Cr. Hrs.); IE Senior Design

Evaluation for the Second IME 4190: Your final grade will be based on the following:

(1) Monthly Progress Report (Feb 8; March 14 and April 11)   *60% (4 X 15)*
(4) Final Presentation (April 19)   *20%*
(5) Final Written Report (April 19)   *20%*

Grading Scale: 93 - 100   A   88 - 92   BA   83 - 87   B   78 - 82   CB
                   73 - 77   C   68 - 72   DC   60 - 67   D   Below 60   E

Course Learning Objectives: By the end of the semester the student should be able:

1. To apply IEE design skills to solve the complex design problem identified in the first IME 4190 class.
2. To work on an engineering team.
3. To prepare a professional engineering written and oral report.

Performance Criteria (Learning Outcomes)

Course Objective 1:
- *Devise methodologies to collect appropriate data to define the posed design problem.*
- *Propose possible design alternatives.*
- *Formulate and construct an appropriate design for the defined problem.*
- *Validate the proposed design through appropriate methodologies.*
- *Summarize findings.*
- *Construct means to convey the design to the user*

Course Objective 2:
- *Projects will take place in teams of 3 to 4 students*
- *Students will schedule all meetings with team members, industry sponsor, and faculty advisor(s).*
- *Students must log meeting minutes and weekly team reports.*
- *Conflict resolution techniques will be discussed.*

Course Objective 3:
- *A written report will be submitted to the department, faculty advisor(s) and industry sponsor.*
- *Three preliminary project presentations will be given during the semester to the IEE faculty.*
- *A final oral team presentation at the Senior Design Conference hosted by the CEAS will be given.*

Topics and Schedule: The teams will meet regularly with the faculty and industrial sponsors. The following is a schedule of the joint meetings for all teams.

Monday January 11: *General Organizational Meeting. Reformation of teams & informal progress report on the team's findings since Dec 2015.*

Monday February 8: *First General Session to ensure that all teams are making progress. Initial progress report is due. Initial team project presentation will be given to the IEE faculty by each team. Each team will have 15 minutes for their presentation. Report and presentation must include a definition of the design problem; sponsor's anticipated outcomes, possible approaches to the problem, and a comprehensive review of the needed and collected data. IEE faculty will critique the progress, report, and presentation and will offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.*

Monday March 14: *Second General Session to ensure that all teams are making progress. Second progress report is due. Second team project presentation will be given to the IEE faculty by each team. Each team will have 15 minutes for their presentation. Report and presentation to include a detailed definition of the design problem, current findings, current work in progress, and proposed work for completion of the project. IEE faculty will critique the progress, report, and presentation and will offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.*

Monday April 11: *Dress Rehearsal for Senior Design Conference -* All teams are expected to videotape a minimum of three rehearsals and submit the tapes before the Dress Rehearsal. *Third General Session to ensure that all teams are making progress. Third progress report is due. Third team project presentation will be given to the IEE faculty by each team. Each team will have 20 minutes for their presentation. Report and presentation to include a detailed definition of the design problem, finalized findings, and a presentation that mimics the final presentation of the project. IEE faculty will critique the progress, report, and presentation and will offer suggestions and constructive criticisms. IEE faculty can cancel a project if it is not felt that the team is making sufficient progress.*

Tuesday April 19: Final presentation for the Senior Design Conference (April 21th) and final reports are due. The faculty sponsor(s) will grade the team reports. As the second term student in IME 4190, you are expected to:

1) *Create a poster for the day of Senior Design Presentation and make sure you have everything needed to post it next to the class room.*
2) *Submit a hard copy of your final report to me and to your academic adviser by 5:00 pm Tuesday April 21st.*
3) *Submit an electronic version of your final powerpoint by the same deadline.*
4) *Arrange for a formal presentation to industrial advisers and report to me the date, time, and place of such presentation.*
5) *Stop by my office on Tuesday to go over the Exit Interview which takes 20 minutes to be completed.*

Relationship of Course Objectives to Performance Criteria and Student Learning Outcomes:

Semester	Course Objectives	Performance Criteria[1]	ABET-EAC Outcomes[2]
1st IME 4190 & 2nd IME 4190	To apply IEE design skills to identify a complex design problem encountered in professional practice.	**E1**. Define problems, compare alternative options, and design solutions. **A2**. Use appropriate engineering science and mathematical tools for decision making.	**E***: An ability to identify, formulate, and solve engineering problems. **A***: An ability to apply knowledge of mathematics, science, and engineering.
1st IME 4190 & 2nd IME 4190	To work on an engineering team.	**G3**. Presents information in writing that is well-organized, addresses objectives, and meets required standard of grammar and language rules.	**G***: An ability to communicate effectively.
1st IME 4190 2nd IME 4190	To prepare a professional engineering written and oral proposal.	**G4**. Presents information in oral format that is well-organized, useful, and effectively delivered.	**G***: An ability to communicate effectively.
1st IME 4190 2nd IME 4190	Work in teams to gather data	**D2**. Researches and gathers information for team project.	**D***: An ability to function on multidisciplinary teams
1st IME 4190	To participated in professional meetings.	**I1**. Attends and participates in professional activities.	**I***: As recognition of the need for and an ability to engage in life-long learning.

[1]**Performance Criteria:**   IME performance criteria may be found at http://www.wmich.edu/ime
[2]**ABET/TAC Outcomes:**   Outcomes may be found at http://www.abet.org/
*Tracked to course notebook.

Use the following format for all your submissions

Us the following Type Font, Spacing, and Indent:

Title: Times New Roman 16, Bold; Leave two line-space above title for submission code
Executive Summary heading*:* Times New Roman 14, Bold, Italic
Executive Summary text: Times New Roman 11, Italic
Heading 1 (e.g., introduction): Times New Roman 14, Bold
Heading 2: Times New Roman 12, Bold, Italic
Heading 3: Times New Roman 11, Bold
All other text: Times New Roman 11

Use white, 8 ½ - by 11" paper. Except for page numbers (see below), leave one-inch margins all around the text of your paper -- left side, right side, and top and bottom. Paragraphs should be indented half an inch. The submission must be single-spaced.

Your submission does not need a title page. At the top of the first page, at the left-hand margin, type your Team number, names, your instructor's name, the course number, and the date -- all on separate, single-spaced lines. Then double-space and center the title above your text. (If your title requires more than one line, double-space between the lines.) Double-space again before beginning your text. The title should be neither underlined nor written in all capital letters. Capitalize only the first, last, and principal words of the title. Titles might end with a question mark or an exclamation mark if that is appropriate, but not in a period.

Number your pages consecutively throughout the submission (including the first page) in the upper right-hand corner of each page, one-half inch from the top. Type your Team # before the page number. Make sure the page-number is always an inch from the right-hand edge of the paper (flush with the right-hand margin of your text) and that there is a single-space between the page number and the top line of text. Do not use the abbreviation *p.* or any other mark before the page number.

Tables should be labeled "Table," given an Arabic numeral, and captioned (with those words flush to the left-hand margin). Other material such as photographs, images, charts, and line-drawings should be labeled "Figure" and be properly numbered and captioned.

Generally, the simpler the better. Why spend money on gimmicky, unwieldy, slippery binders, when I prefer nice, flat stacks of papers they can stuff into my briefcase. A simple staple in the upper left-hand corner of your paper should suffice.

Electronic Submissions

All your electronic submission should be sent at least 30 minutes before the start of the class to: houshyar@wmich.edu

When naming your electronic file, use the following format:

TeamX-ReportX-IEExxxx-Spring 2016.doc

Examples: Team1-Report1-IEE4190-Spring 2016.doc   Team5-Powerpoint2-IEE4190- Spring 2016.ppt