# EIN 4890-1
# Industrial Engineering Senior Design Project 1(IE SDP 1)
# Fall 2014 Course Syllabus


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|---|---|
| Instructor: | Dr. Okenwa Okoli, Rm. 231 CoE, 410-6352, Email: okoli@eng.fsu.edu |
| | Dr. James Dobbs (jdobbs@fsu.edu) |
| Class Hours: | Tu/Tr 3:30 – 4:45 PM, B134 |
| Office Hours: | See schedule |
| TAs: | Emily Hammel (eh12f@my.fsu.edu), Margaret Scheiner (mscheiner@fsu.edu) |


**Recommended Texts**

Manufacturing Facilities Design & Material Handling by F.E. Meyers, P. Stephens. (ISBN 0-13-674821-x).
Quality Management for Organizational Excellence: Introduction to Total Quality (7th Edition). ISBN-13: 978-0132558983 by Dr. David L. Goetsch, and Stanley B. Davis
Six Sigma – The McGraw-Hill 36-Hour-Course. by G. Brue and R. Howes (ISBN 0-07-143008-3)

**Course Description**

This is the first of a two-part course sequence. The course utilizes the integration of all industrial engineering components as its principal theme. The student is required to define a product, design manufacturing (and/or service) processes, and design a system to define, develop, produce, and distribute the product.

Students are to work in groups of no more than three (3) to develop a new product from conceptualization and design, to manufacturing and marketing. This senior year design class is the "capstone" course in the Industrial Engineering curriculum. As such it acts as the culmination of the Industrial Engineering design sequence and draws upon student training in all previous courses to prepare a final design project. This course will utilize the six-sigma methodology to reduce variation and defects in order to deliver products and services that meet customer requirements. The students will focus on identifying factors critical to quality as determined by the customer.

This course will primarily be conducted in the form of discussions, lectures and presentations.
Two well-written reports and professionally delivered presentations by each group are required.

**Course Objectives**

The realization of engineering principles and practice, enabling the graduate engineer to solve engineering problems in an ethical, timely and cost efficient manner.

**Structure**

The **Industrial Engineering Senior Design Project 1** is the first of a two-part course sequence. It consists of two of five integral design phases. (1) Define phase: This determines the project objectives and scope. Information on the process and customer are collected and deliverables to customer are defined. (2) The Measure phase: Collect qualitative and experimental information and objectively categorize and rank.

*Define Phase*

- Project charter: Establish project and team. Set direction and objectives
- Collect customer data - voice of customer (VOC)
- Translate VOC to quantitative specification using function tree; determine what customer considers critical to quality (CTQ)
- Understand project goals, illustrate direction and alternatives, and define objectives
- **Gate review** - Reports and presentations should convey an in-depth comprehensive understanding of the customer's goals in addition to proposing methods for approaching and solving the issue(s). You **MUST** utilize various applicable six sigma tools.

*Measure Phase*

- Collect, measure, and interpret customer data to support all alternatives and prioritize solutions supported by statistical reasoning

- Utilize Cause and Effect diagrams, FMEA
- Process capability and sigma level
- **Gate review** - Reports and presentations should convey an in-depth comprehensive understanding of the customer's goals in addition to proposing methods for approaching and solving the issue(s). You **MUST** utilize various applicable six sigma tools.

Wherever appropriate, your reports must contain the following:

Economic analysis
A justification of all the costs considerations taken for the product or service relevant to the design project shall be provided. This includes justification for equipment and manpower levels, the make or buy decision a rate of return on the investment.

Environmental impact
The students shall demonstrate an understanding of the impact their product or service will have on the environment.

Ethical considerations
Since many ethical issues present themselves in engineering design, the students shall demonstrate an understanding of such issues, and as relevant to their design example discuss such issues including conflict of interests, and tradeoffs between costs and benefits to society.

Health and safety
The students shall assess the impact of their designs, proposed facility layouts and general working practices on the workforce within the organization. Ergonomic considerations of their designs shall be included. The students shall demonstrate an understanding of applicable regulations from bodies such as OSHA, PROSHA, ADA, etc.

Sustainability
The understanding of the long-term impact of designs is imperative. As relevant, the students shall demonstrate the sustainability of their designs.

**In order to assist you, five papers have been included** for you to study and use during your report writing. You may search the open literature for more information.

**You need to submit your reports in electronic form on CD for a grade to be recorded.**

**Management Rules**
We will operate as a team. We should voice our opinion but have a consensus at the end.

1. A **team leader** will be chosen for each phase of the project
2. No personal attacks. Work the problem not the people
2. What is discussed her stays here
3. Not my first choice but I will support it
4. There are no dumb ideas - brainstorm!
5. Listen, do not interrupt

**Expectations**
It is expected that **ALL** students registered for this class will comport themselves in a **professional** manner. Lateness will not be tolerated in any manner. Class attendance is compulsory! You will attend to your sponsors in a manner expected of **engineering professionals**.

The instructor will provide through lectures, enough information on the relevant tools for the successful completion of the course requirements. These will include coverage of six-sigma 'Define' and 'Measure'.

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The course work will also include an introduction to Quality Function Deployment (QFD), a brief discussion on process planning, and a brief discussion on facilities design. **All** other lecture times will be used for **mandatory** discussion of projects using PowerPoint presentations by the team members.
Teamwork is an essential component of this course. You will be graded by your peers on their perception of your contributions towards achieving project goals. **All** teams **MUST** make mission, or will receive a failing grade!

**Grade Policy**

| | | |
|---|---|---|
| **Define Phase** | Report (20%) | |
| | Presentation (10%) | |
| | Teamwork (100 – 0 %)<br>60% = Student assessment<br>40% = Instructor assessment | TBD by Instr & TA based on total effort and individual team member assessments – all group members are responsible for the completion for each report |
| **Measure Phase** | Report (35%) | |
| | Presentation (10%) | |
| | Teamwork (100 – 0 %) | *ibid* |

| | | |
|---|---|---|
| **Project Completion** | Ability to deliver customer (15 %) requirements Designs, simulation models, product manufacture, artifacts, etc. | Requires that an initial, applied trial or prototype of the design/project be created in preparation for the Analyze phase. |
| | Teamwork (100 – 0 %) | *ibid* |
| | Attendance, participation, and character (10%) | Attendance will be taken before the beginning of each class. |

| **Passing** Grades | | **Failing** Grades | |
|---|---|---|---|
| 90 - 100 | A | | |
| 80 - 89 | B | 60 - 69 | D |
| 70 - 79 | C | 0 - 59 | F |

**Program Outcomes**

The following departmental program outcomes are expected of each student on completion of the course:

( 3) Ability to design or redesign integrated systems, components, or processes to meet desired needs within realistic constraints, such as such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
*Note: We define "systems" to include people, materials, information, equipment and energy*.
( 4) Ability to work in teams
( 6) Ability to communicate effectively.
(10) Ability to use modern industrial engineering techniques, skills and tools necessary to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.
(11) Ability to identify, formulate, and solve engineering problems.

**Prerequisite**

Final Term in fall-spring sequence

***Departmental policy on course pre- and co-requisites***

*It is the policy of the Department of Industrial Engineering that a student must receive passing grades in all prerequisite courses prior to enrolling in an Industrial Engineering course. Concurrent registration in a course and its prerequisites is not allowed. All prerequisites to prerequisites must be*

*completed. Failure to abide by this policy can result in the cancellation of your enrollment in the course at any time during the semester and with no refund of fees. Co-requisites courses must be taken concurrently or prior to enrolling in the course. During the first week of classes, the instructor will notify you of the pre- and co-requisites of the course.*

**********  There is no "Incomplete" grade in this class  **********

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**Define Phase**

| | |
|---|---|
| 26-Aug | **Course overview** |
| 28-Aug | Lecture |
| | **Team formation and product selection completed** |
| 2-Sep | **Lecture - Define** |
| 4-Sep | Lecture - QFD |
| 9-Sep | Lecture |
| 11-Sep | Lecture (TBD) |
| 16-Sep | Lecture |
| 18-Sep | Lecture (TBD) |
| 23-Sep | Lecture |
| 25-Sep | Lecture (TBD) |
| 30-Sep | Lecture |
| 2-Oct | Lecture (TBD) |
| 7-Oct | Lecture |
| 9-Oct | Lecture (TBD) |
| 14-Oct | Lecture |
| 16-Oct | Lecture (TBD) |
| 21-Oct | **Gate Review: Report due 4:00 p.m. (20%)** |
| | **Presentations (10%)** |
| 23-Oct | **Presentations** |

**Measure Phase**

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|---|---|
| 28-Oct | **Lecture - Measure** |
| 30-Oct | Lecture |
| 4-Nov | Lecture (TBD) |
| 6-Nov | Lecture |
| 11-Nov | **Veterans Day Holiday** |
| 13-Nov | Lecture |
| 18-Nov | Lecture |
| 20-Nov | Lecture |
| 25-Nov | Lecture (final discussion) |
| 27-Nov | **Thanksgiving Holiday** |
| 2-Dec | **Gate Review: Report due 4:00 p.m. (35%)** |
| | **Presentations (10%)** |
| 4-Dec | **Presentations** |

**Presentations:** **(schedule to be posted later)**

**Electronic copies of all reports are due by 10 AM on Tuesday December 2.**

**No late reports or slides will be accepted.**

***Week 1 (25th August 2014)***

# Dr Okenwa Okoli

## Office Hours

| | Mon | Tues | Wed | Thurs | Fri |
|---|---|---|---|---|---|
| ***9-10*** | | | | | |
| ***10-11*** | | | | | |
| ***11-12*** | | | | | |
| ***12-1*** | | | | | |
| ***1-2*** | | | | | |
| ***2-3*** | | | | Class | |
| ***3-4*** | | Class | | Class | |
| ***4-5*** | | | | | |
| ***5-5:30*** | | | | | |

Please insert your name in any of the unshaded slots.
Each time slot is 15 minutes. If I am not busy, feel free to knock and come in with whatever problems or questions you may have.
Thanks.

Florida A&M University–Florida State University

# COLLEGE OF ENGINEERING

Industrial and Manufacturing Engineering

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Excellence With Caring

***Department Policy on Pre- and Co-requisite Courses***

It is the policy of the Department of Industrial and Manufacturing Engineering (IME) that all prerequisites must be satisfied (*i.e.,* completed with passing grades). Students who have not earned passing grades in all prerequisites for an IME course will have their registrations cancelled for that course. Furthermore, all prerequisites and co-requisites to prerequisites must also be satisfied (*i.e.,* completed with passing grades) otherwise course registration will be cancelled. Co-requisite courses, if any, must be taken concurrently or satisfactorily completed prior to registering in a course. Failure to comply with this policy will result in the cancellation of registration in all affected courses at *any* time during the semester and with *no* refund of fees.

Students: Please read, sign and return this acknowledgement and certification form to the course instructor. Failure to submit this form will result in the cancellation of your registration in the course and/or will prevent you from registering in the course.

## ACKNOWLEDGEMENT and CERTIFICATION

By signing below, you **acknowledge** and **certify** that you have **read** and **understood** the above Departmental policy statement concerning Industrial and Manufacturing Engineering course pre- and co-requisites, you are **aware** of the pre- and co-requisites for this course, and you **understand** that if you have registered for any IME course without having satisfactorily completed **all** of its pre- and co-requisite courses as well as all of their prerequisites and co-requisites that the IME Department or the College of Engineering will administratively **cancel** your course registration at **any** time during the semester and with **no** refund of fees. Furthermore, by signing below, you **certify** that all of the information you are providing is correct.

| **EIN 4890: Industrial Engineering Senior Design Project I** | **Fall** |
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| **Prerequisite** | |
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| Final year in the undergraduate IE program and scheduled to graduate this academic year | ☐ Yes ☐ No |

| **Student Information** | |
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| *Signature:* | Printed Name: |
| FAMU Students – *Complete* student identification number (do not abbreviate): | |
| FSU Students – *Complete* student identification number (do not abbreviate): | |
| Current major (check one): ☐ Industrial Engineering ☐ Pre-engineering ☐ Other (specify): | |

**Instructors:** Collect and retain all forms through the first week of classes. After drop/add during the second week, verify that there is one form for each student on the updated rosters. Then, submit the entire set of forms to Mr. John Taylor for subsequent verification against each student's transcript.

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I acknowledge that I have received and understand the information in the given syllabus.

Print Name:_____

Student # (Last 4 digits) _____

Email: _____

FAMU or FSU (circle one)

Phone Number:_____

Race: B H W A Other Gender: M F

Are you interested in building prototypes that enhance productivity or implementing cost saving strategies?

Are you comfortable with working at hospitals?

Are you proficient in AutoCAD, ProE, or any other CAD software?

Briefly describe your abilities:

Signature: _____Date: _____

**NB:** Signing this form indicates consent to use the last four digits of your **Student number** provided, when displaying documentation relevant to class.

Comments: