

## **ISYE 3106 COURNERSTONE DESIGN**

### **Concentration breadth elective for BSIE**

**Credit:** 3-0-3

**Prepared** Profs. Nazzal, Tokol-Goldsman, 2025

**Prerequisite(s):** ISYE 3030 Basic Statistical Methods with concurrency

**Text:** No textbook is assigned; we will use a series of readings and Senior Design cases. Canvas and MS Teams are the mandatory communication tools in this class. All class-related materials are posted there.

### **Catalog Description**

Structure a complex problem through information gathering, data analysis, industrial engineering and design principles application, project management, while working in and leading diverse teams.

### **Course Description**

This course introduces students to problems in Industrial and Systems Engineering through project-based learning utilizing past Senior Design projects. Emphasis is on identifying and specifying the opportunities for improving a system through diagnostic data analysis, scoping a solution strategy, and writing/presenting a proposal for addressing the clients' needs. In addition, students will receive guidance to help develop their professional skills in communication, professionalism, and teamwork.

### **Major Milestones in approximate weeks**

1. 2<sup>nd</sup> week: Complete team formation
2. 5<sup>th</sup> week: Field project (data collection and analysis) presentation to class
3. 9<sup>th</sup> week: Design challenge initiation project report and presentation to class
4. Last week: Final project (Frame-the-design) report and presentation to class

### **Course Learning Outcomes**

At the end of this course, the students will be able to:

1. Identify, break down, and define a problem/opportunity statement for an industrial engineering design project
2. Practice the information and data collection process to define the problem, understand the context, and identify the opportunities

3. Develop the essential components of writing and presenting a business/ Industrial Engineering design proposal
4. Be effective in a collaborative and inclusive team to meet objectives and learn to provide feedback
5. Write and present a proposal for solving problems addressed with Industrial Engineering methodologies

### The Mapping from the Course Outcomes to ABET Student Learning Outcomes

The table below shows the relationship between course outcomes and ABET student learning outcomes. The table has 8 columns. The first column lists the course learning outcomes listed above. The next 7 columns list the abbreviated ABET Student Learning Outcomes. The entry of H in a row with specific course learning outcome and column with specific ABET Student Learning Outcomes indicate the importance of attain this outcome is high and will be assessed.

| <b>Course outcome \<br/>Program Outcomes</b>                                                                                   | 1. identify, formulate solve engg prob by engg, sci & Math | 2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic | 3 communicate with a range of audience | 4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context. | 5. effective on a team provide leadership, collaborative and inclusive envirn, plan tasks & meet objectives | 6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions. | 7. acquire and apply new knowledge using appropriate learning strategies |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 1. Identify, breakdown, and define an IE problem/opportunity                                                                   | H                                                          |                                                                                                            | H                                      |                                                                                                                                                      |                                                                                                             |                                                                                                                | M                                                                        |
| 2. Practice the info and data collection process to define the problem, understand the context, and identify the opportunities |                                                            |                                                                                                            | H                                      |                                                                                                                                                      | H                                                                                                           | M                                                                                                              | M                                                                        |
| 3. Develop the essential components of writing a business/IE proposal                                                          |                                                            |                                                                                                            | H                                      |                                                                                                                                                      |                                                                                                             | M                                                                                                              |                                                                          |
| 4. Be effective in a collaborative and                                                                                         |                                                            |                                                                                                            |                                        | H                                                                                                                                                    | H                                                                                                           |                                                                                                                |                                                                          |

| Course outcome \<br>Program Outcomes | 1. identify, formulate solve engg prob by engg, sci & Math<br>2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic<br>3 communicate with a range of audience<br>4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.<br>5. effective on a team provide leadership, collaborative and inclusive envirm, plan tasks & meet objectives<br>6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.<br>7. acquire and apply new knowledge using appropriate learning strategies |   |  |   |  |  |  |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|---|--|--|--|
|                                      | inclusive team to meet objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |  |   |  |  |  |
|                                      | 5. Write, present a proposal for solving problems addressed with IE methodologies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | H |  | H |  |  |  |

### Assessment of the important outcomes

Please use H for high importance for assessment. M for medium importance. Will not normally be assessed. L or blank will not be assessed.