

# EST 280 FUNDAMENTALS of INDUSTRIAL ENGINEERING:

**SYLLABUS:** We 6:05 – 8:55PM Zoom Online

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Spring Semester 2021

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**COURSE LEARNING OBJECTIVES:** This is an advanced course in Industrial Engineering.

TECH Learning Objectives:

1. The student will demonstrate the ability to apply technical tools and knowledge to practical systems and problem solving.
2. The student will design, understand, and analyze selected aspects of the human-made world, as defined for this purpose as “artifacts of our surroundings that are conceived, designed, and/or constructed using technological tools and methods” of industrial engineering concepts.

Course Learning Objectives:

The learning objectives of this course will ensure the student can apply Quantitative & Qualitative Problem Solving methods and techniques to: solve problems associated with the concepts listed in the syllabus above,

- Verbally, and visually present these mathematical concepts, numerically and symbolically.
  - Utilize mathematical methods to solve these problems.
  - Estimate and check the results of their computations.
  - Become acquainted with the limits of statistical & mathematical methods taught in this course.
3. Establish a functional understanding of industrial engineering concepts application.
  4. Attain functional, scientific and technical knowledge, and critical thinking skills, related to the industrial engineering profession, and potential preparation for graduate studies.
  5. Develop a balanced and integrated understanding of the concepts, theories, and methodologies used to plan, design, analyze, develop, organize, and industrial engineering operational tasks.
  6. Acquire a proficient knowledge of the key areas of industrial engineering listed within this document.

The student will perform the following to achieve this:

1. There will be homework assignments throughout the semester. The purpose of the HW is to give the student the opportunity to apply the industrial engineering concepts discussed in class. These exercises may involve minor experiments, internet searches, and the application of software such as Excel. Each assignment will be posted on Blackboard through the Assignments section. Assignment may be reviewed in class as time allows. The student will prepare a brief operations report (using MS Word) that summarizes the assigned problems or task. You may be asked to work in a group of three or four students on the exercises. The project will be submitted via Black Board turned in on the required due date will be accepted. Each missed exercise will be assigned a grade of zero.
2. Exams will be given during the course consisting of written problems and true/false multiple choice questions. Tests may be computer graded as appropriate.
3. Evaluate the aspects of engineering alternatives in the operational decision making process and use these concepts and evaluation techniques to perform the analysis.
4. The student will also develop an understanding of the influence industrial engineering has upon the business, the organization, and the management decision making process,

**TEXT:** Industrial Engineering Foundations Author(s):Sassani

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**GRADES:** Test - (15%); Homework (assignments- 8% each, 40% total);

Industrial Engineering problem 10%

Project (25%);           A. Group (3 or less)

1. Group size 3 = 2x size of project 10 pages 5 concepts

2. Group size 2 = 1.5x size of project 8 pages 4 concepts

B. Solo Project           1. Normal size project 5 pages 3 concepts

Participation (10%),

a.- Have to be in class to participate (1 point per class), **and post in the discussion boards**

b.- Random exercises for participation credit (exercise counts for participation point),

c.- Two sick days of class without penalty

## **COURSE SYLLABUS:**

### CONTENT

**Lectures will now be conducted in Black Board using a “Zoom” classroom**

**The first class will be help on Wed Feb 3rd**

Week 1.	Feb 3	Manufacturing Engineering & Processes Design
Week 2.	Feb 10	Facilities Location and Layout.
Week 3.	Feb 17	Supply Chain and Logistics, Material Handling, Distribution, and Routing.
Week 4.	Feb 24	Quality Assurance Statistical Processes Control
Week 5.	Mar 3	Project & Asset Management
Week 6.	Mar 10	Engineering Economics
Week 7.	Mar 17	Human Factors System Design
Week 8.	Mar 24	Review subjects
Week 9.	Mar 31	Operations Research
Week 10.	Apr 7	Risk Analysis & Design of Experiments
Week 11.	Apr 14	Reliability Engineering
Week 12.	Apr 21	Test - online in Black Board
Week 13.	Apr 28	Introduction to System Design, Systems Simulation & Industrial Automation.
Week 14.	May 5	Course overview and review critique

### **Learning Outcomes:**

Students in this course will be able to display and relate the principles of industrial engineering concepts, requirements and constraints, through a scientific management decision process involving adjustments, and transactions of the industrial engineering design process. The learning objectives of this course will ensure the student can apply Qualitative & Quantitative Problem Solving methods and techniques to: solve problems associated with the concepts listed in the syllabus above,

- Verbally, and visually present these mathematical concepts, numerically and symbolically.
  - Utilize mathematical methods to solve these problems.
  - Estimate and check the results of their computations.
  - Become acquainted with the limits of statistical & mathematical methods taught in this course.
- (a) Gain the ability to apply knowledge of mathematics, science, and engineering to industrial engineering problems.
  - (b) Demonstrate the ability to create systems, components, or processes to meet realistic models of operational needs within given constraints,
  - (c) Areas of skill development include socio-economic, ecological, operational, ethical, health and safety, manufacturability, and sustainability
  - (d) The ability to work within multidisciplinary groups
  - (d) The ability to recognize, create, and solve industrial engineering problems
  - (e) Understand the professional and ethical obligations of an industrial engineer
  - (f) Successfully communicate industrial engineering concepts
  - (g) Demonstrate the ability to use the techniques, skills, and industrial engineering techniques necessary for The practice of industrial engineering profession.

Note: This is a guideline of the course content and syllabus. This outline is subject to change as determined by the instructor during the semester.

**GENERAL NOTES:** The course will be conducted using lecture and open discussions during scheduled classes. Homework, solutions to engineering problems will be required. This provides ample opportunity for learning, and also evaluation of the student's performance. Homework assignments will be due as posted on the course Black Board page on Assignments. The problem solutions should be presented in a clear format so computations can be evaluated easily. Prepared spreadsheet solutions and graphics will be accepted. Any notes and assumptions or summary comments should be included.

All homework and tests will be promptly graded. Late home works will not be accepted.

Two exams; a mid-term a final examination will be given under academic conditions, and will be administered in class and during finals week.

Homework assignments should be prepared individually, if not specifically designated as a group assignment. Although it is understood that collaboration with others on the homework may be educationally beneficial, when designated as an individual assignment each student must submit their own individual assignment material.

Fundamental Engineering Ethics require engineers to give proper credit for engineering work where credit is due.

Therefore, references should be cited on all written work to acknowledge the aid of other individuals and both published and unpublished references. "Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at

<http://www.stonybrook.edu/uaa/academicjudiciary/> "

"The University at Stony Brook expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty is required to report disruptive behavior that interrupts faculty's ability to teach, the safety of the learning environment, and/or students' ability to learn to Judicial Affairs."

The University Senate Undergraduate and Graduate Councils have authorized that the following required statements appear in all teaching syllabi (graduate and undergraduate courses) on the Stony Brook Campus.

#### **Americans with Disabilities Act:**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

#### **Academic Integrity:**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

#### **Critical Incident Management:**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.