SIE 250 - Introduction to Systems & Industrial Engineering

Credits and Contact Hours:	3 Credits – Three 50-minute lectures per week.
Instructor's or course coordinator's name:	John Ullrich
Textbook, title, author and year:	Systems Engineering Principles and Practice, Second Edition by Alexander Kossiakoff, William N. Sweet, Samuel J. Seymour and Steven M. Biemer, 2011. A variety of software will be used: MATLAB, SIMULINK, and Excel.
2021-2022 Catalog Description:	System modeling the elementary constructs and principles of system models including discrete-time, discrete-state system theory; finite state machines; modeling components, coupling, modes, and homomorphisms system design; requirements, life-cycle, performance measures and cost measures, tradeoffs, alternative design concepts, testing plan, and documentation. Applications and case studies from engineering.
Prerequisites:	ENGR 102, MATH 129
Required, Elective, or Selected Elective:	Required
Course Objectives:	• Define key elements of a systems engineering lifecycle • Apply principles and practices of requirements derivation into the functional and physical architecture • Apply a working knowledge of interface design • Define critical interfaces • Define key elements of Six Sigma and Lean and their application • Describe and apply the DMAIC phases • Apply MATLAB/Simulink tools, such as basic mathematical modeling, and optimization • List and apply key Lean concepts, such as Muda (waste reduction), VSM, value analysis, and other Lean fundamental concepts

Student Outcomes – Listed inCriterion 3 or any other outcomes are addressed by the course:

Learning Outcome	Measure	Standard/Threshold
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Semester Design project	75% of the students must score 70% or higher
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	Peer evaluated average participation on semester design project	75% of the student will achieve 80% or higher participation
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions	Homework Assignment #3 – System Modeling	75% of the students must score 75% or higher

Topics covered:

This course is intended to give students background and a foundation in the design of systems. We will discuss the systems design process including:

- Requirements Development
- Concept Development
- System Architecture Definition
- Trade-off Analysis
- System Testing
- System Modeling
- Analysis and Simulation
- Performance Measures
- Design Optimization
- Project Management