THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Design and Professional Practice I

MATSCEN 4381.01

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture

Course Description:
An in-depth design project to foster independent thinking and to develop problem-solving skills. Design of experiments, applied statistics, presentation and communication skills will be discussed.

Prerequisites and Co-requisites:
Prereq: 3141, 3151, and 3331. Prereq or concur: 3261, 3271, or 3332, and enrollment as MatScEn-BS major; and GenEd 1201 or 2601; or permission of instructor.

Course Goals / Objectives:
- Learn concepts related to materials design including design of experiments, statistical analysis and data mining
- Learn how to execute design projects, work in teams and effectively disseminate their findings
- Learn methods for material inspection, how to identify modes of failure and to troubleshoot design problems
- Learn concepts related to industrial standards, intellectual property and patents
- GE Reflctn Booknd LO: Engaged Citiznshp & Intercultural Competency: Studnts consider public health, safety, welfare, global, cultural, social, environmental, & econ factors in applying eng design to produce solutions meeting specified needs.
- GE Reflctn Booknd LO: Personal & Professional Development: Students individually assess and pursue personal professional growth in concert with project requirements and personal career goals.
- GE Reflctn Booknd LO: Cultivate Engineering Mindset: Students develop an engineering mindset that demonstrates constant curiosity, makes connections between disparate bodies of information, and seeks opportunities to create value.

Course Topics:

- Research Databases
- Statistical Methods in Design (design of experiments, main effects plots, applied statstics, power law, ANOVA, t-tests, statistical significance, data mining)
- Standards and Specifications (Codes, ASTM guidelines, GLP)
- Role of fracture mechanics/failure modes in design, Inspection methods
- Cost and data analyses, Value Engineering
- Quality Tools: Industrial Application of DoE and statistical analyses
- Proposal writing and critiquing
- Presentation/Oral communication skills, interviewing skills
- Patents and Intellectual Properties
- Proposal Presentations

Designation:

Required