ENGR 540 - Design of Engineering Experiments – Fall 2013

Instructor: Dr. Manoj K. Mohanty
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College of Engineering
Southern Illinois University at Carbondale

COURSE SYLLABUS

Instructor Code: 705
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3 Credit Hours
Office: Engineering E-8
5.00 - 6.15 W, F
Phone: 618 453 7910
Room # A-29
Office Hrs: 3.30 – 5.00 W and F

Objectives:

- The objective of this course is to teach how to design and conduct experiments efficiently and analyze the resulting data to obtain meaningful conclusions. Both statistical design and analysis issues will be discussed.
- Applications from various fields of engineering (including chemical, mechanical, civil, mining engineering, materials science, industrial engineering, etc.) will be illustrated throughout the course.
- A Computer software package (Design Expert) to implement the methods presented will be illustrated and the students will be required to use this software for a class project.


Prerequisite: MATH 483 or MNGE 417, or an Introductory Probability and Statistics course.

Reference Books:

Topics:

1. Introduction (Chapter 1)

2. Simple Comparative Experiments (Chapter 2)
   - Sampling Distributions
   - Hypothesis Testing

3. Experiments with Single Factor (Chapter 3)
   - Analysis of Variance (ANOVA)
   - Model Adequacy Checking
   - Practical Interpretation of Results

4. Completely Randomized and Randomized Block Designs (Chapter 4)

5. Introduction to Factorial Designs (Chapter 5)

6. The $2^k$ Factorial Design (Chapters 6-7)

7. Fractional Factorial Design (Chapters 8-9)

8. Fitting Linear Regression Models (Chapter 10)

9. Response Surface Methods and Process Optimization (Chapter 11)

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Project (includes a report and an oral presentation):</td>
<td>20%</td>
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<tr>
<td>Midterm Exam:</td>
<td>30%</td>
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<tr>
<td>Final Exam:</td>
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The standard university grading policy is usually followed. A relative grading procedure may be followed only if the instructor feels it necessary.

Late Policy

Late homeworks and project reports will be penalized at a rate of 5 points for each day after the assigned due date. No homework will be accepted one week after the due date.