IE 333 Design and Analysis of Experiments 3(3,1,1)

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<tr><td>Catalog Data</td><td colspan="4">Introduction to design of experiments and its applications in industry; Hypothesis testing; Analysis of variance; Residual analysis; Block design; Randomized complete and incomplete designs; Two and multi factor factorial design; Introduction to response surface methodology.</td></tr>
<tr><td>Prerequisite</td><td colspan="4">STAT 324</td></tr>
<tr><td>Co-requisites</td><td colspan="4">N/A</td></tr>
<tr><td>Level</td><td colspan="4">7</td></tr>
<tr><td>Textbook</td><td colspan="4">Design and Analysis of Experiments by Douglas Montgomery (7th edition), 2008.</td></tr>
<tr><td>Learning Objectives</td><td colspan="4">To provide students with understanding of the principles of statistical design of experiments and their analysis supported with real-life industrial applications.</td></tr>
<tr><td rowspan="10">Topics (classes)</td><td></td><td>Topic</td><td>Week</td><td>Contact, hr</td></tr>
<tr><td>1.</td><td>Introduction to Design of Experiments</td><td>1</td><td>5</td></tr>
<tr><td>2.</td><td>Hypothesis Testing and Simple Comparative Experiments</td><td>2</td><td>10</td></tr>
<tr><td>3.</td><td>Experiments with a Single Factor: Analysis of Variance</td><td>2</td><td>10</td></tr>
<tr><td>4.</td><td>Randomized Complete and Incomplete Blocks Designs</td><td>1</td><td>5</td></tr>
<tr><td>5.</td><td>General Factorial Designs</td><td>2</td><td>10</td></tr>
<tr><td>6.</td><td>2^k Factorial Designs</td><td>2</td><td>10</td></tr>
<tr><td>7.</td><td>Regression</td><td>2</td><td>10</td></tr>
<tr><td>8</td><td>Surface Response Methods</td><td>2</td><td>10</td></tr>
<tr><td>Laboratory Topics</td><td></td><td colspan="3">Minitab software</td></tr>
<tr><td>Project work</td><td colspan="4">Independent group projects for design and analysis of an experiment.</td></tr>
<tr><td>Computer Usage</td><td colspan="4">Computer use covers course topics</td></tr>
<tr><td>Learning outcomes</td><td colspan="4">1. Understand the theoretical basis of the need of running experiments and experimental design
2. Explain the source of errors
3. Describe sampling distributions, hypothesis testing and simple comparative experiments
4. Define experiments with a single factor and solve them with analysis of variance technique
5. Explain randomized complete block designs
6. Design experiments using general factorial design with two or more factors
7. Conduct one factor and multi-factor regression
8. Use surface response methods for optimization
9. Learn how to analyze data using Minitab</td></tr>
<tr><td>Estimated Category Content</td><td colspan="4">Engineering Design: 3 credit hour or 100%.</td></tr>
<tr><td>Prepared by</td><td colspan="4">Dr. Adham Ragab</td></tr>
<tr><td>Preparation Date</td><td colspan="4">March 2011 – revision May 2012</td></tr>
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