

Design of Experiments (3)

(Effective Spring 2020)

Prerequisite:	Math 251 and either Stat 325 OR Engineering 311.																								
Catalog Description:	The design and analysis of experiments. Topics include one and two factor Analysis of Variance, randomized designs, repeated measures, and factorial experiments.																								
Goal:	The course prepares students majoring in the mathematical sciences for careers involving Statistics. Since experiments are performed in all disciplines, this course should benefit students from many disciplines including engineering, agriculture, and education in designing and analyzing experiments.																								
Learning Outcomes for Major:	<p>This course addresses one or more of the student learning outcomes for the major.</p> <p>Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:</p> <ol style="list-style-type: none"> i. apply mathematical concepts and principles to perform numerical and symbolic computations. ii. use technology appropriately to investigate and solve mathematical and statistical problems. iii. write clear and precise proofs. iv. communicate effectively in both written and oral form. v. demonstrate the ability to read and learn mathematics and/or statistics independently. 																								
Teaching Objectives:	<p>The student will:</p> <ol style="list-style-type: none"> 1. Have acquired the basic skills to recognize design techniques. 2. Be able to design specific experiments including but not limited to randomized designs, repeated measures and factorial experiments. 3. Be able to analyze specific experiments including but not limited to randomized designs, repeated measures and factorial experiments. 																								
Text(s):	Design and Analysis of Experiments, Tenth Edition, by Douglas C. Montgomery, John Wiley & Sons, Inc. Publisher, 2019. ISBN : 978-1119593409.																								
Outline:	<table> <thead> <tr> <th>Chapter</th> <th>Title (Sections)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Introduction</td> </tr> <tr> <td>2</td> <td>Simple Comparative Experiments</td> </tr> <tr> <td>3</td> <td>Experiments with a Single Factor : The Analysis of Variance</td> </tr> <tr> <td>4</td> <td>Randomized Blocks, Latin Squares, and Related Designs</td> </tr> <tr> <td>5</td> <td>Introduction to Factorial Designs</td> </tr> <tr> <td>6</td> <td>The 2^k Factorial Design</td> </tr> <tr> <td>7</td> <td>Blocking and Confounding in the 2^k Factorial Design</td> </tr> <tr> <td>12</td> <td>Experiments with Random Effects</td> </tr> <tr> <td>13</td> <td>Nested and Split-plot Designs</td> </tr> <tr> <td>14</td> <td>Other Design and Analysis Topics</td> </tr> <tr> <td></td> <td>Additional Topics Chosen by Instructor</td> </tr> </tbody> </table>	Chapter	Title (Sections)	1	Introduction	2	Simple Comparative Experiments	3	Experiments with a Single Factor : The Analysis of Variance	4	Randomized Blocks, Latin Squares, and Related Designs	5	Introduction to Factorial Designs	6	The 2^k Factorial Design	7	Blocking and Confounding in the 2^k Factorial Design	12	Experiments with Random Effects	13	Nested and Split-plot Designs	14	Other Design and Analysis Topics		Additional Topics Chosen by Instructor
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