Class Schedule: M, W: 10:00 – 11:50 a.m.

Credit Hours: 4

Prerequisite: ST 314

Revision Date: December 13, 2010


Catalog Description: Systematic analysis of processes through the use of statistical analysis, methods, and procedures. Application of statistical techniques including use of classic process analysis techniques, regression and design of experiments.

Course Learning Outcomes
1. Describe (identify/write) how a designed experiment is conducted to investigate the performance of processes and systems based upon the principles of replication, randomization, and blocking.
2. Show (write) how the sampling distributions, P-value, and the operating characteristic (OC) curve can be used in experimental design.
3. Show (write) how matrix algebra can be conveniently used to illustrate the applicability of multiple-linear regression models to define the association that exists between a response variable and two or more regressor variables.
4. Develop the linear statistical model to illustrate the use of analysis of variance (ANOVA) as a technique for a single-factor, completely randomized design.
5. Develop the linear statistical model to illustrate the use of ANOVA as a technique for a single-factor, randomized complete block design.
6. Describe (write) how the main effects and interaction can be assessed in a two-factor
factorial design, and develop (write) a linear statistical model for a two-factor factorial design to perform ANOVA.

7. Work as a team on an open-ended (term project) problem on housing to produce a team-written report to effectively communicate the responses to a series of questions.

**Lecture Material**

**Chapter 1**
Introduction, Course Overview

**Chapter 2**
Introduction to Simple Comparative Experiments; Review of Statistical Theory; Sampling and Sampling Distributions; Properties Required of Good Point Estimators; Degrees of Freedom; Sampling Distributions - Normal, Chi-Square, t, and F distributions; Hypothesis Testing; Central Limit Theorem; Type I and Type II errors; Test Statistics; Sample Size; Confidence Intervals; Paired Comparison Designs; Difference in Variances of Normal Populations.

**Chapter 10**
Introduction to Regression Analysis; Simple Linear Regression; Multiple Linear Regression; Statistical Properties of the Estimators; Checking for Model Adequacy - Residual Analysis; Tests for Significance of Regression, Individual Regression Coefficients and Groups of Coefficients; Confidence Intervals in Multiple Linear Regression; Lack-of-Fit Test; Other Linear Regression Models - Polynomial Models.

**Chapter 3**
Introduction to Analysis of Variance; Fixed Effects Model; Decomposing the Total Sum of Squares; Statistical Analysis; Estimating the Model Parameters; Checking for Model Adequacy; Comparing Individual Treatment Means; Graphical Methods; Contrasts; Orthogonal Contrasts; Comparing Pairs of Treatment Means; Random Effects Model.

**Chapter 4**
Introduction to Randomized Complete Block Design; Statistical Analysis; Checking for Model Adequacy; Estimating Missing Values; Estimation of Model Parameters.

**Chapter 5**
Introduction to Factorial Designs; Two-Factor Factorial Designs; Statistical Analysis; Model Adequacy; Estimation of Model Parameters; Sample Size.

**Grading**

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<tr>
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<th>Weight</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>22%</td>
<td>Wednesday, February 2</td>
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<tr>
<td>Test 2</td>
<td>22%</td>
<td>Wednesday, February 23</td>
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<tr>
<td>Final Exam</td>
<td>26%</td>
<td>Thursday, March 17 (12:00 – 1:50 p.m.)</td>
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<tr>
<td>Homework Assignments</td>
<td>15%</td>
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<tr>
<td>Term Project</td>
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<td>100%</td>
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Homework: **Individual** effort  
Term Project: **Group** effort

1. Tests 1 and 2 will be given on the dates indicated above. Students viewing the test at the regular time are considered to have taken the test. There is no makeup for these tests.
2. Assignments must be turned in at 11:50 a.m. (or as specified in class) on the due date. Late assignments **will not** be accepted.
3. Grades will be given on a 90, 80, 70, 60, 50 basis.
4. A student’s academic record is a relatively permanent record of that student’s performance and activities while in school. It is important that each student and the integrity of each student’s record be protected.
5. Students are responsible for any changes to this syllabus announced in class.

Course website: [http://classes.engr.oregonstate.edu/mime/winter2011/ie356/](http://classes.engr.oregonstate.edu/mime/winter2011/ie356/)

**STUDENTS WITH DISABILITIES:**

Students with accommodations approved through DAS are responsible for contacting the instructor prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

**STUDENT CONDUCT:**

1. **DISHONESTY:**

Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

- **Cheating**- use or attempted use of unauthorized materials, information or study aids
- **Fabrication**- falsification or invention of any information
- **Assisting**- helping another commit an act of academic dishonesty
- **Tampering**- altering or interfering with evaluation instruments and documents
- **Plagiarism**- representing the words or ideas of another person as one's own

When evidence of academic dishonesty comes to the instructor's attention, the instructor will document the incident, permit the accused student to provide an explanation, advise the student of possible penalties, and take action. The instructor may impose any academic penalty up to and including an "F" grade in the course after consulting with his or her department chair and informing the student of the action taken.

Please refer to [http://oregonstate.edu/studentconduct/regulations/index.php](http://oregonstate.edu/studentconduct/regulations/index.php) for a comprehensive set of policies that govern student conduct at OSU.
2. EXPECTATIONS:

The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.
STUDENT CONDUCT: