Course Information
Class: T Th 8:00am-9:15am in UPH 339
Instructor: Dr. Byran Smucker (Office: UPH 317)
Office Hours: M Th 10:00-11:00; W 1:45-2:45; or by appointment
E-mail: smuckerb@muohio.edu
Office Phone: 513.529.0955

Course Website

Required Textbook

Supplementary Texts

Course Description
Introduction to the theory and application of response surface methodology and associated experiment designs. This course will be focused on the development of methods and designs that are often used in an industrial/manufacturing/engineering setting. We will develop theory as necessary along the way. Topics include first- and second-order models; designs for such models, including fractional factorial designs and central composite designs; the method of steepest ascent; and optimization of second-order models, including canonical and ridge analysis.

Course Syllabus

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<tr>
<th>Topic</th>
<th>Book Chapter(s)/Notes</th>
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<tbody>
<tr>
<td>1 Overview of RSM</td>
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<tr>
<td>2 Review of Regression and Least Squares</td>
<td>2</td>
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<td>3 Two-level Factorial Designs</td>
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<td>4 Fractional Factorial Designs</td>
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<td>5 Steepest Ascent/Descent in RSM</td>
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<td>6 2nd-order Response Surfaces</td>
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<td>7 DOEs for 2nd-order Response Surface</td>
<td>7-8</td>
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<tr>
<td>8 (time permitting) SPC and/or Mixture Experiments and/or Split-plot Experiments and/or Robust Parameter Design</td>
<td>TBA</td>
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Software
The JMP software package will be used in this course. Though it is likely new for most or all of you, 1) It is cutting edge software likely to be encountered in industry, particularly for DOE and RSM; 2) It is point-and-click and thus relatively easy to learn; 3) It is free for download to Miami students and
faculty (one year license), in both Windows and Mac. (Go to https://software.muohio.edu/store/, sign in, locate and click the SAS Software link on the left, and follow the links/directions for JMP. You should be able to “buy” and download it for $0.00.)

**Homework**

Homework problems will be regularly assigned and collected. I encourage you to work together, but the work you turn in must be your own. Homework assignments should be turned in at the beginning of class on the day they are due, unless otherwise specified. Late homework will not be accepted. An exception to this policy will be considered for legitimate circumstances that are presented to me (via e-mail or in person) before the due date.

**Exams**

There will be one midterm exam; it may be out-of-class to allow more time, but will be closed-book. The final exam will have an in-class and take-home portion. For each sitting exam you may bring one two-sided sheet of notes and a calculator. If extenuating circumstances require you to miss an exam, let me know at least a week in advance.

**Project**

In teams of two or three, you will do a project that will be specified in October. It will allow you to use the techniques we learn to design and optimize a “process”. This project will involve competition.

**Grading**

Your final grade will be comprised of the following elements:

- 25% Homework
- 15% Project
- 20% Midterm
- 20% In-class Final
- 20% Take-home Final

**Important Dates**

- No Classes: Labor Day (Monday, September 5); Fall Mid-Term Break (October 14-16); Thanksgiving (November 23-27);
- Academic Deadlines: September 12 is the last day to drop without a grade; October 28 is the last day to withdraw from the course with ‘W’ and also the last day to change to/from an audit;
- Final Exam: Tuesday, December 13 from 8:00am-10:00am in UPH 339.

**Academic Integrity**

All Miami University policies concerning academic integrity apply to this course. See www.muohio.edu/integrity/index.cfm for details. For this course, the most relevant areas are 1) Turning in your own work for the homework assignments; and 2) Taking exams with no outside assistance.

**Disabilities, Diversity, and Discrimination**

If you have a disability, please see me and I will be glad to make any necessary accommodations. For more information, see the Office of Disability Resources (www.units.muohio.edu/oeeo/odr/) and/or Learning Disability Services (www.units.muohio.edu/saf/lrn/RLC1LD.html). Respecting each person in the class is important. Please see www.miami.muohio.edu/documents_and_policies/diversity_statement/ and www.miami.muohio.edu/documents_and_policies/nondiscrimination.cfm.