SYLLABUS: HCS 5887
INTRODUCTION TO EXPERIMENTAL DESIGN
AUTUMN 2019

Course overview

Instructor
Instructor: Dr. David Barker
Email address: barker.169@osu.edu
Phone number: 614-247-6258
Office hours: By Arrangement

Course description

Introduction to experimental design, including selection and layout of plots, data analysis software, and data interpretation.

Course learning outcomes

Learning goal: Understand effective research techniques, focusing on correct experimental design, including i) selection and arrangement of experimental units, ii) data analysis, and iii) interpretation of software output

Learning Outcomes

1.1 Be able to conduct basic statistical calculations
1.2 Be familiar with methods for making simple comparisons (between 2 treatments)
1.3 Be familiar with methods for complex treatment comparisons (more than 2 treatments)
1.4 Be able to write and interpret model statements in ANOVA
1.5 Be able to conduct analyses with ‘messy’ data, including missing data, subsamples, covariates, and unequal replication
1.6 Be familiar with the assumptions of ANOVA and methods for testing these assumptions.
1.7 Be competent in simple programming with R & SAS.
Course materials

Required

Course technology

Baseline technical skills necessary for online courses
- Basic computer and web-browsing skills
- Navigating Carmen

Necessary equipment
- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Necessary software
- Microsoft Word, PowerPoint, Excel.
- Adobe Reader or equivalent
- SAS can be found here: Office of the Chief Information Officer – The Ohio State University

*both SAS and R are not critical for this course. You’ll be able to complete all assignments using either program. Although you might conduct your research with only program, this class will be your best opportunity to compare these programs; you’ll likely encounter these in your future careers.

Mac users may need to download Parallels for Mac to run SAS, since it is only compatible with Windows.
Grading and faculty response

Grades

<table>
<thead>
<tr>
<th>Assignment or category</th>
<th>Points (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Closed Book Quizzes</td>
<td>35%</td>
</tr>
<tr>
<td>Worksheets, Exercises</td>
<td>65%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

See course schedule, below, for due dates

Late assignments

Recitation Assignments are due within two weeks of the week they are assigned. There are no due date/times but normally recitations can be completed within two – three hours. It’s best to stay on schedule according to the Weekly Modules on Carmen, so you don’t fall behind. You will be unable to continue to the next module until all objectives for the week prior are completed. For example, if a lecture video, recitation worksheet, and quiz are required that week. You must complete all of them before you can move on.

Grading scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70 –72.9: C-
67 –69.9: D+
60 –66.9: D
Below 60: E

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem with Carmen.)
Grading and feedback
For weekly recitations, you can generally expect feedback within 7 days.

E-mail
I will reply to e-mails within 24 hours on school days.

Discussion board
I will check and reply to messages in the discussion boards every 24 hours on school days.

Attendance, participation, and discussions

Student participation requirements
Because this is a distance-education course, your attendance is based on your online activity and participation. The following is a summary of everyone’s expected participation:

- **Logging in: AT LEAST ONCE PER WEEK**
  Be sure you are logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal online course activity. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me as soon as possible.

Other course policies

Academic integrity policy
The Ohio State University’s *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s *Code of Student Conduct* is never considered an “excuse” for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University’s *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.
If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (COAM Home)
- Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)
- Eight Cardinal Rules of Academic Integrity (www.northwestern.edu/uacc/8cards.htm)

**Accommodations for accessibility**

**Requesting accommodations**

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential.

In addition to contacting the instructor, please contact the Office for Disability Services at 614-292-3307 or ods@osu.edu to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University.

Go to http://ods.osu.edu for more information.

**Accessibility of course technology**

This online course requires use of Carmen/Canvas (Ohio State's learning management system) and other online communication and multimedia tools.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Readings, Assignments, Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction &amp; Basic Statistical Calculations</td>
<td>Worksheet 1, Chapters 2, 3</td>
</tr>
<tr>
<td>2</td>
<td>Normal distribution and Hypothesis tests</td>
<td>Chapters 4 &amp; 5, Worksheet 2</td>
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<td>3</td>
<td>Comparing 2 Sample Means</td>
<td>Chapter 6, Worksheet 3</td>
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<tr>
<td>4</td>
<td>Experiments with &gt;2 Treatments</td>
<td>Chapter 9, Quiz 1, Worksheet 4</td>
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<tr>
<td>5</td>
<td>CRD &amp; Experimental Units and Subsamples</td>
<td>Chapter 9, Worksheet 5</td>
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<tr>
<td>6</td>
<td>The Randomized Block Design</td>
<td>Chapter 10, Worksheet 6, Quiz 2</td>
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<tr>
<td>7</td>
<td>RCBD with Subsamples &amp; Missing Data</td>
<td>Chapter 10, Worksheet 7</td>
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<tr>
<td>8</td>
<td>Analysis of Means</td>
<td>Chapter 6, Worksheet 8</td>
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<td>9</td>
<td>Regression</td>
<td>Chapter 7, Worksheet 9, Quiz 3</td>
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<tr>
<td>10</td>
<td>Additional Features for</td>
<td>Chapter 7, Worksheet 10</td>
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<td>11</td>
<td>Assumptions of ANOVA</td>
<td>Chapter 9, Worksheet 11, Quiz 4</td>
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<td>12</td>
<td>Transformations</td>
<td>Worksheet 12</td>
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<td>13</td>
<td>Covariance</td>
<td>Chapter 17, Worksheet 13, Quiz 5</td>
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<tr>
<td>14</td>
<td>Reporting Statistical Information &amp; More Statistics</td>
<td>Worksheet 14</td>
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