Course Instructor: Anya Umlauf, M.S. aumlauf@ucsd.edu

Course Objective: The objective of this course is to introduce the students to statistical methods for analyzing longitudinal, clustered, and repeated measures data; to build proficiency using SPSS for such analyses; and to equip the students with knowledge, experience, and resources to do these types of analyses in their own research.

Prerequisites: CREST/MAS Biostatistics I or Instructor’s permission

Reading Materials: Lecture notes (posted weekly on TritonEd)

Useful Resources:


Statistical software: IBM SPSS version 24 (free): UCSD has a university-wide SPSS license. Download from course’s page on TritonEd (see SPSS Download).

Course Materials: Course materials will be posted on its web page on Lessons folder contains lectures and SPSS data files (in Datasets). Assignments and final project materials will be posted in the Assignments folder.

Homework: Weekly homework assignments will be posted on TritonEd and will be due at the beginning of the class period on each due date. To receive full credit, students must answer all questions and show all relevant work (hand calculations or software output). Completed assignments must be submitted through TritonEd in PDF format. Late homework will not be accepted.

Groups: The students may work in groups of 2 or 3 (at most!) for homework and the final project, and can submit one assignment per group with the names of all group’s members listed on the submitted document. All groups must be formed by homework 3, no changes will be allowed afterward. Working in groups is encouraged but not required.

Final Exam: There will be no final exam.
**Grading:** The course grade will be based on the following

1. Homework (including final project updates): 50%
2. Final project:
   - 20% In-class presentation
   - 30% Final manuscript

**Final Project:**

1. The final project will involve an analysis of a study with clustered, longitudinal, or repeated measures data, preferably from the students own research.
2. The final product will be in the form of a paper and a 5-10 minute presentation, to take place on the last day of class, and additional analysis materials.
3. The level of the presentation will be similar to that of a scientific meeting, with a larger emphasis on the statistical analysis.
4. The paper will have a similar structure to a scientific publication (abstract, introduction, methods, statistical analysis, results, discussion, references, tables and figures). Submission to a scientific journal is encouraged.
5. Timeline:
   - Hw3: a 1-2 page project proposal is due
   - Hw7: preliminary analysis is due (written only, no in-class presentation)
   - Final week: final project is due
6. Every student has to be present for the entirety of the final session.
7. For assignment details, see Final Project document in the Assignments folder on TritonEd.

**Attendance:** Per general CREST attendance policy, no more than 3 missed sessions are allowed. You have to be present in both halves of the class.

**Academic Integrity:** Cheating, plagiarism, and academic dishonesty will be taken seriously and reported to the CREST/MAS program administrators. Passing someone else’s work as one’s own, including printouts from a software and answers to assignment questions, is considered cheating. Sanctions may range from a reduced grade (including 0%) to the failure of the course. **Starting in 2017, all students must complete a tutorial on academic integrity (here: [https://moodle.ucsd.edu/course/view.php?id=16](https://moodle.ucsd.edu/course/view.php?id=16)).** For more information, see a detailed post on the course’s Announcements page on TritonEd.

**Time Considerations:** Students should expect to spend 4–6 hours a week outside of class on studying (including time spent on homework). Individual times may vary.

**Students with Disabilities:** The instructor, in conjunction with the University of California, San Diego, is committed to upholding and maintaining all aspects of the Federal Americans with Disabilities Act of 1990 (AD) and Section 504 of the Rehabilitation Act of 1973. If you are a student with a disability and wish to request accommodations, please contact the Extension office and they will provide you with information and/or a referral to Student Disability Services. Any
information regarding your disability will remain confidential. Because many accommodations require early planning, requests for accommodations should be made as early as possible. Any requests for accommodations will be reviewed in a timely manner to determine their appropriateness to this setting.

Class schedule (subject to change):

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignments due</th>
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<tbody>
<tr>
<td>Jan 13</td>
<td>L1: Regression data analysis overview</td>
<td>Read syllabus and install SPSS</td>
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<tr>
<td>Jan 20</td>
<td>L2: Introduction to repeated measures analysis</td>
<td>Hmk 1 due</td>
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<tr>
<td>Jan 27</td>
<td>L3: Repeated measures ANOVA</td>
<td>Hmk 2 due</td>
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<tr>
<td>Feb 3</td>
<td>L4: Linear mixed effects model Part 1</td>
<td>Hmk 3 - <em>Project proposal</em> due</td>
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<tr>
<td>Feb 10</td>
<td>L5: Linear mixed effects model Part 2</td>
<td>Hmk 4 due</td>
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<tr>
<td>Feb 17</td>
<td>L6: Generalized estimating equations (GEE)</td>
<td>Hmk 5 due</td>
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<tr>
<td>Feb 24</td>
<td>L7: Mixed effects logistic regression</td>
<td>Hmk 6 due</td>
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<tr>
<td>Mar 3</td>
<td>L8: GEE logistic regression</td>
<td>Hmk 7 - <em>Preliminary analysis</em> due</td>
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<tr>
<td>Mar 10</td>
<td>L9: Missing data in longitudinal studies</td>
<td>Hmk 8 due</td>
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<tr>
<td>Mar 17</td>
<td>L10: Additional topics</td>
<td>Hmk 9 due</td>
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<tr>
<td>Mar 24</td>
<td><em>Final project presentation</em></td>
<td><em>Final Project</em> due</td>
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Useful online resources:

UCSD has a university-wide SPSS license. UCSD employees and students can register and obtain further information at [http://acms.ucsd.edu/services/software/available-software/SPSS.html#SPSS](http://acms.ucsd.edu/services/software/available-software/SPSS.html#SPSS).


UCLA provides useful information on many statistical methods for multiple software, including SPSS: [http://www.ats.ucla.edu/stat/spss/](http://www.ats.ucla.edu/stat/spss/)

A collection of links to useful sites, such as on-line statistical calculators and tools, can be found here: [http://statpages.org](http://statpages.org).

**Acknowledgments:** This course was originally designed and taught by Dr. Florin Vaida. Lecture and course contents were developed from his original materials.