Instructor: Steve Lange  
Office: MacAllister 208  
Phone: 262-951-3179

Office Hours: Monday, Wednesday 9:00 am – 11:00 am; Friday 10:00 am – 11:00 am
Or by appointment

E-Mail: slange@carrollu.edu

**Email is the best means of contact. Please allow one business day for responses.**

Prerequisites: Computational Thinking I (CMP 112)


Grading: 3 Journal Reviews (20%), Homework average (40%), 1 Midterm exam (20%), Final exam (20%)

Final Exam: Monday, May 8 – 11:00 am

Grade Scale: 

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<tr>
<th>Grade</th>
<th>A</th>
<th>AB</th>
<th>B</th>
<th>BC</th>
<th>C</th>
<th>D</th>
<th>F</th>
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Course Topics:

Computational science is a hybrid of analyses and tools that utilize techniques in data analysis, algorithmic design, and mathematical modeling. This course will emphasize analyses relevant to disciplines that depend on the crunching of data, while continuing to develop complementary thinking skills essential to doing modern science. To this end, the course will focus on techniques commonly used in the behavioral, biological, environmental and health sciences. The computer programming language Python will also be used as a way to achieve this goal.

Course Objectives:

At the end of this course, students should be able to do the following.

1. CMP 112 material including:
   a. Descriptive Statistics
   b. Z- and t-Tests
   c. 2-Sample t-Test
   d. Linear Regression and Correlation

2. Apply ANOVA in the following cases:
   a. 1-Way ANOVA
   b. Two-Factor ANOVA

3. Non-Parametric Statistics such as:
   a. Mann-Whitney U
   b. Wilcoxon Rank Test
   c. Kruskal-Wallis Test
4. Goodness of Fit and Test for Independence

5. Contingency Tables

6. Have a qualitative understanding of the mathematics models utilized in the above

7. Have a general understanding of Experimental Designs relevant to the above

8. In their respective cases, use Python, Excel or SPSS to execute the above

Course Policies:

**Academic Integrity:** All work on assignments, quizzes and tests is expected to be your own and represent your ability in course content. The Carroll University Academic Integrity Policy is located in your student handbook. Please familiarize yourself with this policy. If a student violates this policy in any way, the instructor or College reserves the right to impose a sanction of failure on the assignments/assessment or failure in the course.

**Attendance:** It is expected that you attend every lecture. You will be accountable for all material covered with no exceptions.

**Journal Reviews:** Over the course of the term, students will be required to read 3 articles that include statistical analysis of experiments in their field of study. They will include summaries of the experimental design, the statistics used to analyze the data, and the results of the experiment.

**Homework:** Assignments are an aid to learning the material. You are allowed to work on them in groups, using any-and-all resources at your disposal. They are due at the START of class; this means completed, printed and stapled prior to the class start time. If you are printing at the class start time, your work is considered late. Should an unfortunate situation arise, contact the instructor prior to the due date/time for possible consideration of other arrangements. Some of the homework may involve in-class exercises. To earn a good grade for these, you will need to 1) Attend class, 2) Participate fully in the exercises, and 3) Ask questions as needed.

Late work will not be accepted without prior arrangements or a valid medical excuse.

**Tests:** There will be one midterm exam and a final exam. Due to the nature of mathematics, each test should be considered cumulative. All tests will be open book/notes.

**Accommodation for Disabilities:** If you need accommodations for a documented disability, or are considering obtaining documentation, you should make an appointment with Martha Bledsoe, our disabilities coordinator, no later than the first week of class. She can be reached by calling 524-7335 or contacting her via e-mail at mbledsoe@carrollu.edu. It is your responsibility to get any paperwork turned in to me as soon as possible so that I am able to make the required accommodations.

**Carroll Portal (eLearning):** This class will use the Carroll Portal for various purposes. Homework assignments will be posted there; so will any handouts/resources you will need. Your grades will be posted there when available.

*The instructor and the University reserve the right to modify, amend, or change the syllabus, course requirements, grading policy, etc., as needed. Students will be notified of any changes during the lecture periods.*