Instructor: Professor Mary C. Christman 352-392-3724  
406, McCarty Hall C mcxman@ufl.edu

Instructor Office Hours: Tues 3:00 to 4:00 pm or by appointment

Teaching Assistant: Nabanita Mukherjee nmukher@stat.ufl.edu
428, McCarty Hall C

Teaching Assistant Office Hours: TBA

Course Objective: To train graduate students in life sciences in statistical concepts and methodology for planning experiments and analyzing data

Required Texts and Course materials:  
2) Course Notes for STA 6166, available as downloadable pdf files from the class website

Optional Lab: STA 5106, section 6881 (T, periods 10-11), 8595 (W, periods 2-3), or 9091 (F, periods 3-4), is a 1cr. computer class in statistical data analysis using SAS. It is highly recommended that you register for one of the sections since NO statistical software will be taught in STA 6166.

Web Site: http://www.stat.ufl.edu/CourseINFO.htm; click on “STA 6166, Section 8489”

Grading: Homework 25%  
Exams (3) 25%

Exam Dates:  
(I) 2 – 2:45 pm Tuesday September 18
(II) 2 – 2:45 pm Thursday October 25  
(Final) 10 am – noon on Thursday, 13 December

Policies and Additional Information:

1. Please do not be late for class nor leave early. This class is large and people entering and leaving during lectures is disruptive.

2. Please turn off all electronic devices prior to class starting. No email, phone calls, text messaging, or IM is permitted during class.

3. Office Hours. Office hours are listed above. Help outside these times are by appointment only. Call or email to schedule an appointment.

4. Occasionally, additional materials or other notes (interesting websites, pointers to recent interesting articles, etc.) will be placed on the class web site. Check often to ensure you are not missing anything important!
5. The **class Email account** will be used occasionally to answer questions or possibly to send out additional information to everyone. Be sure your campus email address is current in the system because we will be using the listserv created by ISIS.

6. There will be **3 exams**, two regular exams plus a cumulative final.
   a. We will not be available to answer **questions on exam materials** for the 24 hrs before an exam so make sure you have any questions answered before that.
   b. Students will be allowed a single 8.5x11” sheet for equations and notes.
   c. You may NOT share information or calculators with other students during the exam. You may not use a computer unless explicitly allowed. I encourage you to ask the proctors any questions regarding clarification or interpretation of exam questions but please do not ask us about your answer.
   d. Answers to the exams and homework will be provided as quickly as possible after the event and will be posted to the website.

7. **Missed Exams.** If you must miss an exam for an acceptable reason, let me know **as soon as possible before** the scheduled exam. It is unlikely a make-up exam will be offered unless the student was ill or had an acceptable conflicting event. Acceptable conflicting events are field work for research or presentations at meetings. No other conflicts will be accepted. Please do not ask for a change in date due to reunions, weddings, parties, etc. The request will definitely NOT be granted! This includes final exams and planning to go home after the semester. I will not honor your request to leave early.

8. Late **homework** will not be accepted and will be recorded as a 0 grade. If you are going to miss a class or have a scheduling conflict, return the assignment before the due date! It is the responsibility of the student to work all of the assigned homework problems **independently** (which means by yourself, on your own). The experience gained from doing these problems is invaluable and necessary for the understanding of the material we shall be covering. Please note that obtaining help from fellow students or others on a homework assignment is considered cheating by the University and will not be allowed unless explicitly stated.

9. Please do not ask us to alter your grade on an exam or homework unless we made a calculation mistake (added the total wrong, or took points off a correct answer, etc). If you think this is what happened then you should provide the exam and a **written** explanation of the reason you believe we made a mistake to me **within 24 hours** of the return of the exam. No verbal explanations will be accepted.

10. We do not give extra credit, so please do not ask. Plan ahead and study so that it does not become an issue.

11. A tentative schedule and reading list are provided. It is recommended that you do the reading ahead; you will get much more out of the lectures if you do. **Please plan on bringing your course notes to every class.**

**University Policies:**

**Academic Dishonesty:** All members of the University Community share the responsibility to challenge and make known acts of apparent academic dishonesty. Acts of academic dishonesty will not be tolerated and will be referred to the Student Honor Council. Information regarding University policies about academic
dishonesty and the University’s honor code may be found at:
http://www.dso.ufl.edu/judicial/procedures/academicguide.html

Academic accommodations: If you have a documented disability and wish to discuss academic accommodations with me, please contact me as soon as possible. Information on Disability Resources can be found at http://www.dso.ufl.edu/drp/services/

Recommendations for Alternative Resources

Any good introductory text in Applied Statistics should be useful. Examples include:


Additional resources include many websites with material from other professors’ lecture notes. Use Google Scholar to find these.

Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>23 Aug</td>
<td>Introduction (Populations, Samples, Sampling)</td>
</tr>
<tr>
<td>28 Aug</td>
<td>Ch. 1 – Summarizing data</td>
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<tr>
<td>4 Sep</td>
<td>Ch. 2 – Introduction to Probability</td>
</tr>
<tr>
<td>11 Sep</td>
<td>Ch. 3 – Concepts of Inferential Statistics</td>
</tr>
<tr>
<td>18 Sep</td>
<td><strong>Exam I is Tuesday 18 Sep</strong></td>
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<tr>
<td>25 Sep</td>
<td>Ch 4 – Univariate, Single Population Part I</td>
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<tr>
<td>16 Oct</td>
<td>Ch 12 – Univariate, Single Population Part II</td>
</tr>
<tr>
<td>23 Oct</td>
<td><strong>Exam II is Thursday 25 Oct, Period 7</strong></td>
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<tr>
<td>6 Nov</td>
<td>Ch. 12 – Bi- or Multivariate Populations Part I</td>
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<tr>
<td>13 Nov</td>
<td>Ch. 5, 6, &amp; 7 – Bi- or Multivariate Populations Part II</td>
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<tr>
<td>20 Nov</td>
<td><strong>Holiday on 22 Nov, no class</strong></td>
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<tr>
<td>13 Dec</td>
<td>continue Ch. 5, 6, &amp; 7 – Bi- or Multivariate Populations Part II</td>
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<td><strong>Exam III is Thursday 13 Dec (13B) at 10am - noon</strong></td>
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Material Covered

1. Introduction
2. Sampling to collect data
3. Summarizing data
   a. Shape, Center, Spread
4. Introduction to Probability
   a. Probability as relative frequency
   b. Axioms of probability using Normal distribution
   c. Other probability distributions
5. Concepts of Inferential Statistics
   a. Populations and samples
b. Descriptions
   i. point estimation of population parameters
   ii. confidence interval estimation of population parameters

c. Hypothesis testing
   i. Description of testing approaches
   ii. shape
      1. continuous (e.g. Shapiro-Wilk)
      2. categorical (e.g. chi-square)
   iii. for continuous or discrete data
      1. center (e.g. T-test)
      2. spread (e.g. Chi-square)

d. study of relationships
   i. means vary among categories or different populations
   ii. means varies continuously as a function of explanatory variables

6. Univariate, Single Population Part I
   a. Continuous or discrete variables
      i. Sampling From the Population
         1. Checking the Population Probability Distribution
            a. Visual plot (histogram, normal prob plot)
            b. Testing the shape (Shapiro-Wilk)
         2. Point Estimation of population parameters
      ii. Sampling Distributions
         1. Normal for mean + CLT
         2. Chi-square for variance
      iii. Single Population Inferences About Mean
         1. Confidence Interval Estimation
         2. Hypothesis Test
            a. Using the CI
            b. T-test
         3. checking assumptions
      iv. Single Population Inferences About Variance
         1. Confidence Interval Estimation
         2. Hypothesis Test
            a. Using the CI
            b. Chi-square test

7. Univariate, Single Population Part II
   a. Categorical Variables
      i. Bernoulli Population
         1. Population Parameters
            a. Proportion or probability of success
         2. Sampling From the Population
            a. Binomial Rules
         3. Sampling Distribution of the sample mean
            a. Binomial distribution of the sum
            b. Normal distribution of the mean by CLT
         4. Inferences About Population Proportion
            a. Confidence Interval Estimation
            b. Hypothesis Test
i. Using the CI
ii. T-test

ii. Population with more than two categories
   1. Population Parameters
      a. Proportions for k categories
   2. Sampling From the Population
      a. Multinomial Rules
   3. Sampling Distribution
      a. Multinomial distribution of the sums in each category
      b. Binomial distribution when reduced to 2 categories
   4. Inferences About Population Proportions
      a. Confidence Interval Estimation
      b. Hypothesis Test
         i. Chi-square test against expected proportions

8. Bi- or Multi-variate Populations Part I
   a. Categorical Variables
      i. Two or more populations with 2 or more categories
         1. RxC contingency tables
            a. chi-square test
            b. alternatives

9. Bi- or Multi-variate Populations Part II
   a. Continuous variables
      i. Inferences about Means for two or more populations (Model: Yij=mu + e_ij)
         1. Confidence Interval Estimation
         2. Hypothesis Test for two means
            a. Using the CI
            b. T-test for two independent samples
            c. Paired T-test for two dependent samples
         3. ANOVA for more than two means
            a. ANOVA table
            b. Pairwise Testing of Means
               i. Multiple comparisons
            c. Diagnostics and Remedial Measures
         4. Linear regression for more than 2 values of an explanatory variable
            a. Model describing how means are related to each other
            b. ANOVA table
            c. Testing coefficients
               i. T-tests
            d. Diagnostics and remedial measures
      ii. Inferences about Variances for two or more populations
          1. Confidence Interval Estimation
          2. Hypothesis Tests for two variances
             a. Chi-square test
          3. Hypothesis Test for more than two variances
             a. Levene Med test
      b. Discrete Variables
         i. Transformations for normality
ii. Models which explicitly use the count distribution