I. Course Number and Title
Biostatistics I
Credit: 3 Credit Hours
Course Number: OCOR 5603 (DE1)
Days: 7 January - 25 March
Time: Sunday Evening 6:00 - 7:00 PM

II. Instructor
Patrick C. Hardigan, Ph.D.
Phone: 954-262-1524
E-Mail: patrick@nova.edu
Office: Room 1522B Terry Building
Office Hours: WebCT or by Appointment

III. Course Description
This is an introductory statistical course for marine biology/oceanographic science majors. The course will introduce elementary methods for presenting biological data in summary form, analyzing biological data, and designing experiments. It is not a mathematics course and so will not stress derivations of formulae but, rather, will emphasize the application of statistical ideas and methods to the analysis and interpretation of biological experiments and comparative data. The student will be able to assess a situation involving data analysis, state the null and alternative hypotheses proposed, decide on the correct statistical procedure to test the null hypothesis and the assumptions of the test used, calculate the statistic, assess its statistical significance, and interpret the data in light of the calculated result.

IV. Learning Outcomes
At the completion of the course, students will be able to:

- Describe critical aspects of data such as scales of measurement and whether variables are discrete or continuous.
- Calculate summary statistics.
- Create appropriate graphs, charts, maps, and tables to represent data.
- Calculate common probability distributions and apply those calculations to solve problems based on biological studies.
Randomly allocate experimental units to treatments and apply this technique to solve problems based on biological studies.

Calculate the distribution of observations about the mean based on the assumption of normality and apply those calculations to solve problems based on biological data.

Calculate the distribution of sample means about the mean and apply those calculations to solve problems based on biological data.

Compare one and two means (from paired and unpaired data) using both parametric and non-parametric methods and use those methods to test hypotheses.

Analyze categorical data to test both goodness-of-fit and contingency hypotheses.

Compare more than two means using analysis of variance methods and use those methods to test hypotheses derived from both single-factor and two-factor experimental designs.

Calculate least-squares regression lines and apply those calculations to solve problems based on biological studies.

Determine the appropriateness of various statistical tests and procedures for analyzing different types of biological data.

VI. Instructional Approach
Elluminate sessions (e-sessions) will consist of a mix of lecture, discussion, and in-class tasks for discovery of JMP. You should be sure to always check for new lecture notes on the course website before class begins.

VII. Attendance
Attendance is mandatory. If you miss an e-session YOU are responsible for the material.

VIII. Academic Dishonesty
In order to ensure the highest standards of academic honesty and ethical behavior, the NSU policies on cheating and plagiarism will be strictly enforced. I am empowered by NSU policy to penalize a student suspected of academic dishonesty, plagiarism, or otherwise misrepresenting work and I will do so and report that student to the Dean of the OC. Nova Southeastern University has contracted with turnitin.com to provide plagiarism detection services, and I will submit any suspicious documents to this service.

IX. Keys To Success
In order to maximize your performance in this course, I suggest that you attend every lecture, pay close attention, take good notes, and participate in the discussion. Later, rewrite your class notes in order to ensure that you understand everything. Do not hesitate to come to me with questions or concerns about past lecture material.

It is generally a good idea to read the appropriate chapters in the textbooks prior to the lecture. This will facilitate your comprehension and organization of the lecture material.
When rewriting your lectures, refer again to the textbook to check the correct spelling of terms, the logical sequence of events, and/or difficult concepts.

For some of you, studying together in groups will be a very productive approach. Talking about the material, quizzing each other about the material, and sharing time exploring the material builds your interest and comprehension, and makes learning fun.

X. **What you Can Expect Of Me**

You can expect that I will arrive on time for lectures and be well prepared. You can expect that I will be clear about my expectations and the criteria I use in assigning grades and that I will be fair and equitable. I will treat everyone in the class with consideration and respect.

XI. **What I Expect of You**

I expect you to come to class, arrive on time, and be prepared for lecture and lab. I expect you to stay awake, take notes, participate in discussions and ask questions. I expect you to turn in your assignments on time and in good condition.

XII. **UNIVERSITY-WIDE POLICY STATEMENTS**

A. **Academic Misconduct:** Academic misconduct appears in a variety of forms (including plagiarism). It is a violation of NSU academic policy and may be punished in a variety of ways, from failing the assignment and/or the entire course to academic probation, suspension or expulsion. If you have questions about what constitutes academic misconduct before handing in an assignment, see your instructor or the NSU Student Handbook at [http://www.nova.edu/cwis/studentaffairs/forms/ustudenthandbook.pdf](http://www.nova.edu/cwis/studentaffairs/forms/ustudenthandbook.pdf).

B. **ADA Policy:** Nova Southeastern University provides accommodations for students with documented disabilities. If you have a disability for which you believe you require accommodation, please contact Academic Services ([http://www.nova.edu/disabilityservices/](http://www.nova.edu/disabilityservices/), 954-262-7189).

C. **Last Day to Withdraw:** It is your responsibility to formally withdraw from this course by completing the appropriate forms before the fourth week of the quarter in order to receive a partial refund. A request for tuition refund must be made in writing at the time of withdrawal. Refunds will be made solely at the option of the university and will be based on the legitimacy of the reason for withdrawal. I will **NOT** backdate paperwork so that you can avoid earning a grade lower than you like.

D. **Email Policy:** All email communications between students and faculty must be conducted via NSU email accounts or WebCT ([http://www.nova.edu/common-lib/policies/emailcomm.policy.html](http://www.nova.edu/common-lib/policies/emailcomm.policy.html)). Emails sent to faculty from non-NSU accounts will be returned to the sender with instructions to resend the communication from your NSU account. To set up an NSU email account or to get help with an existing account, go to [https://www.nova.edu/sbin/account_request](https://www.nova.edu/sbin/account_request). Also, the computer help desk is available to assist you with questions regarding your NSU email account. It can be reached at 954-262-HELP (4357).

Winter 2014

Patrick C. Hardigan, Ph.D.
E. **Student Course Evaluations**: Student comment and feedback evaluating each college class is an important tool to evaluate program effectiveness. Participation in this process is a responsibility of each student.

XIII. **Required Course Text**
- I will also provide supplemental readings related to R and data analysis

XIV. **Required Course Statistical Package**
- R (free). http://www.r-project.org/
- R Studio (free). http://www.rstudio.com/
- Also available in computer lab

XV. **Course Requirements**
- Four problem sets are assigned throughout the course. They are intended to serve as practice for topics covered in class. The problem sets will involve the use of JMP. Problem sets are due on the date listed in the course syllabus. Students will submit their work using **MS Word, Apple Pages or PDF formats using WebCT's assignment dropbox**. I will not accept submissions in other formats. Answers must be typed, double-spaced, using correct grammar and punctuation, including all relevant charts and graphs. Assignments submitted after the due date will receive a zero.
- A final-term exam is assigned during week 11. The final exam is a cumulative exam. This is a timed exam.
- Seven Eluminate (E) sessions are offered. The E sessions are held on the day indicated in the course outline. All e-session are **MANDATORY**. If you cannot attend you must contact me before the E session. Failure to do so will result in a reduced grade.
- An Assignment Discussion Board will be offered throughout the course. Students are strongly encouraged to post questions and provide answers to the posting. All postings will involve the graded assignments. You are NOT required to participate with the Assignment Discussion Board.

XVI. **Grading Mechanism**
Your grade is the weighted harmonic mean of your assignments:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Sets</td>
<td>60%</td>
</tr>
<tr>
<td>Final Exam - timed exam</td>
<td>40%</td>
</tr>
</tbody>
</table>
# Course Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Wheater Readings</th>
<th>Assignments</th>
<th>E Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 6, 2014</td>
<td>Chapter 1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Jan 13, 2014</td>
<td>Chapter 1-2</td>
<td></td>
<td>January 13 6-7 PM EST</td>
</tr>
<tr>
<td>3</td>
<td>Jan 20, 2014</td>
<td>Chapter 1-3</td>
<td></td>
<td>January 20 6-7 PM EST</td>
</tr>
<tr>
<td>4</td>
<td>Jan 27, 2014</td>
<td>Chapter 3-4</td>
<td>Problem Set 1 due</td>
<td>January 27 6-7 PM EST</td>
</tr>
<tr>
<td>5</td>
<td>Feb 3, 2014</td>
<td>Chapter 3-4</td>
<td></td>
<td>February 3 6-7 PM EST</td>
</tr>
<tr>
<td>6</td>
<td>Feb 10, 2014</td>
<td>Chapter 7</td>
<td>Problem Set 2 due</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Feb 17, 2014</td>
<td>Chapter 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Feb 24, 2014</td>
<td>Chapter 5</td>
<td>Problem Set 3 due</td>
<td>February 17 6-7 PM EST</td>
</tr>
<tr>
<td>9</td>
<td>Mar 3, 2014</td>
<td>Chapter 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mar 10, 2014</td>
<td>Chapter 6</td>
<td>Problem Set 4 due</td>
<td>March 3 6-7 PM EDT</td>
</tr>
<tr>
<td>11</td>
<td>Mar 17, 2014</td>
<td>Chapter 6</td>
<td></td>
<td>March 17 6-7 PM EDT</td>
</tr>
<tr>
<td>12</td>
<td>Mar 24, 2014</td>
<td></td>
<td>March 24, 2014</td>
<td>Final Exam 5-8 PM EDT</td>
</tr>
</tbody>
</table>