Intermediate Statistical Analysis I  
Biostatistics 611 – Fall 2013  
Syllabus (Subject to Revision)

1. Course Prefix and Number: BST 611
2. Course Title: Intermediate Statistical Analysis I
3. Instructors: Al Bartolucci, PhD  
   Professor Emeritus, Department of Biostatistics  
   Office: Ryals Room 343B  
   Phone: (205) 934-4906  
   Email: Albartol@uab.edu

   When: Tuesday/Thursday 09:30 – 10:45 AM
   Where: Ryals 407

   Dr. Bartolucci Office Hours: Usually by appointment . Drop ins welcome if I’m available.

   TA Information:  
   TBA

   TA Office Hours and Optional Computer Lab Sessions:  
   TBA

   Course Web-site: This course will utilize a password-protected course web site (Blackboard Learn) where the syllabus, course handouts, datasets, homework assignments, and other relevant course material can be downloaded by any student registered for the course. Address: HTTP://www.soph.uab.edu -> Blackboard, -> LOG IN TO BB LEARN. The course label is: BST 611-2B Inter Statistical Analysis I-Fa2013

4. Credit Hours: 3

5. Introduction: BST 611 is an intermediate-level course in basic analysis methods, intended to introduce students to the elementary concepts, statistical models and applications of probability, commonly used sampling distributions, parametric and nonparametric one and two sample tests, confidence intervals, and analysis of variance (ANOVA). Students are taught to conduct the relevant analyses using current software. There are no prerequisites for this course. This is a required course for most, if not all, the following degrees:
   - BST: MPH
   - ENH: All degrees except MSPH eTox or MSPH Clinical Research (BST 611 may be taken for ENH MPH degrees)
   - EPI: All degrees except PhD (BST 621 is required for PhD)
   - HB: MSPH and PhD (BST 611 may be taken for HB MPH degrees)
   - HCOP: MSPH Outcomes Research (BST 611 may be taken for HCOP degrees)
   - MCH: BST 611 may be taken for MCH degrees

   Course Prerequisites: This course is the first course in the basic applied statistical methods sequence for the first year graduate students in Biostatistics. There are no prerequisites and does not assume any prior statistical knowledge. However, basic algebraic skills will be needed for some calculations.

6. Description: This course with utilize current statistical techniques to assess and analyze public health related data. In addition, students will learn to read and critique the use of such techniques in published research. Students will also determine what analytical approaches are appropriate under different research scenarios. The course is lecture based with optional help sessions and computer lab software demonstrations. Students will be expected to interact with one another and the instructor during lectures – class participation is encouraged.
## 7. Course Objectives and Competencies:

<table>
<thead>
<tr>
<th>BST 611 Learning Objectives</th>
<th>Competencies</th>
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<tbody>
<tr>
<td>1. Describe the roles biostatistics serves in the discipline of public health including applications in other areas of public health and the health sciences</td>
<td>MPH 1</td>
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<tr>
<td>2. Apply descriptive techniques commonly used to summarize public health data</td>
<td>MPH 2</td>
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<td>3. Utilize the logic and language of scientific methods in public health and other life science research</td>
<td>MPH 3</td>
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<td>4. Describe the basic concepts of probability, random variation and commonly used statistical probability distributions</td>
<td>BST 1, MPH 4</td>
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<td>5. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions</td>
<td>BST 2, MPH 5</td>
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<td>6. Describe the basic methods of measurement including reliability and validity</td>
<td>MPH 6</td>
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<tr>
<td>7. Apply common statistical methods for inference</td>
<td>BST 3, MPH 7</td>
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<td>8. Describe preferred methodological alternative to commonly used statistical methods when assumptions are not met</td>
<td>MPH 8, BST 4, ENH 18</td>
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<tr>
<td>9. Apply descriptive and inferential methodologies according to the type if study design for answering a particular research question</td>
<td>MPH 9, BST 5, ENH 18</td>
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<tr>
<td>10. Understand simple and multiple linear regression</td>
<td>MPH 10</td>
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<td>11. Interpret the results of statistical analysis found in public health studies</td>
<td>MPH 11, BST 6, ENH 18</td>
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<td>12. Understand issues of data collection, analysis and study management</td>
<td>BST 45, ENH 15, HB 14</td>
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<tr>
<td>13. <strong>Describe the statistical basis for computing epidemiological measures</strong></td>
<td>EPI 4</td>
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<tr>
<td>14. Describe approaches to the analysis of discrete and continuous data</td>
<td>EPI 35</td>
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<td>15. Display epidemiological data via tables, charts, and graphs, so that they can be easily understood</td>
<td>EPI 36</td>
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<tr>
<td>16. Manage datasets and select the appropriate approach to analyze data</td>
<td>EPI 39</td>
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<td>17. Critically evaluate published research</td>
<td>HCOP 50</td>
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<tr>
<td>18. Demonstrate knowledge and skills required to become an independent researcher</td>
<td>HB 20</td>
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</tbody>
</table>

### 8. Evaluation

All material submitted for grading must be typed, no output will be accepted unless specifically requested. Homework assignments must be passed in on schedule and will be evaluated for completeness. All home work assignments must be done on one side of a page (no two sided copies). All homework assignments for in class registrants must be turned in hard copy form by class time on the due date. No emailed (electronic) assignments will be accepted unless the TA has made that accommodation with you. Five points will be deducted from your final grade each day for late assignments, unless there are extenuating circumstances. There may be rare exceptions made to this policy on an individual basis, provided that this is worked out in advance with the instructor. They are due by 10:45 AM on the due date.

**Midterm:** 50%

**Final:** 50%

Both the midterm and final may have in-class and take home components. The final will be cumulative across all topics. The **midterm** is given as a one day exam in class on **Tuesday October 22, 2013**. You must be present on that day. The **final** is a one day exam given in class on **Tuesday December 3, 2013**. These days are firm. No alternative times are allowed and no make up exams will be given.

If you register for this course you are bound to adhere to all requirements.

Students are expected to appear in class on the UAB campus for in class exams during the times the exam is scheduled. **Homework not submitted on time will result in a deduction of at least 5 points per**
assignment from the final grade. The homework is graded and can help enhance your final grade if all assignments are completed. You must complete all the homework assignments on time.


10. Required Texts:


Software: Students may use any appropriate statistical package (except EXCEL) for assignments and exams. However, the course notes and computer lab sessions will be conducted in JMP. The instructor will not assist with other programs besides JMP and SAS. JMP software is available on all SOPH computers and may be purchased for individual use for $25 from SOPH MITS.

11. Other References: Various Published Research Papers and Articles may be provided throughout the semester.

12. Special Instructions: Attendance is not required. However, if a class is missed, the student is responsible for the material. Neither the instructors nor the TA will be responsible for lecture material missed. Pager, Beepers, and Cell Phones must be turned to vibrate or silent during lecture periods. No laptops are allowed in class. Students should only leave class for urgent reasons.

13. Course Schedule (Tentative—subject to revision):

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Syllabus and course introduction</td>
<td>D: Preface, Chapter 1</td>
</tr>
<tr>
<td>2</td>
<td>Introduction and Overview, Basic Concepts</td>
<td>D: Chapter 3</td>
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<tr>
<td>3</td>
<td>JMP Introduction Discussion</td>
<td>Hand out Homework 1</td>
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<tr>
<td>4</td>
<td>Descriptive Statistics &amp; Graphical Methods</td>
<td>Hand out Homework 1</td>
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<tr>
<td>5</td>
<td>Probability Concepts</td>
<td>Hand out Homework 1</td>
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<tr>
<td>6</td>
<td>Sampling Distributions, Discrete &amp; Continuous</td>
<td>Hand out Homework 1</td>
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<tr>
<td>7</td>
<td>Overview of Hypothesis Testing</td>
<td>Hand out Homework 1</td>
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<tr>
<td>8</td>
<td>Hypothesis Testing (continued)</td>
<td>Hand out Homework 1</td>
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<tr>
<td>9</td>
<td>Extending Hypothesis Testing, using p-values and confidence intervals</td>
<td>D: Section 7.5</td>
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<tr>
<td>10</td>
<td>Two proportions (continued)</td>
<td>D: Section 7.6</td>
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<tr>
<td>11</td>
<td>Comparing two proportions (continued)</td>
<td>D: Section 7.6</td>
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<tr>
<td>12</td>
<td>Analysis of Frequencies, Chi-Square</td>
<td>D: Section 7.6</td>
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<tr>
<td>13</td>
<td>Descriptive Statistics for Continuous Variables</td>
<td>D: Section 7.6</td>
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<tr>
<td>Page</td>
<td>Content</td>
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<tr>
<td>18</td>
<td>Estimation and Confidence Intervals</td>
<td>D: Chapter 6</td>
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<td>19</td>
<td>Hypothesis Testing: One Population</td>
<td>D: Section 7.1 &amp; 7.2</td>
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<td><strong>Homework 4 Due</strong></td>
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<td>20</td>
<td>Hypothesis Testing: One Population (Continued)</td>
<td>D: Section 7.3 &amp; 7.4</td>
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<td></td>
<td><strong>Midterm Exam (October)</strong></td>
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<tr>
<td>21</td>
<td>Hypothesis Testing: One Population (cont)</td>
<td>D: Section 7.9 &amp; 7.10</td>
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<td>22</td>
<td>Hypothesis Testing: Two Populations</td>
<td>D: Chapter 9</td>
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<td></td>
<td><strong>Midterm Exam Due</strong></td>
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<tr>
<td>23</td>
<td>Hypothesis Testing: Two Populations (cont)</td>
<td>D: Chapter 9</td>
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<td><strong>Hand out Homework 5</strong></td>
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<td>24</td>
<td>Power and Sample Size (Introduction)</td>
<td>D:</td>
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<td></td>
<td>Correlation &amp; Regression</td>
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<td>25</td>
<td>Other Topics in Correlation, Transformations, Curve Fitting</td>
<td>D: Chapter 8</td>
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<td><strong>Homework 5 Due</strong></td>
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<td>26</td>
<td>Comparing more than two means: ANOVA</td>
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<td></td>
<td><strong>Hand out Homework 6</strong></td>
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<tr>
<td>27</td>
<td>Comparing more than two means: ANOVA</td>
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<td></td>
<td>ANOVA: multiple comparisons</td>
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<tr>
<td>28</td>
<td>Further Discussion of ANOVA</td>
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<td></td>
<td><strong>Homework 6 Due</strong></td>
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<td></td>
<td><strong>Hand out Homework 7 – Optional</strong></td>
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<tr>
<td>29</td>
<td>(Approximate Thanksgiving Holiday)</td>
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<tr>
<td>30</td>
<td>Review, <strong>Home Final</strong></td>
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<td></td>
<td><strong>Homework 7 Due – Optional</strong></td>
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<td></td>
<td>Extended Office Hours, Time TBA</td>
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<td></td>
<td>Final due date on all outstanding homework and exams</td>
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<tr>
<td>31</td>
<td><strong>Final Exam</strong></td>
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</tbody>
</table>

14. **Accessibility:** Any student with a disability that may need accommodations in order to successfully complete all requirements of this course should visit the Office of Disability Support Services, located in Room 516 of the Hill University Center, extension 4-4205 or at dss@uab.edu. This office is responsible for registering students and ensuring the University’s compliance with Section 504 of the Rehabilitation Act and the American with Disabilities Act. Once registered, this office will then inform faculty members of all courses in which the student is enrolled of the student’s status and the specific nature of any accommodations required. Any student requiring such accommodation should discuss this with the course master and assure that the appropriate correspondence is sent from the Office of Disability Support Services.

15. **Honor Code:** As a student in the School of Public Health, you are subject to the SOPH Student Honor Code which can be found in its entirety at http://www.soph.uab.edu/about/mission/honorc code. You are responsible to understand the contents of the Honor Code and to abide by it. Academic dishonesty: Cheating includes but is not limited to the unauthorized use of notes, books or other sources of information; copying the work of another or allowing someone to copy the work of another student during a formal academic exercise (e.g. take home examination, homework assignment or written essay). Plagiarism is the undocumented use of other authors’ words, texts, images, and ideas that don’t come from your own head. Making up sources, altering numbers, statistics, or just a few words of a document is considered plagiarism. Poor documentation or paraphrasing of a source is also considered plagiarism. Unauthorized collaboration is working with others without the specific permission of the instructor on assignments that will be submitted for a grade. This rule applies to in-class or take-home tests, papers, labs, or homework assignments. Students may not collaborate without faculty authorization.

*Any violations of the Honor Code will be punished to the full extent allowable under the SOPH Honor Code.*