Introduction to Biostatistics  
(BE7022 and PH7022)  
Summer 2016  
Department of Environmental Health  
University of Cincinnati

**Message to Students:** This course is listed as Introduction to Biostatistics. There is no prerequisite of statistical backgrounds to the class. The expectation is that by the end of the class, everyone, whoever has learned statistics before or not, will reach conclusion that she or he has learned something useful and practical from the course. The goals of this course can be summarized in the following: (1) I will introduce you some common but basic statistical tools such as t-test, z-test, two sample t-test, paired t-test, ANOVA model, regression model and other non-parametric tests; (2) I will connect the dots and show you how different statistical tests are related and how you should apply the tests under different circumstances; and (3) I will teach you to use SAS Enterprise in computation. In addition, I will also teach how to use Excel to handle some statistical problems. Remember, learning statistics can be fun, especially when you start to know what to do and how to use the right tools to solve real problems. I look forward to seeing you in my class.

**Instructor:** Jun Ying, PhD  
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University of Cincinnati  
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*Email: yingj@uc.edu*  
*Office: Kettering Lab, Room 112*

**TA:** Ms. Lixia Zhang  
zhang2lx@mail.uc.edu

**Online Coordinator:** Ms. Lisa Groh  
grohle@mail.uc.edu

**Contacts:**
1. For questions related to learning modules (including SAS/EXCEL modules and in-class exercise modules), please contact Lisa by email.
2. For questions related to class notes, homework assignments, please contact Lixia (TA) at her office hour, or by email.
3. For questions related to the contents of modules and notes, please ask Dr Ying and Lisa at the discussion session.
4. Other requests and questions can be raised to Dr Ying directly by email. Please make sure you put “BE/PH7022 Introduction to Biostatistics 15US” as the subject of the email and introduce yourself in the email.
**Course website:** Blackboard or https://canopy.uc.edu
Choose “meta_yingj_845: (Meta 15US) INTRO BIOSTATISTICS (001)”

**Course Description:**
This course will provide an introduction of basic concepts of statistics, methods of statistical analysis, and tools of statistical computation. The goal is to help students understand the language of statistics and the art of statistical investigation; perform basic statistical analysis of their own research; and read and evaluate analytical results in health and research articles.

**Course Objectives:**
By the completion of this course, students will
1. Use descriptive statistics and graphical methods to describe sample data.
2. Understand the reasoning by which findings from sample data can be extended to larger, more general populations.
3. Estimate population parameters using point and interval estimation.
4. Perform hypothesis tests about one, two, or more than two population means or proportions.
5. Use regression and correlation techniques to examine linear relationships in data.
6. Perform statistical computations and read statistical summaries using software packages SAS Enterprise and Excel.
7. Critically evaluate the results of scientific studies.

**Textbook and Readings:**
*There is NO required test book for this class.*
Any book entitled “Introduction to Biostatistics” or “Introduction to Statistics” or “Basic Biostatistics” or “Basic Statistics” can be used as your own reference.

**Statistical Software:**
*There is NO required software to purchase for this class.*
However, we will learn a statistical software package called SAS Enterprise in the class. We will also use Microsoft EXCEL in the class.

**Prerequisite:**
*There is NO prerequisite for this class.*
It is expected students know basic calculus and have some basic knowledge of using EXCEL.

**Course Format:**
Online Learning Modules w. Onsite and WebEX Discussion Session
**Leaning Modules:**
Learning Modules are posted on each Monday morning, and required to complete reading before Sunday night of the week. Evidence of completing modules on time will be counted as a portion of the course grade.

**Discussion (Review Session):**
A WebEX discussion session will be provided on each Friday 12-1pm. Students can also attend the session onsite in room G17 in the Kettering Lab. The session is held to review the contents of the week and address questions from attendants. The WebEX link will be sent to students one day before the class. Each student is required to attend at least 4 discussion sessions (either onsite or online) in order to earn full credits that will be counted into the final grade. Students who cannot attend the session will be asked to review the recorded discussion later posted at the Blackboard.

**WebEX Introduction on 7/7/2015:**
An introduction of the class will be offered through onsite (in Kettering Lab room G17) and WebEX (live) on 7/7 (Monday) 12-2pm. Each student is required to attend the session. A direction to the Kettering Lab will be provided in a separate file and the link to log into WebEX will be provided one day before the session. The attendance to this session is mandatory and the credit will be counted into the course grade.

**Criteria Included for Evaluation and Determination of Grade:**
1. Learning modules each week 21%
2. Attending onsite/online discuss sessions (Fridays) 6%
3. Homework and In class exercise 50%
4. Take Home Project 23%

**Content of Course and Schedule (see Tables 1-3 below):**

**Table1 Contents of course**

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Contents</th>
<th>Notes</th>
<th>Modules</th>
<th>SAS/EXCEL Modules</th>
<th>HWK/In Class Exercise/Final Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/6-7/12</td>
<td>Introduction; Measures; Graphic and Summary Statistics (1)</td>
<td>0, 1, 2, 3</td>
<td>1.1, 1.2, 2.1, 2.2, 3.1</td>
<td>1, 2, 3</td>
<td>HWK1</td>
</tr>
<tr>
<td>2</td>
<td>7/13-7/19</td>
<td>Summary Statistics (2), Probability and Distributions</td>
<td>4</td>
<td>3.2, 4.1, 4.2</td>
<td>3, 4, 5</td>
<td>2A, 2B</td>
</tr>
<tr>
<td>3</td>
<td>7/20-7/26</td>
<td>Inference, CI and HT</td>
<td>5</td>
<td>5.1, 5.2, 5.3</td>
<td>6, 7, 8</td>
<td>HWK2</td>
</tr>
<tr>
<td>4</td>
<td>7/27-8/2</td>
<td>Comparing Means</td>
<td>6</td>
<td>6.1, 6.2</td>
<td>9, 10, 11</td>
<td>HWK3</td>
</tr>
<tr>
<td>5</td>
<td>8/3-8/9</td>
<td>ANOVA, Comparing Proportions (1)</td>
<td>7, 8</td>
<td>7, 8.1</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>8/10-8/16</td>
<td>Comparing Proportions (2), Regression</td>
<td>9</td>
<td>8.2, 9.1, 9.2</td>
<td>13, 14</td>
<td>HWK4</td>
</tr>
<tr>
<td>7</td>
<td>8/17-8/23</td>
<td>Summary, Final Project Due</td>
<td>10</td>
<td>10</td>
<td>None</td>
<td>Final Project Due</td>
</tr>
</tbody>
</table>
Table 2 Schedule of Onsite/online discussion sessions and office hours

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Time</th>
<th>Format</th>
<th>Host</th>
<th>Room (Kettering Lab)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/6/2015</td>
<td>12-2pm</td>
<td>WebEX Introduction</td>
<td>Jun/Lixia/Lisa</td>
<td>G17</td>
</tr>
<tr>
<td>1</td>
<td>7/8/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>1</td>
<td>7/10/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Jun/Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>2</td>
<td>7/15/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>2</td>
<td>7/17/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Jun/Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>3</td>
<td>7/22/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>3</td>
<td>7/24/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Jun/Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>4</td>
<td>7/29/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>4</td>
<td>8/5/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>5</td>
<td>8/7/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Jun/Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>6</td>
<td>8/12/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>6</td>
<td>8/14/2015</td>
<td>12-1pm</td>
<td>WebEX Discussion</td>
<td>Jun/Lixia</td>
<td>G17</td>
</tr>
<tr>
<td>7</td>
<td>8/19/2015</td>
<td>12-1pm</td>
<td>Office Hour</td>
<td>Lixia/Jun</td>
<td>G17/Room112</td>
</tr>
</tbody>
</table>

Table 3 Schedule for homework (HWK), in-class exercise and final project

<table>
<thead>
<tr>
<th>HWK/In Class Exercise/Final Project</th>
<th>Posted Date</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWK1</td>
<td>7/7/15</td>
<td>7/13/2015</td>
</tr>
<tr>
<td>2A, 2B</td>
<td>7/13/2015</td>
<td>7/19/2015</td>
</tr>
<tr>
<td>HWK2</td>
<td>7/20/2015</td>
<td>7/27/2015</td>
</tr>
<tr>
<td>HWK3</td>
<td>7/27/2015</td>
<td>8/3/2015</td>
</tr>
<tr>
<td>HWK4</td>
<td>8/10/2015</td>
<td>8/17/2015</td>
</tr>
<tr>
<td>Final Project</td>
<td>8/10/2015</td>
<td>8/20/2015</td>
</tr>
</tbody>
</table>

**Policy:** Syllabus subject to revision as necessary
Welcome! Please read this file along with the Syllabus carefully before you start the class.

**Course:** This class is called “Introduction to Biostatistics”. The class is offered to students in either Clinical and Translational Research Program (registered as BE 7022) or MPH program (registered as PH7022).

**Online class:** In this time, the class is offered “Online”, meaning students are mainly to learn the contents through online modules posted in each week on the Blackboard. In order to ensure the quality of the online class reaches the same level of the onsite class, this class will be offered two onsite methods to help students digest the contents from online modules. (1) Every other week, the instructor will provide an onsite discussion session to the students (see Syllabus for details). Each discussion session will be video taped and posted online later for students who cannot make the onsite discussion. (2) The TA will provide onsite Q&A for students in each week.

**Online tools:** (1) In each week, a video module will be provided through the Blackboard (BB) for the contents of the current week. The exact link can be found in the folder called “Course Documents” under the BB. (2) In addition, a point point note will be posted in the same folder of BB in each week. (3) Announcements will be posted both in BB and by emails respectively. (4) Homework assignments and take home final project will be posted and submitted thru the BB too. (5) An SAS Enterprise software is required for the class but NOT require to purchase for the class (see next section for details).

**About software**

- Our primary software is SAS and we are going to use an interface version called Enterprise in the class. SAS is available in many places on campus including the Main (Langsam) Library and the Health Science (Harrison) Library, and computer labs. Details can be found on the UCIT webpage: [http://labs.uc.edu/labHours.php](http://labs.uc.edu/labHours.php).
- SAS also has a very nice cloud offering that is FREE for faculty & students: SAS OnDemand for Academics ([http://www.sas.com/govedu/edu/programs/od_academics.html](http://www.sas.com/govedu/edu/programs/od_academics.html)) provides a no-cost online delivery model to professors for teaching and students for learning data management and analytics.
- For some of you who are interested in installing SAS on your own computer, you can purchase a SAS license for use in one year. Details can be found on the UCIT webpage: [http://www.uc.edu/ucit/ware/software/sas.html](http://www.uc.edu/ucit/ware/software/sas.html).
- We will also use Microsoft word, excel, and power point in class.
- There is no other software required for the class.

**About Syllabus**

- We don’t require a text book for the class. However, I will strongly suggest you keep at least one statistical text book on your shelf and you will find it helpful either later for your capstone or in the future for your work.
• Course grade: There is no written exam for the class. The course grade is mainly based upon (1) completion of viewing and reviewing of the video clips and notes posted in the BB; (2) taking the mini questions; (3) completing and submitting 4 homework assignment; and (4) completing and submitting a final project. Details can be found in the syllabus.

About On site discussion (MSB E602)

• Every other week I will provide an onsite discussion to the students. The onsite discussion will be on Thursday’s 4-6pm. I will ask your feedbacks late to adjust schedule if necessary.
• Each onsite discussion will be videotaped and posted online later to students who can’t make the class.
• I may also change the onsite discussion into webinar format if majority of students can’t make the class and prefer an online format.
• In the first week (7/3/2014), I will provide two sessions to the students (one around the noon and one in the late afternoon, see syllabus for details). Please make your effort to show up in one of the sessions.