

Introduction to Biostatistics (BE7022 and PH7010)

Summer 2017

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 objectives of this course are summarized in the following: (1) to introduce 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) to connect the dots between different statistics tests, parametric vs. non-parametric tests, hypothesis testing vs. confidence interval and show how different statistical concepts and methods are connected; (3) to focus on application while at the same time providing basic statistical reasoning behind the application; and (4) to teach how 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. This class is an online class. Students are provided online modules and notes in each week to learn concepts. SAS modules will also be provided in accordance with lecture modules and notes.

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.

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 website:

Course materials will be available in the Blackboard meta_yingj_873: (Meta 2175) INTRO BIOSTATISTICS (001)

Instructor: Jun Ying, PhD
Department of Environmental Health
University of Cincinnati
Phone: 513-558-2767
Email: yingj@uc.edu
Office: Kettering Lab, Room 112

TA: *[Zhang, Tianmo \(zhangto\) zhangto@mail.uc.edu](mailto:zhangto@mail.uc.edu)*
[Yu, Hao \(yu2ho\) yu2ho@mail.uc.edu](mailto:yu2ho@mail.uc.edu)

Online Coordinator: Filla, Benjamin (fillab) fillab@ucmail.uc.edu

Contacts:

1. For questions related to learning modules (including SAS/EXCEL modules and in-class exercise modules), please contact the Online Coordinator by email.
2. For questions related to class notes, homework assignments, please contact TA's by email or set up a face to face meeting.
3. For questions backboard, virtual lab (using SAS) or other tech related issues, please contact the UCIT for help.
4. Other requests and questions can be raised to the Instructor directly by email. Please make sure to put "**17US Introduction to Biostatistics**" in the title.

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:

The class will teach SAS Enterprise for statistical computation and analysis. You can consider access to the software from the following sources:

1. Purchase a SAS license from UCit GetIT or UC book store (preferred)
<https://www.uc.edu/ucit/services/hardware-software/facstaff-software/sas.html>
2. Use SAS from UC Virtual Lab for Free <https://kb.uc.edu/KBArticles/UCVLabs-Windows.aspx>
3. Use SAS cloud for free ([SAS OnDemand for Academics](#)).

Notice:

- (1) The class has no obligation of support on software installation and online access. Students should contact UCIT or IT support of your department for information regarding SAS license, virtual lab, and/or online SAS OnDemand.
- (2) Even though this class offers lab instruction on statistical computation using SAS enterprise, students can use any other software such as R or SPSS at their own choices to work on their homework assignments, final project, and in-class exercises.

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 class with Learning Modules, Class Notes offered in the Blackboard.

Leaning Modules:

Learning Modules are posted on each **Friday morning, starting on 6/2/2017**, and required to complete reading **before Thursday mid night** of the next week. Evidence of completing modules on time will be counted as a portion of the course grade.

WebEX Sessions:

There will be 2 WebEX meetings in the term. Please see Table2 for details of schedules. The WebEX will be recorded and posted in the blackboard afterwards. Students are encouraged to attend the WebEX sessions for information and instructions related to the course.

Assignments and Final Project:

There will be 4 homework assignments and one final project for the class. Schedules of posting dates and due dates are available in Tables3. All homework assignments and the final project MUST be submitted to the Blackboard only. Email submission will NOT be accepted unless pre-approved by the instructor.

Criteria Included for Evaluation and Determination of Grade:

- | | |
|-----------------------------------|-----|
| 1. Learning modules each week | 40% |
| 2. Homework and In class exercise | 40% |
| 3. Take Home Project | 20% |

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

Table1 Contents of course

Week	Dates	Contents	Module	SAS Module	In Class Practice
1	6/2-6/8	Introduction; Measures; Graphic	1.1, 1.2, 2.1, 2.2	1	
2	6/9-6/15	Summary Statistics; Probability and Distributions	3.1, 3.2, 4.1, 4.2	2, 3, 4, 5	Module4 In Class 2A, 2B
3	6/16-6/22	Probability and Distributions; Inference, CI and HT	4.2, 5.1, 5.2	5, 6, 7	
4	6/23-6/29	Inference, CI and HT	5.1, 5.2, 5.3	6, 7, 8	
5	6/30-7/6	Comparing Means	6.1, 6.2	9,10,11	
6	7/7-7/13	Comparing Means	6.1, 6.2	9,10,11	
7	7/14-7/20	ANOVA	7	12	
8	7/21-7/27	Comparing Proportions; Regression	8.1, 8.2, 9.1, 9.2	13, 14	
8	7/28-7/31	Summary; Special Topics	Pre-recorded WebEX	na	
9	7/31	Final Project Due on 7/31/2017			

Table2 Schedule of 3 WebEX sessions

Week	Date	Time	Format
1	6/2/2017	5:00-6:00	WebEX Session1
2	7/28/2017	5:00-6:00	WebEX Session2

Table3 Schedule for homework (HWK) and final project

HWK/In Class Exercise/Final Project	Posted Date	Due Date
HWK1	6/2/2017	6/15/2017
HWK2	6/9/2017	6/22/2017
HWK3	6/30/2017	7/13/2017
HWK4	7/14/2017	7/27/2017
Final Project	7/14/2017	7/31/2017

Attendance and Participation Policy:

1. Modules will be completed on time in each week specified in Tab1. The attendance will be checked based upon the log information of each module. Missing one module on time will cause a deduction of 4 points from the final score.
2. ***WebEX sessions are encouraged to attend. They are recorded afterwards and made available on the BB for students to watch. It is students' responsibility to attend or watch the WebEX session on time in order to catch information relevant to the classes. Failing to do so may cause difficulties to understand contents related to modules, notes and homework assignments and students will have to bear the cost themselves as the consequence.***
3. Late submission of an assignment will receive 0 point unless it is pre-approved by the instructor.
4. ***Missing 3 module deadlines or missing 2 assignments will automatically receive an "I" (incomplete) from the course.***

Academic Integrity: All students shall comply with the Code of Student Conduct of the University of Cincinnati (UC) http://www.uc.edu/conduct/Academic_Integrity.html. Academic misconduct will be zero tolerated in this course. Regardless of the type of assignment, students found responsible for violating the UC Academic Integrity Policy will receive an "F" for the course. All violations will be forwarded to the Office of University Judicial Affairs, Department of Student Life where a university disciplinary file will be created.