



## Statistical Computation and Software (PH-7011 / BE-7011)

Department of Environmental Health  
University of Cincinnati College of Medicine

### I. Course Information:

**Title:** Statistical Computation and Software

**Course #:** PH-7011/ BE-7011

**Credit Hours:** 1

**Term:** Fall 2019 (19FS)

**Class Location:** Online

**Class time:** Online

**Prerequisites:** There is NO prerequisite for this class. However, it is expected students know basic calculus and have some basic knowledge of using EXCEL. Students who take the Introduction to Biostatistics (BE7022 / PH7010) in the next spring semester may also be benefited from the contents and computation skills learned from the class.

### II. Instructor Information:

**Name:** Dr. Jun Ying

**Title:** Professor of Biostatistics

**Office Information:** Kettering Room 101

**Office:** (513)558-2767

**Email:** yingj@ucmail.uc.edu

**Office Hours:** By Appointment Only

**Communication Policy:** Students are encouraged to contact me anytime via email. A response will be given within 36-48 hours except on weekends. Office hours will be held by appointment only. The teaching assistant can be reached by email, and face-to-face meetings can be scheduled upon request.

### III. Course Materials

**Recommended but not required text:** 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. Students can choose either one of the options to access to the software

- Purchasing a SAS license from UCit GetIT or UC book store (preferred)  
<https://www.uc.edu/ucit/services/hardware-software/facstaff-software/sas.html>
- Using SAS from UC Virtual Lab (Free) <https://kb.uc.edu/KBArticles/UCVLabs-Windows.aspx>

#### **Notice**

- 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 and virtual lab.
- 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.

#### IV. Course Description and Messages:

- **Course Description**

The goal of the course is to introduce statistical computation using different software packages. Students will learn statistical computation related to other Biostatistical courses in this class. The course may be more effective if students take the Introduction to Biostatistics (BE7022 / PH7010) simultaneously in the same term.

- **Messages**

This course is designed for students in the MPH Program Epidemiology Concentration and the CTR program. Yet other graduate and undergraduate students may be allowed to attend after the instructor's approval. Undergraduate students will also need the approval from their advisors and submit the approval by email to the instructor. This is a one credit course developed to provide some basic knowledge and skills in statistical computation using three different software packages: SAS, SPSS and R. For SAS, the class will offer computation using both SAS Program and SAS Enterprise. Many times students find instructors using different statistical software in their classes, especially the statistic and epidemiologic classes. It becomes challenging for students to take these courses and learn the software packages at the same time. Sometimes students find two similar classes may use different software packages simply because of different preference of the instructors. In this class, the students will learn how to use different software solve the same problem from the same dataset. That way they will have a better sense how these software packages are connected and be more confident in computation when they take other statistic and epidemiologic classes. In addition, such experience will be a plus in their resume when students put three software packages in their skill setting.

#### V. Student Learning Outcomes:

Upon successful completion of this course, the learner will be able to:	How is this outcome assessed?
1. Learn to import/export data from different software packages	Homework; Self-assessment by following exercise in each module.
2. Use graphical methods to describe sample data	Homework; Self-assessment by following exercise in each module.
3. Summarize data using descriptive statistics	Homework; Self-assessment by following exercise in each module.
4. Perform hypothesis testing and confidence interval on one sample data	Homework; Self-assessment by following exercise in each module.
5. Perform hypothesis testing on two, or more than two samples	Homework; Self-assessment by following exercise in each module.
6. Use regression and correlation techniques to examine linear relationships in data	Homework; Self-assessment by following exercise in each module.
7. Compare proportions using a Chi square test	Homework; Self-assessment by following exercise in each module.



## VI. Instructional Methods:

**Course Format:** Online class with Learning Modules, Class Notes offered in the Blackboard.

**Learning Modules:** Learning Modules are posted on schedule (see Table below for details). Please note students are required to complete reading the Learning Modules before the due dates to receive full points. All Learning Modules will be available throughout the semester after being posted. But students will receive partial or no points after the due dates.

## VII. Course Communication:

University policy requires that the email set up in Blackboard is the primary means of communication. It is advisable that you use your UC email for this purpose and that you check it often. If you choose to change your email in Blackboard to a non-UC email it is your responsibility to ensure you check it frequently.

## VIII. Course and Grading Policies:

- Course Structure:** The course is designed as an in-person, residential class. Changes to the syllabus, due dates, course requirements or grading requirements will be made as far in advance as possible.
- 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](http://www.uc.edu/conduct/Academic_Integrity.html). Academic misconduct includes, but is not limited to: acts of cheating, plagiarism, falsification, and misappropriation of credit. The Student Code of Conduct defines behavior expected of all University of Cincinnati students. It is each student's responsibility to know and comply with the University's Student Code of Conduct. 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.
- Disability:** Students with disabilities who need academic accommodations or other specialized services while attending the University of Cincinnati will receive reasonable accommodations to meet their individual needs as well as advocacy assistance on disability-related issues. Students requiring special accommodation must register with the Disability Services Office. [UC's Disability Services Office](#).
- Counseling Services, Clifton Campus:** Students have access to counseling and mental health care through the University Health Services (UHS), which can provide both psychotherapy and psychiatric services. In addition, Counseling and Psychological Services (CAPS) can provide professional counseling upon request; students may receive five free counseling sessions through CAPS without insurance. Students are encouraged to seek assistance for anxiety, depression, trauma/assault, adjustment to college life, interpersonal/relational difficulty, sexuality, family conflict, grief and loss, disordered eating and body image, alcohol and substance abuse, anger management, identity development and issues related to diversity, concerns associated with sexual orientation and spirituality concerns, as well as any other issue of concerns. After hours, students may call UHS at 513-556-2564 or CAPS Cares at 513-556-0648. For urgent physician consultation after-hours students may call 513-584-7777.
- Title IX:** Title IX is a federal civil rights law that prohibits discrimination on the basis of your actual or perceived sex, gender, gender identity, gender expression, or sexual orientation. Title IX also covers sexual violence, dating or domestic violence, and stalking. If you disclose a Title IX issue to me, I am required forward that information to the Title IX Office. They will follow up with you about how the University can take steps to address the impact on you and the community and make you aware of your rights and resources. Their priority is to make sure you

are safe and successful here. You are not required to talk with the Title IX Office. If you would like to make a report of sex or gender-based discrimination, harassment or violence, or if you would like to know more about your rights and resources on campus, you can consult [UC's webpage for Title IX](#) or contact the office at 556-3349.

6. **Class Attendance & Participation:** There is no specific requirement for class attendance. Participation is required through completion of scheduled modules and assignments. Details are provided in the next two policies.
7. **Missed and/or late submission of homework assignments:** Missed and/or late submission of an assignment without a pre-approval from the instructor may result in a deduction of up to 25% of the score. **Missing 3 assignments will receive a final grade of "F" if without a valid excuse or an "I" (incomplete) with an excuse.** The instructor reserves the right to make decisions about extenuating circumstances on a case-by-case basis.
8. **Missed completion of scheduled modules:** Missed and/or late completion of watching an assigned module can be deducted up to 25% points without a pre-approval from the instructor. Failing to meet **3 module deadlines or will receive an "F" if without a valid excuse or an "I" (incomplete) with an excuse.** The instructor reserves the right to make decisions about extenuating circumstances on a case-by-case basis.
9. **Criteria for letter grades:** Students receive a raw score from each module and homework assignment. The raw scores are converted into standard scores 0-100 and aggregated into a total score using the following allocation formula. The letter grade from the course will be based upon the standard score using cuts determined from the overall distribution of the standard score in the class as well as history data from previous classes.

***Standard Score Allocation:***

Components	<b><i>Distribution of grades</i></b>
Learning modules	40%
Homework assignments	60%
<b><i>Total</i></b>	<b><i>100%</i></b>

## IX. Course Schedule:

The following Table summarizes schedules of course materials including notes, modules and assignments. The entire semester is divided into 10 sessions including a Session 0. In each session students are required to complete the module in about 10 days. There are additional 3 days for completing the assignment. In each session, other course materials including a PPT note, datasets, and SAS and R codes are posted for convenience to follow the contents.

Table

Contents	Module# / Assignment#	Posted Date of Module and Assignment	Module Due Date	Assignment Due Date
Session0 - Know your software	Modules Pre 1 and 2 / No Assignment	8/26/2019	9/5/2019	-
Session1 - Import / export data	Modules 1.1, 1.2 & 1.3 / Assignment 1	9/6/2019	9/15/2019	9/18/2019
Session2 - Data management	Modules 2.1 & 2.2 / Assignment 2	9/16/2019	9/25/2019	9/28/2019
Session3 - Histogram and Box plot	Modules 3.1 & 3.2 / Assignment 3	9/26/2019	10/5/2019	10/8/2019
Session4 - Summary Statistics	Modules 4.1 & 4.2 / Assignment 4	10/6/2019	10/15/2019	10/18/2019
Session5 - Inference (CI and HT)	Module 5 / Assignment 5	10/16/2019	10/25/2019	10/28/2019
Session6 - Comparing Means	Modules 6.1 & 6.2 / Assignment 6	10/26/2019	11/5/2019	11/8/2019
Session7 - ANOVA	Module 7 / Assignment 7	11/6/2019	11/15/2019	11/18/2019
Session8 - Comparing Proportions	Modules 8.1 & 8.2 / Assignment 8	11/16/2019	11/25/2019	11/28/2019
Session9 - Regression	Module 9 / Assignment 9	11/26/2019	12/5/2019	12/8/2019