Course Title: Biostatistics Theory I

Course Number: BIST 0613

Course Location: Rutgers SPH, RM234, Piscataway

Course Date & Time: 3:00-5:00 pm on Mondays

Course Instructor: Shou-En Lu, PhD, Associate Professor of Biostatistics,

Rutgers School of Public Health, Rm 215

shouen.lu@rutgers.edu

732 235 9764

Office Hours: By appointment

Course Assistant: Fang Dai  df509@sph.rutgers.edu

Required Course Text:


Additional/Supplemental Readings/Resources:


Course Description: Statistics is a branch of science dealing with the collection, analysis, interpretation, and presentation of numerical data. This course is an introduction to probability modeling as a basis for statistical inference. The underlying strategy in prediction and inference involves the determination of a probability modeling. This can be approached from two perspectives: analytical (mathematical) and computational (algorithmic). It is important for students to master both perspectives. Advanced calculus is sufficient background for the analytical. This course serves to lay a foundation in statistical theory for M.S., M.PH, DrPH and Ph.D. students so that they can pursue more advanced technical materials.

Selected Department Competencies Addressed: Each Department identifies competencies for each degree offered. The competencies addressed in this course for the MPH, MS and DrPH for the Department of Biostatistics include:

- Apply basic probability theory and standard statistical methods to biomedical, clinical and public health research;
- Use probability and statistical theory to evaluate and identify appropriate methods of analysis;
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• Conduct appropriate statistical analysis of data to solve medical and public health problems;
• Review and critique statistical methods and interpretations presented in published research
tudies, presentations or reports.

Course Objectives: By the completion of this course, students will be able to:

1. Describe, prove, and apply the basic probability theory.
2. Develop probability models for experiments.
3. Apply basic probability and standard statistical methods to design experimental and
observation studies in biomedical, clinical and public health research.

Course Requirements and Grading:

• Course Evaluation Description:
  1. Midterm Exam 35 pts.
  2. Final Exam 35 pts.
  3. Homework Assignment 30 pts.
     Total: 100 pts.

• Grading policy:
  1. On all homework assignments/problem sets, students are encouraged to discuss with
     one another, but work should be carried out and written up independently. If any two
     identical write-ups are found, both homework assignments are considered failed.
  2. It’s the students’ responsibility to make their papers legible. Unreadable work will NOT
     be graded.
  3. The students are asked to answer each question as accurately and concisely as
     possible. If it is necessary to attach the computer output with the homework assignment,
     ONLY the “essential” segments are required. Do NOT submit the complete output
     section or the log file. Otherwise, 50% points will be taken away.
  4. Unless notifying the instructor beforehand, late submission of homework will NOT be
     graded.

Course Schedule:

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<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>9/10 Introduction, Set Theory and Probability Set Function</td>
<td>Chp 1.1-1.3</td>
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<tr>
<td>2</td>
<td>9/17 Conditional Probability and Independence, Random</td>
<td>Chp 1.4-1.5</td>
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<td></td>
<td>Variables</td>
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<tr>
<td>3</td>
<td>9/24 Discrete Random Variables, Continuous Random Variables</td>
<td>Chp 1.6, 1.7</td>
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<tr>
<td>4</td>
<td>10/1 Expectation of a Random Variable, Some Special</td>
<td>Chp 1.8, 1.9, 1.10</td>
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<td>Expectations, Important Inequalities</td>
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<tr>
<td>5</td>
<td>10/8 Distribution of Two Random Variables</td>
<td>Chp 2.1</td>
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<tr>
<td>6</td>
<td>10/15 Transformations Bivariate Random Variables</td>
<td>Chp 2.2</td>
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<tr>
<td>7</td>
<td>10/22 Midterm Exam</td>
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Learning Management System: Canvas will be used extensively throughout the semester for course syllabus, assignments, announcements, communication and/or other course-related activities. It is the student's responsibility to familiarize themselves with Canvas and check it regularly. If you have difficulties accessing Canvas, please inform the instructor and Canvas Support (help@canvas.rutgers.edu). Canvas is accessible at canvas.rutgers.edu.

School of Public Health Honor Code: The School of Public Health Honor Code is found in the student bulletin (sph.rutgers.edu/academics/catalog/index.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Students with Disabilities: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student must Apply for Services by first completing a Registration Form with the Rutgers Office of Disability Services (ODS) at ods.rutgers.edu. The student will also be required to participate in an ODS intake interview and provide documentation. If reasonable accommodations are granted, ODS will provide you with a Letter of Accommodations which should be shared with your instructors as early in your courses as possible.

Graduate Student Computer Policy: Students are required to possess a personal laptop, no older than approximately two years, that must meet minimum requirements which may be found online at: sph.rutgers.edu/student_life/computer_requirements.html

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.

Withdrawal/Refund Schedule: Students who stop attending their course(s) without processing an Add/Drop Course form will receive a failing grade. Furthermore, students dropping to zero credits for the
semester are considered withdrawn and must submit a completed Leave of Absence form from the School of Public Health’s Office of Student Affairs. The School of Public Health refunds tuition only. Administrative and technology fees are non-refundable. You may find the Withdrawal/Refund Schedule on the School of Public Health website at: sph.rutgers.edu/academics/registration/school_calendars.html

Appendix

Fall 2018 Academic Calendar

Tuesday, September 4   Fall Semester Begins
Tuesday, November 20    Thursday Classes (No Tuesday Classes)
Wednesday, November 21  Friday Classes (No Wednesday Classes)

Thursday, November 22 – Thanksgiving Recess
Sunday, November 25
Wednesday, December 12 Classes End

Thursday, December 13 Reading Days
Friday, December 14 - Friday, Final Exams
December 21
Friday, December 21 GRADES DUE!

Spring 2019 Academic Calendar

Tuesday, January 22 Spring Semester Begins
Saturday, March 16 – Sunday, Spring Break
March 24
Monday, May 6 Classes End
Tuesday, May 7 and Reading Days
Wednesday, May 8
Thursday, May 9 - Wednesday, Final Exams
May 15
Thursday, May 16 GRADES DUE!
TBA School of Public Health Convocation
Sunday, May 19 Rutgers University Commencement
### Fall 2018 Withdrawal/Refund Schedule

Students who stop attending their courses without processing an **Add/Drop Course** form will receive a failing grade. Furthermore, students dropping to zero credits for the semester are considered withdrawn and must submit a **Leave of Absence**. If you do not register for any courses or submit a leave of absence you will be administratively withdrawn from the School of Public Health.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Refund Percentage and Grade</th>
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<tbody>
<tr>
<td>April 2 – September 17</td>
<td>100% refund for all dropped courses and no class recorded.</td>
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<tr>
<td>17-Sep</td>
<td>Last day to add a course to existing schedule.</td>
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<tr>
<td>September 18 – September 24</td>
<td>Last day to drop course w/o &quot;W&quot; grade if not withdrawing in full.</td>
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<tr>
<td>September 25 - October 1</td>
<td>80% refund for all dropped courses and a W grade recorded.</td>
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<tr>
<td>October 2 – October 8</td>
<td>60% refund for all dropped courses and a W grade recorded.</td>
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<tr>
<td>October 9 – October 15</td>
<td>40% refund for all dropped courses and a W grade recorded.</td>
</tr>
<tr>
<td>15-Oct</td>
<td>0% refunds and a grade of W recorded.</td>
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**LAST DAY TO WITHDRAW WITH A GRADE OF W**