Course Title: Biostatistical Computing Fall 2019

Course Number: BIST 0535J – 030 (17372)

Course Prerequisites: Introduction to Biostatistics (PHCO 0504) (with a grade of B or higher)

Course Location: Classroom 2A, School of Public Health Building, Piscataway

Course Date & Time: Monday 6:00-8:00 PM

Course Instructor: Yen-Hong Kuo, Ph.D.
Adjunct Assistant Professor
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Office Hours: Mondays after class for 1 hour

Course Assistant: Han Yu
Course Assistant
Department of Biostatistics and Epidemiology, Rutgers School of Public Health
hy295@sph.rutgers.edu
TEL: 862.371.9474

Office Hours: Mondays 5:00-6:00 PM and Tuesdays 5:30-6:30 PM @ SPH 2A

Course Web Page: Rutgers Canvas ► 2019FA - Biostatistical Computing BIST0535J030

Required Course Text:

Additional/Supplemental Readings/Resources:

Course Software: SAS and R
- SAS
  - SAS 9.4 Windows (64-bit) installed on your own laptop under MS Windows 10
    - School of Public Health Computer Support
      - https://sph.rutgers.edu/student-life/computer-support.html
    - SAS Education Analytical Suite 9.4 Windows only Expires July 31 2020
      - https://software.rutgers.edu/product/3571
      - $100.00
Course Description: This course provides the student with the ability to conduct statistical analysis using statistical software SAS and R. The primary goals of the course are using the SAS programming language to solve a variety of database and statistical problems, and using R language to perform statistical analysis. This is a highly applied course and the student is expected to complete computer exercises each week.

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

- Create SAS data sets from raw data
- Write programs to check data for accuracy
- Write simple SAS programs to manipulate (e.g., partition, merge and transform) raw data
- Generate high quality graphs using SAS and R
- Perform basic descriptive statistics using SAS and R
- Perform some statistical tests using SAS and R

Course Schedule: (tentative)

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Activities</th>
<th>Quiz</th>
<th>HW</th>
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<tbody>
<tr>
<td>1</td>
<td>09/09/19</td>
<td>Introduction to SAS and descriptive statistics</td>
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<td>2</td>
<td>09/16/19</td>
<td>Input data into SAS (including importing data from Excel)</td>
<td>M1*</td>
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<td>3</td>
<td>09/23/19</td>
<td>Working with SAS data sets</td>
<td>1</td>
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<td>4</td>
<td>09/30/19</td>
<td>Output SAS data to external files</td>
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<td>5</td>
<td>10/07/19</td>
<td>PROC FORMAT and SAS functions</td>
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<tr>
<td>6</td>
<td>10/14/19</td>
<td>More on SAS data steps</td>
<td>2</td>
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<td>7</td>
<td>10/21/19</td>
<td>Introduction of SAS Output Delivery System (ODS)</td>
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<td>8</td>
<td>10/28/19</td>
<td>Project presentation (part 1)</td>
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<td>Review of Basic descriptive statistics</td>
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<td>Basic SAS statistical procedures (univariate descriptive statistics)</td>
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<tr>
<td>9</td>
<td>11/04/19</td>
<td>Introduction of R</td>
<td>3</td>
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<tr>
<td>10</td>
<td>11/11/19</td>
<td>Basic statistical tests and confidence intervals with SAS and R</td>
<td>3</td>
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<tr>
<td>11</td>
<td>11/18/19</td>
<td>Linear Regressions using SAS and R</td>
<td>4</td>
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<td>12</td>
<td>11/25/19</td>
<td>SAS graphics</td>
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<td>Introduction of graphics using R</td>
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<td>13</td>
<td>12/02/19</td>
<td>Review of SAS data step</td>
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<td>Introduction of SAS macro</td>
<td>5</td>
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<td>14</td>
<td>12/09/19</td>
<td>Project presentation (part 2)</td>
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<td></td>
<td>Review</td>
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<td>15</td>
<td>12/16/19</td>
<td>Final exam</td>
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*: M1 is mock quiz which is for practicing purpose.
Course Requirements and Grading:

Course format

- Weekly lectures

- Homework assignments
  - Due at 6:00 PM on the scheduled date via Rutgers email submission.
  - Solutions to each assignment will be discussed right after the submission is due.
    - This is to ensure that you know your performance right away.
  - Students may be called upon to present homework solutions to the class.

- Quizzes
  - 6:00-6:25 PM on the scheduled date.
  - Open book and open notes in-class quiz.
  - Solutions to each quiz will be discussed right after the quiz is ended.
    - This is to ensure that you know your performance right away.

- A two-part group project
  - 3 students per group (1 or 2 groups may have 2 students due to class size)

- A final exam
  - A 2-hour open book and open notes in-class exam on the scheduled date.
  - Format
    - True/False questions
    - Multiple choice questions
    - Programming Questions with short answers on solving database and statistical problems

Grading Policy

- The course overall grade will be determined by the grades of
  - Homework assignments (20%)
  - Quizzes (20%)
  - Group project (1st part: 15%, 2nd part: 15%. Total: 30%)
  - Final exam (30%)

- There will be no makeup quiz.
  - Solutions to each quiz will be discussed right after the quiz is ended.
    - This is to ensure that you know your performance right away.
  - A grade of zero will be assigned to missed quizzes.
  - The lowest 2 grades for the quizzes will be dropped in the final calculation.
    - This means that you will be able to miss 2 quizzes.

- There will be no late homework assignment submission.
  - Solutions to each assignment will be discussed right after the submission is due.
    - This is to ensure that you know your performance right away.
  - A grade of zero will be assigned to missed homework assignments.

- There will be no early, late, or makeup final exam.
**Course Grade Assignment**

- Course grade will be assigned based on the following criteria and posted to Rutgers BANNER Web system by January 03, 2020.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Total Score (100 points)</th>
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<tbody>
<tr>
<td>A</td>
<td>90.00 - 100.00</td>
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<tr>
<td>A-</td>
<td>88.00 - 89.99</td>
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<tr>
<td>B+</td>
<td>84.00 - 87.99</td>
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<tr>
<td>B</td>
<td>80.00 - 83.99</td>
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<tr>
<td>B-</td>
<td>75.00 - 79.99</td>
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<tr>
<td>C+</td>
<td>70.00 - 74.99</td>
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<tr>
<td>C</td>
<td>65.00 - 69.99</td>
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<tr>
<td>F</td>
<td>&lt; 65.00</td>
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</table>

**Tips for Enjoying This Course:** The only way to learn statistical programming is by writing lots of programs based on the understanding of why and how. There is no shortcut. Simply looking in the back of the book for solutions or asking others for answers will do nothing to improve your programming skills. Do your best to solve all the assigned problems yourself. Before working on those problems, make sure that you can write your own codes to execute all examples in the lecture notes without looking at the provided codes. This can be easily achieved by understanding why and how each code is used. You are encouraged to e-mail Course Instructor with questions after you write and run your own codes with the responses from software, and to discuss assigned homework problems with fellow students before submitting your own programs. It is imperative that you keep up with the work in this class. Practice, practice, practice until you are able to execute all examples in the latest lecture without looking at those examples, that will guarantee your readiness for the coming lecture. When keeping up the good work, you will be able to enjoy this course by improving your knowledge and achieving your anticipated grade.

**Selected Department Competencies Addressed:** Each Department identifies competencies for each degree offered. The competencies addressed in this course for the MPH curriculum in Biostatistics include:

- Apply basic probability theory and standard statistical methods to problems relevant to biomedical, clinical and public health research
- Use statistical computer packages to organize, analyze, and report collected data

Please visit the Department webpages on the School of Public Health’s website at [https://sph.rutgers.edu](https://sph.rutgers.edu) for additional competencies addressed by this course for other degrees and departments.
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.

Commitment to Safe Learning Environment: The Rutgers School of Public Health is committed to helping create a safe learning environment for all students and for the School as a whole. Free expression in an academic community is essential to the mission of providing the highest caliber of education possible. The School encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. The School encourages all students to disclose any situations where you may feel unsafe, discriminated against, or harassed. Harassment or discrimination of any kind will be not tolerated and violations may lead to disciplinary actions.
Reporting Discrimination or Harassment: If you experience any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. You may report such incidents to the RBHS Title IX Office or to the School of Public Health’s Office of Student Affairs. Rutgers University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. If you experience any other form of discrimination or harassment, including racial, ethnic, religious, political, or academic, please report any such incidents to the School’s Office of Student Affairs. The School strongly encourages all students to report any incidents of discrimination or harassment to the School. Please be aware that all Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers as listed in Appendix A to Policy 10.3.12) are required to report information about such discrimination and harassment to the School and potentially the University. For example, if you tell a faculty or staff member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty or staff member must share that information with the RBHS Title IX Coordinator. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can find a list of resources in Appendix A to University Policy 10.3.12. For more information about your options at Rutgers, please visit Rutgers Violence Prevention and Victim Assistance.

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.

Policy Concerning Use of Turnitin: Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (directly or via learning management system, i.e. Canvas) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

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