Time: N/A

Location: N/A

Instructors and Contact Information:
Chiu-Hsieh (Paul) Hsu
Email: pchhsu@email.arizona.edu
Office: Drachman A232
Instructor Availability: via email or webinar

Teaching Assistant: Aubrey Jensen (aubreyjensen@email.arizona.edu)

TA Office Hours
By appointment only

Catalog Description: This course introduces biostatistical methods and applications, and will cover descriptive statistics, probability theory, and a wide variety of inferential statistical techniques that can be used to make practical conclusions about empirical data. Students will also be learning to use a statistical software package (STATA or SAS).

Course Prerequisites: One year of college-level mathematics

Course Objectives: During the course, students will:
- Identify the properties of given data sets, including the level of measurement for each variable
- Apply appropriate descriptive statistics to the data according to its measurement type
- Apply appropriate inferential statistics to the data according to its measurement type
- Formulate and test hypotheses
- Use a computer statistical software package (Stata, SAS or R) to accomplish these objectives
- Apply your statistical knowledge to the design of research studies, including selection of proper research design and determination of sample sizes necessary to show statistical significance
- Interpret and critique medical and scientific journal articles which frequently rely heavily on statistical procedures

Learning Outcomes (Competencies Obtained):

Program Competencies Covered (MPH Program Level):

Upon completion of the course, students will be able to:
Evidence-based Approaches to Public Health:
1. Apply epidemiological methods to the breadth of settings and situations in public health practice
2. Select quantitative and qualitative data collection methods appropriate for a given public health context
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
4. Interpret results of data analysis for public health research, policy or practice

Communication:
19. Communicate audience-appropriate public health content, both in writing and through oral presentation

Biostatistics Concentration Competencies Covered (MPH/MS Programs):

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

Biostatistics MPH Competencies Covered:
1. Ability to select appropriate research designs to meet the needs of various studies, and be able to explain the limitations of implemented designs

Biostatistics MS Competencies Covered:
1. To demonstrate understanding of basic concepts of probability, random variation and commonly used statistical probability distributions
3. To suggest preferred methodological alternatives to commonly used statistical methods when assumptions are not met

Course Notes: A webpage has been created for this class using the Desire 2 Learn (D2L) interface. The course website contains the syllabus, lecture recordings, class notes, homework assignments and exams. Class announcements also will be posted on this site, so it is a good idea to check the site before each class to stay current.

To access the 576A website, login at: http://d2l.arizona.edu
- Click the 'UA NetID' Login.
- Enter your NetID and password, as you would to access your UA email account.

Under 'My Courses', click on: ‘BIOS 576A SP20 101 202’
- Announcements: This section contains any class announcements
- Content: Access the syllabus, lecture videos, class notes, homework assignments and homework solutions.
- Quizzes: weekly quiz, practice exams and exams.

The 8th Edition is available for purchase in the AHSC bookstore or from the publisher or other online sites. Alternatively, you may rent a hard copy or purchase electronic access from the publisher. The link is:


The link for the book companion site is:
http://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781305268920&token=9AE29419C1268A54CA68E32089062519410D57EECD1682449D0D980B44D9EDFCAB5D7594F170D4043A192E004D101E5706E711DD63BDA74735DF87FD02D550510A62BA38359CBF68

The book companion site includes:
- Data Set Descriptions (.doc)

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• Data Sets (required for homework)
• Study Guide (includes a summary of each chapter with additional problems and solutions)

Announcements:
A D2L course site is created for this course. All course announcements will be posted on the site. So check out the course site constantly! In addition, a list of students taking this course can be found on the course site. Students can use the list to find their study partners and exchange experience.

Course Format:
Each week’s lecture will be delivered through video streaming based on the PowerPoint slides created for each lecture.

Lectures, Discussions and Quizzes:
All of the lectures can be found under Content on the D2L site. All of quizzes, including exams, can be found under Quizzes on the D2L site.

Webinars:
There will be weekly webinars (Monday 4:30~5:30PM) throughout the semester and before each exam. It is not required for you to attend the webinars. The webinars will be recorded and posted on the course D2L site. You need to have internet access to join the webinar and can participate in discussion using either texting or microphone/speaker.

Course Requirements:

1. Watch the lecture videos

2. Homework
• The homework assignment for each week is included in each week’s module with the due date.
• The homework will be discussed in each week’s webinar before the homework is due. This is an opportunity to check that you have the correct answers if you work through the homework before the webinar.
• Late homework assignments will not be accepted. Homework must be turned in online to the appropriate assignment folder by midnight of the due date. Please make sure that you submit the homework to the correct assignment folder.
• Scoring: Each homework assignment is worth ten points. Partial credit (one point) will be given if an honest attempt at the problem was made even without the correct answer. No credit (zero points) is given if the problem was not attempted. If you turn in a completed homework assignment by the due date, you will get at least 7 points.
• Format: The homework can be typed or handwritten. Circle or highlight numeric answers that you calculate by hand. Remember to show your work so that the grader can give partial credit for a wrong answer. Bold, highlight, or otherwise emphasize those results that are obtained as computer output. Only include the correct computer output. Remember to compile your homework into one file.
• Answers are posted on the D2L website right after it is due. Please check the D2L site when your homework is returned to make sure that you understand the answers if you did not receive full credit.
• Keep copies of all of your homework so that you can study for the exams while your submitted work is being graded by the TA.
• You can drop your lowest four homework scores. It is best to reserve these for times that you are unexpectedly out of town, cannot turn in the homework due to illness, or your computer crashes with your homework on it.
• Please do not ask if you can turn in your homework late. The policy of dropping your lowest four scores was designed to protect you if the submission of your homework is delayed.

3. Online Examinations

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date available</th>
<th>Lectures and homework</th>
</tr>
</thead>
</table>

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Exams will include problems similar to the homework, interpretation of results from published papers, and selection of the most appropriate statistical analysis approach.

- You don’t need to use STATA to complete the exams.
- Each exam must be taken and submitted on D2L when it is available.

**4. Extra Credit**
- There may be extra credit available for the course

### Grading Scale/Student Evaluation and Policies:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Due Dates</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>Every Tuesday at 11:59PM if there is homework due.</td>
<td>30 (each homework weighted the same, even if length differs)</td>
</tr>
<tr>
<td>Exam 1</td>
<td>2/22</td>
<td>20</td>
</tr>
<tr>
<td>Exam 2</td>
<td>4/11</td>
<td>20</td>
</tr>
<tr>
<td>Final</td>
<td>5/9</td>
<td>20</td>
</tr>
<tr>
<td>Medical paper critique</td>
<td>5/6</td>
<td>5</td>
</tr>
<tr>
<td>Quizzes</td>
<td>5/6</td>
<td>5 (if you take ALL quizzes, including the 3 practice exams)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**Description of each Assessment and Competencies Covered by the Assessment**

**Homework:** Homework assignments build statistical analysis skills

**Exams 1 and 2 and Final:** MPH Competencies and Biostatistics Competencies listed above

Final grades are based on the following point system:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90% - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80% - 89%</td>
</tr>
<tr>
<td>C</td>
<td>70% - 79%</td>
</tr>
<tr>
<td>D</td>
<td>60% - 69%</td>
</tr>
<tr>
<td>E</td>
<td>59% or less</td>
</tr>
</tbody>
</table>

Grades will not be curved. The final grade will NOT be automatically rounded up but the instructor reserves the right to revise this scale, if necessary.

**Course Schedule:** Any changes to the following schedule will be announced in lecture or the D2L site. You are responsible for obtaining information on any changes.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>Introduction</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>Week 1</td>
<td>Descriptive Stats</td>
<td>Ch. 2 (skip 2.7)</td>
</tr>
<tr>
<td>Week 2</td>
<td>Probability</td>
<td>Ch. 3 (skip 3.8~3.10)</td>
</tr>
<tr>
<td>Week 3</td>
<td>Distributions</td>
<td>Ch. 4 and 5 (skip 4.1<del>4.7; 4.13; 5.6</del>5.8)</td>
</tr>
<tr>
<td>Week 4</td>
<td>Estimation</td>
<td>Ch. 6 (skip 6.3~6.4; 6.9)</td>
</tr>
<tr>
<td>Week 5</td>
<td>Exam 1</td>
<td>Ch. 1~6</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Week 6</th>
<th>Hypothesis Testing: One-Sample Inference</th>
<th>Ch. 7: 7.1<del>7.4; 7.7; 7.12</del>7.13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 7</td>
<td>Hypothesis Testing: Two-Sample Inference</td>
<td>Ch. 8 (skip 8.9~8.11)</td>
</tr>
<tr>
<td>Week 8</td>
<td>Nonparametric Methods</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>Week 9</td>
<td>Hypothesis Testing: Categorical Data</td>
<td>Ch. 10 (skip 10.5~10.8)</td>
</tr>
<tr>
<td>Week 10</td>
<td>Spring Break</td>
<td></td>
</tr>
<tr>
<td>Week 11</td>
<td>Power and Sample Size</td>
<td>7.5, 7.6; 8.10; 10.5</td>
</tr>
<tr>
<td>Week 12</td>
<td>Exam 2</td>
<td>Ch. 7~10</td>
</tr>
<tr>
<td>Week 13</td>
<td>Simple Linear Regression</td>
<td>Ch. 11: 11.1~11.6</td>
</tr>
<tr>
<td>Week 14</td>
<td>Multiple Linear Regression</td>
<td>Ch. 11: 11.7~11.10</td>
</tr>
<tr>
<td>Week 15</td>
<td>Multisample Inference (ANOVA)</td>
<td>Ch. 12 (skip 12.10)</td>
</tr>
<tr>
<td>Week 16</td>
<td>Review Final Inference</td>
<td></td>
</tr>
<tr>
<td>Week 17</td>
<td>Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

**Statistical Software:** You will need to use STATA to be able to complete the analyses required for the course. STATA will be emphasized during the lectures and weekly webinar.

**Purchasing STATA:**

You can order online at the following link:

http://stata.com/order/new/edu/gradplans/student-pricing

STATA 16 is the newest version. If you order using the link you will receive STATA 16. STATA/IC 16 can be purchased at an academic rate of $48 for a 6-month license, $94 for a one-year license and $225 for a perpetual license. After you purchase STATA you will be given directions on downloading and installing the package, with the necessary activation key.

If you have an older version of STATA, it will be fine for this class.

PDF versions of the manuals can be accessed from the Help Tab within STATA. There is no need to purchase the manuals.

**Tips for Succeeding in the Course:**

1. Watch the lecture videos
2. Ask questions about the lecture notes and textbook at the webinar
3. Do your homework and exams early
4. Check your homework answers against the answer key
5. Turn your homework, Exam 1, Exam 2 and Final in on time
6. Ask questions until you understand the material

**Communications:** You are responsible for reading emails sent to your UA account from your instructor and the announcements that are placed on the course web site. Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students

**Accessibility and Accommodations:**

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation. If our class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom

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seating is not usable. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/students

**Code of Academic Integrity**
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercise must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity, available through the office of the UA Dean Students: http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity

**Classroom Behavior:** (Statement of expected behavior and respectful exchange of ideas:
Present policies to foster a positive learning environment, including use of cell phones, mobile devices, etc.). Students are expected to be familiar with the UA Policy on Disruptive Student Behavior in an Instructional Setting found at: http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting

**Threatening Behavior Policy:** The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one’s self, http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

**Nondiscrimination and Anti-Harassment Policy:**
The University of Arizona is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

**UA Smoking and Tobacco Policy:**
The purpose of this Policy is to establish the University of Arizona’s (University) commitment to protect the health of University faculty, staff, students, and visitors on its campuses and in its vehicles, http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy

**Plagiarism:** What counts as plagiarism?
- Copying and pasting information from a web site or another source, and then revising it so that it sounds like your original idea.
- Doing an assignment/essay/take home test with a friend and then handing in separate assignments that contain the same ideas, language, phrases, etc.
- Quoting a passage without quotation marks or citations, so that it looks like your own.
- Paraphrasing a passage without citing it, so that it looks like your own.
- Hiring another person to do your work for you, or purchasing a paper through any of the on- or off-line sources.

**Syllabus Changes:** Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

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