Department of Epidemiology and Biostatistics

SYLLABUS
Epidemiologic Methods (EPID 573B)
Spring 2020

Time: Mondays & Wednesdays 1:30-2:45pm

Location: Drachman Hall A116, also Mondays only for Spring 2020 in Phoenix

Instructor: Leslie Dennis, MS, PhD
Professor
Email: ldennis@email.arizona.edu with 573B in the Subject line

Instructor Availability: (Email the instructor to request an appointment. The instructor does not check email 24 hours a day 7 days a week. Expect a response within the next 2 business days (so within 24-48 hours). Typically, appointments are best on Mondays and Wednesdays prior to class.

Teaching Assistant: Abraham Ocejo Garcia aocejogarcia@email.arizona.edu
Preceptor: Kim Parra klparra@email.arizona.edu (in-class on Mondays)

Since there is no course TA, some assignments will be completed on your own by hand, and then entered into an Assignment under Quizzes to be graded. Other assignments will be brought to class for grading by you, fellow students and/or the instructor, with a few remaining assignments graded after submission to D2L. Since there is not a TA, several Practice Problems are provided with solutions similar to Assignments and Exam questions.

Catalog Description: This course will increase the student's understanding of research methods in epidemiology and provide practice for the epidemiology student to design research studies and review other epidemiologic research designs.

Course Prerequisites:
- Epidemiology: Epidemiology 573A (Basic Principles in Epidemiology)
- Biostatistics: Epidemiology 576A (Biostatistics for Public Health)

Course Objectives and Expected Learning Outcomes:
This course will expand on basic concepts and principles of epidemiology discussed in 573A and 576A, and go into more depth in epidemiology methods.

- Course Objectives: Upon completion of this course students will be able to:
  - Describe the strengths and limitation of various study designs
  - Realize the major sources of bias & contrast across study designs,
  - Illustrate the methodological characteristics of the most important data collection techniques,
- Describe the strengths and limitation of using existing data,
- Develop skills to use research methods in epidemiologic, and
- Communicate results.

**Learning Outcomes (Competencies Obtained):**

**MPH Program Competencies Covered (MPH Program level):**
Core MPH competencies that will be addressed during this course from the 22 CPEH required competencies include parts of 1-4.

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 data using biostatistics, informatics, computer-based programming and software, as appropriate.
4. Interpret results of data analysis for public health research.

**Concentration Competencies Covered:**
The competencies below are covered in lectures, class activities and assignments.

**Epidemiology MPH Program (in-person) specific Competencies Covered:**
(2) Compare the relative strengths and weaknesses of epidemiological study designs, and choose the most appropriate design for specific research questions.
- Assessment is via Assignments1-4: outline the components of case-control studies; Assignment 5 describing findings from cohort studies; Assignment 6 describing biases within study designs; Assignment 7 designing a study then discussing and revising with classmates. These concepts are then included on quizzes 1 & 2, the midterm and final.

(3) Calculate and interpret appropriate measures of disease frequency and excess risk across multiple study designs.
- Assessment is via calculations for in-class activities on study design; then later again when calculating disease frequency and excess risk when examining confounding and effect modification (see specifics listed below in 4).

(4) Assess and identify strategies to minimize bias in analytic studies, along with assessing effect modification and confounding, then stratifying or adjusting as appropriate in analyses.
- Assessment of bias within study design issues listed above in (2) along with Assignment 8 on reliability and misclassification (also assessed on the midterm).
- Assessment of confounding and effect modification is via Assignments 10-17 including calculating crude, stratum specific and adjusted ORs/RRs by hand and using logistic regression techniques along with interpreting models presented in published papers and from STATA and SAS output. This material is also assessed on quizzes 3 & 4 and the final exam.

(5) Interpret epidemiological analyses in the context of published literature and communicate key findings to various audiences.
- Assessment is via interpreting models presented in published papers and from STATA and SAS output. This material is also assessed on quiz 4 and the final exam.

**MS Epidemiology Competencies:**
(1) Select appropriate study design for assessing the association between a given exposure and an outcome, and then understanding advantages and limitations of these approaches.

- Assessment is via Assignments 1-4: outline the components of case-control studies; Assignment 5 describing findings from cohort studies; Assignment 6 describing biases within study designs; Assignment 7 designing a study then discussing and revising with classmates. These concepts are then included on quizzes 1 & 2, the midterm and final.

(3) Identify potential sources of bias for various study designs and their impact on study quality.

- Assessment of bias within study design issues listed above in (2) along with Assignment 8 on reliability and misclassification (also assessed on the midterm).

(4) Conduct descriptive and analytic analyses, including strategies to assess confounding and effect modification methods, to make statistical inferences.

- Assessment of confounding and effect modification is via Assignments 10-17 including calculating crude, stratum specific and adjusted ORs/RRs by hand and using logistic regression techniques along with interpreting models presented in published papers and from STATA and SAS output. This material is also assessed on quizzes 3 & 4 and the final exam.

Partial ability to (6) Demonstrate ability to manage and analyze epidemiological data from a one (rather than a variety of sources) sources.

- Assessment is via analyses of data and individually to consider coding of variables before running analyses, running analyses in SAS or STATA then presenting the methods used and results from STATA or SAS output in a Table format as if for publication. This material is also partially assessed on quiz 4 and the final exam.

(7) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.

- Assessment is via presenting methods and results from class analyses in written format as if for publication. This prepares students to take these concepts further in EPID 573C.

**PhD Epidemiology Competencies:**

(3) Design appropriate studies using causal inference principles for testing hypotheses in specific populations, after evaluating specific design advantages and limitations.

- Assessment is via Assignments 1-7 by outlining the components of case-control studies, describing findings from cohort studies and describing biases within study designs; then applying these concepts to design a study and help other students identify potential issues within their study designs. These concepts are then applied to examples on quizzes 1 & 2, the midterm and final.

(4) Evaluate the integrity, comparability, and limitations of data to make inferences related to analyses and results.

- Assessment is via Assignment 6 to describing biases within study designs by comparing the advantages of biases avoided by some designs, then apply to designing study. They then evaluate the limitation of data and making inferences within the analyses of confounding and effect modification by considering how their assigned main exposure is related to other factors measured.

**Course Notes:** All course material will be available on D2L.
Required Textbook and Readings: none
Readings and Notes will be provided on the D2L website.

Required or Special Materials:
- Calculator (not connected to internet for exams thus not cell phone or computer)
- Pencil or black pen for completing assignments not typed and not submitted via D2L quizzes after completing
- Pencil or non-gel blue or black pen for exams

Students are expected to either bring assignments to class on their laptops or a printed version. Please review assignments for clarifications of when a printed version is required.

Additionally, students are expected to have and bring to class a blue pen to mark-up printed assignments when required based on in-class discussions, to be turned in at the end of class for credit or scanned to D2L.

Course Software:
Assignments are typically expected to be completed in MS Word. There may be occasion to use Excel.

Students will have the choice to use either STATA or SAS statistical packages to conduct their analyses of the survey data. Thus, the course will provide STATA and SAS programming tutorials. Students are responsible for obtaining access to either STATA or SAS statistical software. R is not supported by this course.

Students will also need to have access to Qualtrics, which is available to University of Arizona students. Qualtrics is a program that develops online surveys (or data entry programs). EPID 573B will only provide information on how to use Qualtrics for developing survey items. The group assignment for online survey software will either require output from Qualtrics.

Course Requirements:
Preliminary quiz (for no grade) required to get access to Assignment #1.

This course is 15-16 weeks. For a UA 15-week course you are expected to spend 3 hours per week in class plus 6-9 hours outside of class for a 3 credit course. Since this is the second semester epidemiology methods course, it tends to be the meat of epidemiological methods and for many students it may take the maximum time most weeks to complete assignments and prepare for quizzes and exams.

The class project(s) will include the following that are specifically listed as assignments.

a) Design a survey in Qualtrics with your assigned Group B (Tutorials will only cover this online software not others). Each group will be assigned topics (to save time), design the survey items, and then enter them into Qualtrics using relevant skip logic and range checks.

b) Here students will analyze the results of a prior survey in STATA or SAS. Groups will be stratified by use of STATA or SAS.
   a. Your assigned Group C will include other students with topics on the same dataset. The groups are expected to work together for initial programming to read in data and to run descriptive analyses on demographic factors for a Table 1 (if you were writing a whole article).
b. Each student will be randomly assigned to an analysis topic (unique outcome & exposure combination). Students will then edit and add to the group program to examine crude and adjusted models for their outcome & exposure.

Due to the limited time within a semester, these 2 class projects are separate since analyzing your own survey data would add a lot of other steps.

Typically each Week will have:

**Readings** – are expected to be completed prior to class on the date that they are listed.

**Assignments** – to be turned in for credit prior to class on the date listed. Points are listed for each Assignment on the schedule. Assignments will be worth 10 points.

- A few Assignments will be turned in under D2L Assignments. These should be in Word so that the instructor can give feedback using tracked changes.
- Most assignments will be turned in by entering your answers into the relevant labeled Assignment under D2L Quizzes to auto grade since this course does not typically have a TA. I advise students to complete these Assignments in Word or on paper prior to opening the quiz. These assignments under D2L Quizzes do allow the maximum of 10 attempts.

5 other in-class or other exercises each worth minimal points, 5 points each.

**Discussions** – are to expand upon some ideas, more specifically to provide GROUP discussions on Assignment to post, so that afterwards individuals can comment on disagreements, discrepancies, other details and/or clarifications requested for the whole class to review with instructor comments.

**Quizzes** – there will be 4 online timed quizzes to help students to identify when they may not be grasping basic aspects of the topics. While they are open notes, they are timed so that the material should be known.

2 exams – these cover materials in class and/or Assignments. They are timed.

**Grading Scale/Student Evaluation and Policies:**

**Assignments & In-class exercises (25% of grade)**

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.

- Points and due dates are listed for each Assignment.
- The Assignments walk students through important epidemiological concepts.
- **Due to the pace of this course note late Assignments will be accepted/graded.**
- Download the homework assignment in Word.

- Turning in Assignments:
  - Submitted under Quizzes: Most assignments after they are completed need to be entered under Quizzes listed as Assignments so that D2L will self-grade the Assignment for course points. The instructor recommends that you complete assignments in Word or by Hand before submitting to the Assignment under Quizzes. You may also want to bring them to class for discussion.
  - Submitted to the Assignment tab: When requested Upload the Assignments in one Word file unless otherwise specified. Assignments must be submitted as a Word file not PDF to the Assignment tab by the due date. This will allow the instructor to provide feedback
through track changes. Feedback will not be provided for any non-Word documents submitted. For these assignments download the homework assignment in blue or bold font within the Word document when submitted for assignments listed under the Assignments pulldown tab. Points will be taken off for not using the required fonts (Arial 11 pt) and 1 inch margins on written assignments listed under the assignment tab.

- A detailed Answer Key will typically post after an Assignment is due. Thus, no late assignments will be accepted after the Answer Key has posted.
- There are 15 Assignments each worth 10 points = 150 points.

In-class exercises:
- Additionally, there will be 25 points; 5 points each for 5 other minor In-class exercises. To receive credit, students need to be In-class and participate in group activities or complete the individual assignment as relevant. These will be classified differently from Assignments. One extra credit In-class/Group A assignment has been added.

Discussions:
- Discussion boards/comments are set up for clarifications that they whole class may benefit from.

Additionally, the instructor has set up a sharing mechanism for group assignments. During the semester each student will be assigned to 3 different groups, one each for: study design assignments, survey design and analyzing data.

Assignments & In-class Exercises: 25% (150+25= 175 of 700 points)

Quizzes (17.8% of grade):
There will be 4 quizzes (worth 25, 40, 30 and 30 points). The purpose of quizzes is for student to attempt to gage where they are in their understanding of course concepts prior to exams. Thus, for quizzes with low scores, the student should prepare more for exams. The quiz points are worth less than exam points, thus are lower impact at a time where modifications can be made in studying techniques, studying with other students and meeting with the instructor if proactive.

Exams (57.1% of grade):
There will be 2 exams: one before spring break and a final exam, each 200 points. The exams will account for 400 points out of 700 points, so for 57.1% of your grade. Make-up exams will only be considered with valid excuses determined by the instructor and based on UA policies, and must be scheduled and taken prior to the scheduled midterm and final exams. Students with disabilities are responsible for informing the instructor via UA policies at the beginning of the semester.

Assignments & Points are also shown on the Course Schedule below.

Therefore:

Assignments & In-class Exercises: 25% (150+25= 175 of 700 points)
Quizzes: 17.8% (125 of 700 points) based on 4 quizzes
Exams: 57% (400 of 700 points) based on 2 exams

**Grading Scale:** Regular grades are awarded for this course (A, B, C, D, E.)

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<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
<td>630-700</td>
</tr>
<tr>
<td>B</td>
<td>80-89.99%</td>
<td>560-629</td>
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<tr>
<td>C</td>
<td>70-79.99%</td>
<td>490-559</td>
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<tr>
<td>D</td>
<td>60-69.99%</td>
<td>420-489</td>
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<tr>
<td>E</td>
<td>&lt; 60%</td>
<td>0-419</td>
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</table>

If you think the instructor has made an error in grading, please email the instructor in a polite manner as soon as possible (not at the end of the course).

**Incomplete Grades not allowed:** Since this class is only taught once a year and is required for 573C, incomplete grades are not allowed except for extreme medical emergencies.

Late Assignments will not be accepted unless revised dates are posted for the whole class.

**Class Attendance/Participation:** Expected for lectures and required for exams. Class Discussions are very important.

All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. **These need to be identified to the instructor in week 1 of the course.** Extensions in due dates pre-approved by the UA Dean of Students (or Dean’s designee) will be honored. Therefore, they need to be brought up during the first week of class.

**Course Schedule:** see attached and updates on D2L

**Classroom Behavior:** Expected behavior is to allow for respectful exchange of ideas: these include being respectful towards your fellow student and instructor(s) when communicating in class, or via Discussion boards and email. This includes not using cell phones and other mobile devices in class.

**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](https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students)

**University Course Policies:** [https://academiaffairs.arizona.edu/syllabus-policies](https://academiaffairs.arizona.edu/syllabus-policies)

These policies include Threatening Behavior Policy, Accessibility and Accommodations, Code of Academic Integrity, and Nondiscrimination and Anti-Harassment Policy

**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.

**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 campuses and in its vehicles. The official policy can be found at: [http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy](http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy)
**Plagiarism:** Plagiarism can occur when a student copies text word-for-word (direct quoting should rarely be used in epidemiology) instead of paraphrasing and correctly referencing materials used for preparing a written assignment. This includes fictitious or incorrect references. If plagiarism is detected on an assignment, it will result in automatic failure for that assignment.

A second offense or plagiarism of the final manuscript will result in automatic course failure. All these actions will be reported to the Program Director, the Dean of the College of Public Health, and the Dean of Students. This policy is in place for this class because scientific writing is a fundamental skill at both the undergraduate and graduate level in this field, and for this course. If you feel you are unsure as to what might constitute plagiarism, there are numerous resources at the University of Arizona, including the writing lab, to help you understand and avoid plagiarism.

**Plagiarism & Cheating: What counts as plagiarism or cheating?**

- Copying and pasting information from a website or another source.
- Copying and pasting information from a website 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.
- Asking someone else the answers to the assignments then using those answers.
- 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.

The Epidemiology Program faculty members reserve the right to check assignments or papers with TurnItIn for plagiarism.

**Classroom civility:** In this interactive course it is expected that students and the instructor will:

a. use respect (including disagreeing respectfully) both when posting and responding to posts
b. listen to discussions/posts and involve others
c. resist the temptation to dominate discussion by waiting for others to contribute
d. consider everyone’s opinions to be “valid” or at least interesting or a reference point for examining one’s own opinions; allow thinking broadly, “outside the box”
e. appreciate a small amount of tension (too much “sameness” means dull discussion)
f. stay focused on the subject (anyone can raise the possibility that discussion is getting too tangential, that too much time is being spent on a small issue, that other issues are being neglected. Others can challenge this and defend spending more time.)

**Recommended Learning Strategies**

To be an effective learner in this course the following are strongly encouraged:

1. Continuously monitor the course outline. The course outline includes all deadlines for the course. Do not expect to be reminded of any of the due dates on the course outline. Unless otherwise notified, students are accountable for meeting all deadlines as listed on the outline.
2. Check the course website regularly for announcements.
3. Read all recommended readings.
4. Participate in class discussion.
5. Ask questions.
6. Answer questions.
7. Use the discussion boards.
8. Listen to your classmates; their insights are an important source of learning in this course. A general rule of thumb is to let at least two other people have a chance to say something before you speak again.

Gender Pronoun Guideline
It is already UA policy that class rosters are provided to instructors with a student’s preferred name. Students may share their preferred name and pronoun with members of the teaching staff and fellow students, as desired, and these gender identities and gender expressions will be honored in this course. As the course includes group work and in-class discussion, it is critical to create an educational environment of inclusion and mutual respect. In this class, to be inclusive of all gender identities and expressions, students will be referred to by their first or last names, the pronoun of their choice, or by default, the pronoun “they”.

This course affirms people of all gender expressions and gender identities. Feel free to correct instructors on your preferred gender pronoun. To inform all of your instructors, you can add your gender pronoun in UAccess, by clicking edit your name then Pronoun is below your name.

Content Warning
This course addresses topics including sexually transmitted infections (STIs) and sexual activity practices (that may be related to STIs), often leading to valuable discussions on topics such as confounding and causal pathways. Course material includes content that is explicit in its depiction of number and type of sexual partners. The instructor will provide advance notice when such materials will be used: these topics are in data potential assigned for Assignments 15-17. Please contact the instructor to discuss any content-related concerns, as alternative materials may be available.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Readings/Presentation to review prior to class</th>
<th>Assignments:</th>
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</thead>
<tbody>
<tr>
<td>#1</td>
<td>Jan 15</td>
<td>Overview of course &amp; review 573A</td>
<td>#1-15–due prior to 1:30pm date listed;</td>
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<td>In-Class - due 1pm 2 days after date listed, unless</td>
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<td>otherwise specified -see D2L</td>
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<tr>
<td>#2</td>
<td>Jan 20</td>
<td><strong>HOLIDAY – NO CLASS</strong></td>
<td><strong>Assign 1:</strong> Individual rev Wacholder I-III</td>
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<td>Jan 22</td>
<td>Ecologic &amp; Cross-sectional (&amp; work on</td>
<td><strong>Assign 2:</strong> Group review of Wacholder I-III</td>
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<td>Assignment #2 due by Friday 3pm)</td>
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<td></td>
<td></td>
<td>Wacholder I</td>
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<td>Wacholder II</td>
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<td>Wacholder III</td>
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<tr>
<td>#3</td>
<td>Jan 27</td>
<td>Principles of Case-control Studies</td>
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<td>Jan 29</td>
<td>Types of Controls in C-C studies</td>
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<tr>
<td>#4</td>
<td>Feb 3</td>
<td>Case-Control Design Options</td>
<td>0) In-class Grp A: Article review</td>
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<td>Feb 5</td>
<td>Compare &amp; Contrast Design Options</td>
<td>1) In-class Grp A: Case-control comparison</td>
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<td>Quiz 1 C-C (25 pts) due 2-8-20 7:30pm</td>
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<td>Assign 1: Individual rev Wacholder I-III</td>
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<td>Assign 2: Group review of Wacholder I-III</td>
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<tr>
<td>#5</td>
<td>Feb 10</td>
<td>Cohort</td>
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<td>Feb 12</td>
<td>Cohort</td>
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<td>Cohort Notes</td>
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<tr>
<td>#6</td>
<td>Feb 17</td>
<td>RCT</td>
<td>10</td>
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<td></td>
<td>Feb 19</td>
<td>In-class Study Design</td>
<td>10</td>
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<td>Quiz 2 (40 pts) due 2-22-19 7:30 pm</td>
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<td>Assign 3: Exist Cohort Studies</td>
<td>10</td>
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<td>2) In-class (individual): calculate CI and ID</td>
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<td>3) In-class Grp A: Design a Cohort Study</td>
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<tr>
<td>#7</td>
<td>Feb 24</td>
<td>Reliability &amp; Misclassification</td>
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<td>Feb 26</td>
<td>Reliability &amp; Misclassification</td>
<td>10</td>
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<tr>
<td>#8</td>
<td>Mar 2</td>
<td>Review</td>
<td>10</td>
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<tr>
<td></td>
<td>Mar 4</td>
<td>Exam 1 (200 pts)</td>
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<td>Mar 8-14 <strong>SPRING BREAK – NO CLASS</strong></td>
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<tr>
<td>#9</td>
<td>Mar 16</td>
<td>Survey Design, Group B work session</td>
<td>5)Online-Complete 2 surveys in Qualtrics.</td>
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<td>Mar 18</td>
<td>-work with Group B in-class or other</td>
<td>No required class this week but group work.</td>
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<td></td>
<td>Survey Design, Group B work session</td>
<td>Dr. Dennis will be in classroom or her office.</td>
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<tr>
<td>#10</td>
<td>Mar 23</td>
<td>Confounding</td>
<td>10</td>
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<td></td>
<td>Mar 25</td>
<td>Effect Modification (EM)</td>
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<td>skim notes</td>
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<tr>
<td>#11</td>
<td>Apr 1</td>
<td>Work through problems</td>
<td>10</td>
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<tr>
<td></td>
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<td>Confounding &amp; Effect Modification</td>
<td>10</td>
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<td>skim notes</td>
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<tr>
<td>#12</td>
<td>Apr 6</td>
<td>Confounding &amp; Effect Modification</td>
<td>10</td>
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<td>Apr 8</td>
<td>Confound &amp; EM→Multivariate</td>
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<td>Quiz 3 (30 pts) due 4-11-20 7:30pm</td>
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<td>Assign 8: Group B Completed Survey</td>
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<td>Practice Problems C+EM</td>
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<tr>
<td>#13</td>
<td>Apr 13</td>
<td>STATA &amp; SAS tutorials online</td>
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<tr>
<td></td>
<td>Apr 15</td>
<td>STATA/SAS &amp; Presenting Results</td>
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<td>#14</td>
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<td>Apr 29</td>
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<td>Quiz 4 (30 pts) due 5-2-20 7:30 pm</td>
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<td>#16</td>
<td>May 4</td>
<td>Multivariate Analyses</td>
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<td>May 6</td>
<td>Review</td>
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<td>**May 11 **Final Exam (200 pts): 1 –3 pm</td>
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<td>Monday room Drachman A118</td>
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</table>

EC= extra Credit

Assignments:

- #1-15–due prior to 1:30pm date listed;
- In-Class - due 1pm 2 days after date listed, unless otherwise specified -see D2L

EC= extra Credit