Class time  T Th 11.00-12.15
Class location  McGavran-Greenberg Hall 2301
Labs  Variable.

Instructors  Daniel Westreich  djw@unc.edu
Wayne Rosamond  wayne_rosamond@unc.edu

TAs  Amy Huber  anhuber@live.unc.edu
Ruth Link-Gelles  ruthlg@live.unc.edu
Marissa Seamans  seamans@live.unc.edu

Office hours  starting August 25
Instructor  TBD  McGavran-Greenberg Hall 2105C
TAs  Tuesday 9.00-10.00  Epidemiology student room
Tuesday 12.30-1.30  Epidemiology student room
Thursday 10.00-11.00  Epidemiology student room

Honor code  Academic integrity is at the heart of Carolina and moreover at the heart of the scientific enterprise. We all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system. Information, including your responsibilities as a student is outlined in the Instrument of Student Judicial Governance. Your full participation and observance of the Honor Code is expected. If you have any questions about this issue, you may talk with the Instructors or a TA. (Most language directly from http://studentconduct.unc.edu/faculty/honor-syllabus).

Grading  Grades are based on four components: take-home exercises (24% of final grade); mid-term exam (24% of final grade); final exam (36% of final grade); and lab (16% of final grade). High pass will be given for final grade of 90.0 and above; pass for 70.0-89.9; low pass for 60.0-69.9; fail for <60.0.

Exercises  The three exercises are to be completed independently, without help from any other students. Late policy: 50% of your final score is deducted for each day late. If you have a scheduling conflict which will prevent you from completing or turning in the assignment on time, talk to the Instructor one week before the assignment is due. Reasonable exceptions will be made for sicknesses and emergencies.

Labs  Attendance in lab is required without prior authorization from your TA; active participation is expected. Labs are posted 1 week in advance; you are required to email your answers to lab questions to your TA by 9.45am the Monday of that lab session. (That is, Lab 2 is due at 9.45am on September 8). You may work in groups and consult whatever guides you wish to complete the labs; however, your words must be your own (do not copy answers word-for-word from each other). Lab grade will be determined as: 75% of lab grade is based on the completed labs you send to your TA. We will randomly select one question from each lab to grade as pass/fail for effort, not for accuracy: making a valiant attempt at answering a question will be a pass, even if your answer is wrong. 25% of lab grade is based on leading or co-leading at least one lab session; your TA will talk to you about this during the first lab session.

Exams  Mid-term exam is in a regular class period. Final exam is in the final exam period on December 11. You are not permitted to access any previous exams for this class, subject to the Honor Code.

Schedule  See following page, along with readings, assignments, and overview. Readings follow.
<table>
<thead>
<tr>
<th>Date</th>
<th>Subject</th>
<th>Subtopics</th>
<th>Readings/Assignments†</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/19</td>
<td>Epidemiology &amp; society</td>
<td>Asking good questions</td>
<td>Rothman Chapters 1-2</td>
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<tr>
<td>8/21</td>
<td>Occurrence</td>
<td>Survival, risk, rate</td>
<td>Rothman 4; ME3 3*</td>
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<tr>
<td>8/25</td>
<td>LAB 1</td>
<td>Measures of occurrence</td>
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<tr>
<td>8/26</td>
<td>Occurrence</td>
<td>Prevalence, incidence</td>
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<tr>
<td>8/28</td>
<td>Contrasts</td>
<td>Differences, ratios, attributable proportions, 2x2 tables.</td>
<td>CI 1; Optional – paper 5 Exercise 1 out</td>
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<tr>
<td>9/2</td>
<td>LABOR DAY</td>
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<tr>
<td>9/4</td>
<td>Causality</td>
<td>Potential outcomes; exposure/intervention; Identifiability assumptions. Causal diagrams.</td>
<td>Cl 2, 3; Rothman 3; Optional – paper 1; CI 6 Exercise 1 due</td>
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<tr>
<td>9/8</td>
<td>LAB 2</td>
<td>Causality</td>
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<tr>
<td>9/9</td>
<td>RCTs 1</td>
<td>Theory &amp; conduct. Modification/interaction, power, generalizability, missing data (LTFU).</td>
<td>Cl 4, 5; Rothman 8, 9, 11; Optional - CI 10</td>
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<tr>
<td>9/11</td>
<td>RCTs 2</td>
<td>RCTs</td>
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<tr>
<td>9/15</td>
<td>LAB 3</td>
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<tr>
<td>9/16</td>
<td>RCTs 3</td>
<td>Analytic exercise in trials analysis, and standardization.</td>
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<tr>
<td>9/18</td>
<td>RCT example</td>
<td>BAN background, statistical/ design/implementation challenges, communication (van der Horst)</td>
<td>Paper 2</td>
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<tr>
<td>9/22</td>
<td>LAB 4</td>
<td>Effect Measure Modification &amp; Interaction &amp; Standardization</td>
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<td>9/25</td>
<td>Observational cohorts 2</td>
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<tr>
<td>9/29</td>
<td>LAB 5</td>
<td>Observational study theory</td>
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<tr>
<td>9/30</td>
<td>Observational cohorts 3</td>
<td>...continuation of the above</td>
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<tr>
<td>10/2</td>
<td>Observational example</td>
<td>ARIC (Heiss &amp; Avery)</td>
<td>ARIC papers (TBD)</td>
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<tr>
<td>10/6</td>
<td>LAB 6</td>
<td>Confounding</td>
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<tr>
<td>10/7</td>
<td>Linear regression</td>
<td>Intuitive intro to concepts in regression, scatterplots, OLS</td>
<td>Rothman 12 Exercise 2 due</td>
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<tr>
<td>10/9</td>
<td>Putting it together Part I</td>
<td>Review of concepts so far, based on class/TA input</td>
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<tr>
<td>10/13</td>
<td>LAB R1</td>
<td>TA-led review sessions</td>
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<tr>
<td>10/14</td>
<td>MIDTERM</td>
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<td>10/16</td>
<td>FALL BREAK</td>
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<tr>
<td>10/20</td>
<td>LAB 7</td>
<td>Reading/reviewing the literature</td>
<td>Rothman pp 87-107, 126-133; Cl 8; paper 3; paper 4</td>
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<tr>
<td>10/21</td>
<td>Case-control 1</td>
<td>Theory, conduct; selection bias (missing data, Berkson’s bias)</td>
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<tr>
<td>10/23</td>
<td>Case-control 2</td>
<td></td>
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<tr>
<td>10/27</td>
<td>LAB 8</td>
<td>Case-control theory</td>
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<tr>
<td>10/28</td>
<td>Case-control 3</td>
<td>Analysis of case-control studies (Mantel-Haenszel)</td>
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<tr>
<td>10/30</td>
<td>Case-control example</td>
<td>Long Island Breast Cancer study (Gammon)</td>
<td>(TBD)</td>
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<tr>
<td>11/3</td>
<td>LAB 9</td>
<td>Case-control analysis; selection bias</td>
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<tr>
<td>11/4</td>
<td>Surveillance/screening 1</td>
<td>Surveillance; screening; measurement/information bias; correcting measurement bias. Exposure assessment.</td>
<td>Rothman pp 133-136; CI 9</td>
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<tr>
<td>11/6</td>
<td>Surveillance/screening 2</td>
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<tr>
<td>11/10</td>
<td>LAB 10</td>
<td>Surveillance</td>
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<tr>
<td>11/11</td>
<td>Surveillance example</td>
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<tr>
<td>11/13</td>
<td>Hierarchies of study design</td>
<td>Ecologic; cross-sectional; crossover; meta-analysis. + random error; Bayesian inference.</td>
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<tr>
<td>11/17</td>
<td>LAB 11</td>
<td>Misclassification/Information bias</td>
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<tr>
<td>11/18</td>
<td>Math modeling</td>
<td>Basic predator-prey &amp; SIR models (Powers)</td>
<td>Exercise 3 out</td>
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<tr>
<td>11/20</td>
<td>Communicating results</td>
<td>Visual displays of data; interacting with policy makers (Rosamond)</td>
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<tr>
<td>11/24</td>
<td>LAB 12</td>
<td>Study theory; meta-analysis</td>
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<tr>
<td>11/25</td>
<td>Conflicts of interest</td>
<td>Panel discussion; also broader ethical questions</td>
<td>Exercise 3 due</td>
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<tr>
<td>11/26</td>
<td>THANKSGIVING</td>
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<tr>
<td>12/1</td>
<td>LAB R2</td>
<td>TA-led review sessions</td>
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<tr>
<td>12/2</td>
<td>Outro/capstone</td>
<td>Putting it all together</td>
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<tr>
<td>12/11</td>
<td>FINAL</td>
<td>At noon</td>
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</table>
Readings
†Indicates that when not otherwise noted, a number indicates a chapter. E.g. CI 9 means Causal Inference, chapter 9.
*Italics denotes supplemental (optional) readings; all ME3 readings are optional but highly recommended.

(CI) Hernán MA, Robins JM. Causal Inference.