COURSE DESCRIPTION:
Advanced Topics in Epidemiology expands on many of the same topics as H526, exploring them in greater breadth and depth. Topics include causal theory, measures of disease and association, confounding, selection bias, predictive models, directed acyclic graphs, effect modification, mediation, indirect and direct effects, study design, and other contemporary topics.

Prerequisites: H526, H581
Co-requisites: None

LEARNING RESOURCES: Will be posted on Canvas and consist of 2-4 published articles per week.

STUDENT LEARNING OUTCOMES:
• Critique modern causal theory and apply causal models
• Identify appropriate measures of disease and association
• Apply advanced methods to address sources of bias in epidemiologic studies
• Evaluate the role of statistical models in epidemiologic investigations
• Assess confounding, mediation, and effect modification in epidemiologic studies
• Identify strengths and weakness of study designs

PROGRAM COMPETENCIES IN PUBLIC HEALTH:
Upon satisfactory completion of the degree in Public Health/Epidemiology, the students will have met the program competencies found at http://health.oregonstate.edu/degrees/competencies

COURSE CONTENT:

SCHEDULE

<table>
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<th>Unit</th>
<th>Week</th>
<th>Topics</th>
<th>Assignments</th>
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<tr>
<td>UNIT 1: CAUSAL THEORY</td>
<td>Week 1</td>
<td>Causal theory, causal models</td>
<td>Weekly reading and Homework 1</td>
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<tr>
<td>UNIT 2: MEASURES OF DISEASE AND ASSOCIATION</td>
<td>Week 2</td>
<td>Cumulative incidence and incidence density, standardization</td>
<td>Weekly reading and Homework 2</td>
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<td>Week 3</td>
<td>Population attributable fraction</td>
<td>Weekly reading and Homework 3</td>
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UNIT 3: BIAS AND ERROR
Week 4 Confounding, information bias, other biases Weekly reading and Homework 4
Week 5 Selection bias, imputation, inverse probability weighting Weekly reading and Lab 1
UNIT 4: STATISTICAL MODELS
Week 6 Estimation & inference, statistical interaction, additive and multiplicative risk Weekly reading and Homework 5
Week 7 Predictive vs. associative models Weekly reading and Homework 6
UNIT 5: PATHWAYS AND MECHANISMS
Week 8 Directed acyclic graphs, mediation Weekly reading and Homework 7
Week 9 Indirect and direct effects Weekly reading and Lab 2
UNIT 6: STUDY DESIGN
Week 10 Case-control studies, other study designs Weekly reading and Homework 8

EVALUATION OF STUDENT PERFORMANCE:

ASSIGNMENTS:
Exercises will be due Mondays before class, one week after they are assigned. Please submit through Canvas.

Labs should be submitted to Canvas by 6pm on the due date listed above. Exercises and labs should be typed. Late exercise and labs will be penalized 20% per day.

Students may consult one another on exercises and labs, but work should be conducted separately. Assignments should be completed independently.

Students should submit any statistical software code with assignments; code should be complete and annotated.

Assignments will be graded blindly. Please do not put your name in the document or file name.

Each student will be assigned a different topic to summarize for their fellow students (Topic Summary) at the beginning of the subsequent class session. Students are encouraged to meet with the instructor before their Topic Summary.

GRADING:
1000 points:
8 exercises (75 points each; 600 points)
2 labs (150 points each; 300 points)
Topic Summary (100 points)

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<thead>
<tr>
<th>93-100% A</th>
<th>90-92% A-</th>
<th>87-89% B+</th>
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<tbody>
<tr>
<td>83-86% B</td>
<td>80-82% B-</td>
<td>76-79% C+</td>
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<tr>
<td>73-76% C</td>
<td>70-72% C-</td>
<td>66-69% D+</td>
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<td>63-66% D</td>
<td>60-62% D-</td>
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DIVERSITY STATEMENT
The College of Public Health and Human Sciences strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

EXPECTATIONS FOR STUDENT CONDUCT
The Student Conduct Code establishes community standards and procedures necessary to maintain and protect an environment conducive to learning, in keeping with the educational objectives of Oregon State University. This code is based on the assumption that all persons must treat one another with dignity and respect in order for scholarship to thrive. For the full Student Conduct Code see http://oregonstate.edu/studentconduct/

Academic or Scholarly Dishonesty is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For specifics related to offenses proscribed by the University see: http://oregonstate.edu/studentconduct/offenses-0

RELIGIOUS HOLIDAY STATEMENT
Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

STUDENTS WITH DOCUMENTED DISABILITIES
“Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Student with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.”