Epidemiology is the cornerstone of many different disciplines. NUR 59900 is an online methods course, which is requisite for many health-related fields. The design of the course is to teach thinking and problem-solving skills. The course does not focus on teaching you “what to think;” rather, it teaches you “how to think.” As a professional, people do not bring you answers. They bring you questions that may take the full extent of your knowledge in a discipline to answer the question. The instructional design of the course provides a foundation that encourages thinking, problem solving, and application. The course does require memorization of formulas and studying for quizzes and the final exam. Application of knowledge and concepts is the main emphasis.

NUR 59900: Principles of Epidemiology

Prerequisites:
At least one undergraduate or graduate statistics course (e.g., STAT 30100, IE 33000, STAT 50300, STAT 51100, or equivalent).

Course Description:
This course focuses on application of epidemiologic descriptive and analytic statistics and how they are used to draw cogent and valid conclusions. The nature of epidemiologic study as it relates to human morbidity, mortality, and injury (disability) is reviewed. The utility of public health, vital statistics, concepts of disease transmission, types of epidemiological studies, surveillance/screening tests, and causality are included.

NUR 59900 Principles of Epidemiology aims to address the following content domains and competencies outlined by the Council on Linkages between Academia and Public Health Practice Core Competencies for Public Health Professionals. June 26, 2014. Students successfully completing this course will be equipped to meet the core competencies associated with a Master of Public Health Degree. Skills incorporated into this course include:

Course Objectives:
At the conclusion of this course, students will be able to:
1. Interpret results of statistical analyses found in public health studies (and in any medically related study where epidemiological statistics are reported).
2. Develop written and oral presentations based on statistical analyses for both health professionals and educated lay audiences.
3. Identify key sources of data for epidemiological purposes.
4. Identify the principles and limitations of public health/medical screening programs.
5. Describe a public health/nursing problem in terms of magnitude, person, place, and time.
6. Explain the importance of epidemiology for informing scientific, ethical, economic, and political discussions of health issues.
7. Comprehend basic, ethical, and legal principles pertaining to the collection, use, and dissemination of epidemiological data.
8. Apply the basic terminology and definitions of epidemiology.
9. Calculate basic epidemiology measures/statistics.
10. Communicate epidemiologic information to lay and professional audiences by understanding the meaning of a constant and know which constant to use under a given circumstance.
11. Draw appropriate inferences and conclusions from epidemiologic data based on the descriptive information presented and/or the epidemiological measure/statistic used.
12. Evaluate the strengths and limitations of epidemiologic reports and recognize when incorrect terminology is used and erroneous conclusions are drawn, which is commonplace.
### Public Health Practice Core Competencies for Public Health Professionals

#### NUR 59900 Epidemiology Course Objectives

<table>
<thead>
<tr>
<th>Analytical Assessment Skills</th>
<th>2, 6, 7, 8, 9, 10, 11, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1B1. Describes factors affecting the health of a community (e.g., equity, income, education, environment)</td>
<td>2, 6, 7, 8, 9, 10, 11, 12</td>
</tr>
<tr>
<td>1B2. Determines quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) needed for assessing the health of a community</td>
<td>2, 5, 7, 8, 9, 10, 11, 12</td>
</tr>
<tr>
<td>1B12. Assesses community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)</td>
<td>2, 7, 8, 9, 10, 11, 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Policy Development/Program Planning Skills</th>
<th>1, 4, 7, 8, 9, 10, 11, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B5. Monitors current and projected trends (e.g., health, fiscal, social, political, environmental) representing the health of a community</td>
<td>1, 4, 7, 8, 9, 10, 11, 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cultural Competency Skills</th>
<th>6, 7, 8, 9, 10, 11, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>4B2. Describes the diversity of individuals and populations in a community</td>
<td>6, 7, 8, 9, 10, 11, 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Community Dimensions of Practice Skills</th>
<th>1, 4, 6, 7, 8, 9, 10, 11, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>5B2. Identifies relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)</td>
<td>1, 4, 6, 7, 8, 9, 10, 11, 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Health Sciences Skills</th>
<th>1, 3, 7, 8, 9, 10, 11, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A4. Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making</td>
<td>1, 3, 7, 8, 9, 10, 11, 12</td>
</tr>
</tbody>
</table>

### Required Text and Tools:

### Supplemental Readings (Optional Textbooks)

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Course Delivery
This course is delivered completely online through Purdue Extended Campus. For summer of 2015, the course runs from June 15, 2015 to August 3, 2015 and is asynchronous. To find more information about registration please see: http://www.distance.purdue.edu/institutecredit.

Course Outline NUR 59900 Principles of Epidemiology

I. Epidemiology, History and Definitions
   A. What is Epidemiology and Why is it Important?
      1. Human Population (Magnitude, Person, Place, Time)
      2. Distribution of Disease
      3. Disease Cycles
         a) Sporadic
         b) Endemic
         c) Epidemic
         d) Pandemic
         e) Holoendemic
         f) Hyperendemic
      4. Determinants
      5. Prevention of Disease
         a) Primary
         b) Secondary
         c) Tertiary
   B. History
      1. Medicine
         a) Infectious Disease Epidemiology
         b) Snow and Cholera
         c) Pasteur/Koch
         d) Graunt
      2. Behavioral Epidemiology
      3. Leading Causes of Death
   C. Objectives of an Epidemiological Investigation
      1. Steps in Studying Disease Etiology

II. Incidences of Morbidity and Mortality
   A. Incidences of Morbidity
      1. Duration, Incidence, and Types of Prevalence: For example:
         a) Point Prevalence
         b) Period Prevalence
         c) Lifetime Prevalence
   B. Ratios: Rates, Ratios, and Proportions
      1. Crude Rates (Birth and Death)
         a) Category-Specific Rates
         b) Birth Mortality Rates (Infant, Neonatal, and Maternal)
         c) Cause Specific Rate
         d) Cause-Fatality Rate
         e) Proportionate Mortality Rate (PMR)
C. Adjustments-Standardize Mortality Ratio (SMR)
   1. Direct Method
   2. Indirect Method

III. Sources of Health Data
   A. Investigating Outbreaks
      1. Direct and Indirect Transmission
      2. Case
         a) Index
         b) Primary
         c) Secondary
      3. Incubation vs. Duration
   B. Demography
      1. Age and Sex
      2. Sex Ratio, Sex Specific Death Rate
      3. Life Expectancy
   C. Problems with Data Collection
      1. Survey
      2. Interview Survey
      3. Hospital Data Problems
      4. Ethical issues
      5. Morbidity Report Problems
         a) Under-numeration
         b) Misreporting
      6. Sources of Mortality Data

IV. Competency: Key Sources of Data for Epidemiological Purposes
   A. U.S. Census Bureau
   B. CDC
   C. Secondary Data Sources
   D. Additional Data Sources

V. Methods of Surveillance
   A. Surveillance
   B. Screening
      1. When to Screen
      2. When not to Screen
   C. Sensitivity and Specificity
      1. Positive Predicated Value
      2. Negative Predicated Value
   D. Repeat Screenings
   E. Relationships

VI. Study Designs
   A. Types of Study Designs: Observational and Experimental
      1. Experimental
         a) Community
         b) Clinical
      2. Observational
         a) Case-control
b) Cross-Sectional

c) Historical Prospective
d) Prospective/ Longitudinal

VII. Assessing Risk
A. Direct Measure of Risk (Prospective)
   1. Absolute Risk
   2. Attributable Risk
   3. Preventive Risk
   4. Relative Risk
B. Indirect Measure of Risk (Retrospective and Cross-Sectional)
   1. Odds Ratio
   2. Matched Sample

VIII. Epidemiological Studies Related to Casualties
A. Causality
B. Confounding Variables
C. Error
   1. Random
   2. Systematic
D. Bradford Hills Criteria
   1. Strength of Association
   2. Dose-Response Relationship (Biological Gradient)
   3. Temporal Relationship
   4. Specificity of Association
   5. Consistency of Association
   6. Biological Plausibility
   7. Coherence
   8. Experimentation to Rule Alternative Explanations
   9. Analogy

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**Academic Calendar - Summer Semester 2015**

<table>
<thead>
<tr>
<th>Date</th>
<th>Chapters</th>
<th>Quiz/Exam Covers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, June 15</td>
<td>Syllabus, Introduction Slides</td>
<td></td>
</tr>
<tr>
<td>Wednesday, June 17</td>
<td>What is Epidemiology, Disease Prevention</td>
<td>Syllabus, Introduction Slides</td>
</tr>
<tr>
<td>Friday, June 19</td>
<td>History of Epidemiology</td>
<td>What is Epidemiology, Disease Prevention</td>
</tr>
<tr>
<td>Monday, June 22</td>
<td>Roots of Modern Epidemiology, Epidemiologic Investigation</td>
<td>History of Epidemiology</td>
</tr>
<tr>
<td>Wednesday, June 24</td>
<td>Indices of Morbidity, Ratios: Rates, Ratios, &amp; Proportions</td>
<td>Roots of Modern Epidemiology, Epidemiologic Investigation</td>
</tr>
<tr>
<td>Friday, June 26</td>
<td>Incidence, Duration, &amp; Indices of Morbidity</td>
<td>Indices of Morbidity, Ratios: Rates, Ratios, &amp; Proportions</td>
</tr>
<tr>
<td>Monday, June 29</td>
<td>Prenatal and Infant Life, Additional Mortality Formulas</td>
<td>Incidence, Duration, &amp; Indices of Morbidity</td>
</tr>
<tr>
<td>Wednesday, July 1</td>
<td>Standard Mortality Rates (SMR)</td>
<td>Prenatal and Infant Life, Additional Mortality Formulas</td>
</tr>
<tr>
<td>Friday, July 3</td>
<td>Independence Holiday Observed</td>
<td>No Class/Quiz</td>
</tr>
</tbody>
</table>

\(^2\) This schedule is subject to change at Dr. Black’s discretion.
<table>
<thead>
<tr>
<th>Date</th>
<th>Chapters</th>
<th>Quiz/Exam Covers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, July 6</td>
<td>Investigating Outbreaks</td>
<td>Standard Mortality Rates (SMR)</td>
</tr>
<tr>
<td>Wednesday, July 8</td>
<td>Demography</td>
<td>Investigating Outbreaks</td>
</tr>
<tr>
<td>Friday, July 10</td>
<td>NOVA: Vaccines—Calling the Shots</td>
<td>Demography</td>
</tr>
<tr>
<td>Monday, July 13</td>
<td>Surveillance</td>
<td>NOVA: Vaccines—Calling the Shots</td>
</tr>
<tr>
<td>Wednesday, July 15</td>
<td>Problems with Data Collection</td>
<td>Surveillance</td>
</tr>
<tr>
<td>Friday, July 17</td>
<td>NOVA: Surviving Ebola</td>
<td>Problems with Data Collection</td>
</tr>
<tr>
<td>Monday, July 20</td>
<td>Study Designs</td>
<td>NOVA: Surviving Ebola</td>
</tr>
<tr>
<td>Wednesday, July 22</td>
<td>Calculating Risk</td>
<td>Study Designs</td>
</tr>
<tr>
<td>Friday, July 24</td>
<td>Causality</td>
<td>Calculating Risk</td>
</tr>
<tr>
<td>Monday, July 27</td>
<td>Use this break to study.</td>
<td>Causality</td>
</tr>
<tr>
<td>Wednesday, July 29</td>
<td>Use this break to study.</td>
<td>Help sessions may be scheduled during this time if requested.</td>
</tr>
<tr>
<td>Friday, July 31</td>
<td>Use this break to study.</td>
<td>Help sessions may be scheduled during this time if requested.</td>
</tr>
<tr>
<td>Monday, August 3 -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday, August 5</td>
<td><strong>Final Exam</strong></td>
<td><strong>All material above.</strong></td>
</tr>
</tbody>
</table>

**Final Exam**

*You will have 4 hours once you begin to complete the exam. Please do not schedule travel during this time.*

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3 Available on PBS.org: [http://tinyurl.com/lb8fgmd](http://tinyurl.com/lb8fgmd)

4 Available on PBS.org: [http://tinyurl.com/q3atvf8](http://tinyurl.com/q3atvf8)