SAFE/MICR 474/674 - Epidemiology

TAUGHT EVERY SPRING SEMESTER

The study of the distribution and dynamics of disease in populations. Prereq: STAT 330. Cross-listed with MICR.

Overview:

This 3-credit course is designed as an introduction to the study of the distribution and dynamics of disease in populations. Principles and methods of epidemiologic investigation are presented, often in the form of case studies. Although noninfectious diseases will be included in the course, infectious ones, including those of food safety interest, will be emphasized.

This course does not involve classroom meetings, but is delivered in a distance education format. As discussed in a subsequent section, distance delivery alters the activities, responsibilities, and expectations for the student and instructors relative to traditional classroom courses.

Course Goals:

Students successfully completing this course will be able to demonstrate mastery of certain basic tenets and tools of epidemiology and to apply this knowledge to disease control and prevention.

Course Objectives:

All students will:

- Define epidemiology, Types and Uses of Epidemiology
- Correctly use the basic vocabulary of infectious disease epidemiology including: agent, reservoir, carrier, zoonosis, transmission, incubation period, susceptible host, subclinical infection, vector, fomite, etc.
- Demonstrate understanding of Disease Progression, Ecology, Patterns and Determinants
- Demonstrate the ability to apply Epidemiologic Measures of Disease Frequency, such as Prevalence, Cumulative Incidence, Incidence Density, cumulative mortality, Mortality Rate, and Case Fatality Rate.
- Compare active and passive disease surveillance systems
- Identify sources of data in epidemiology, and state the advantages and limitations of each.
- Demonstrate understanding of advantages and disadvantages of different sampling techniques.
Describe the criteria on which sample size determination is based.
Demonstrate understanding of the strengths and limitations of the different epidemiological study designs such as: a) cross-sectional, b) case-control, c) cohort, and d) clinical or community trial; and Measures of Association such as Relative Risk, Attributable Risk, Odds Ratio.
Explain the concept of bias in epidemiological studies and describe methods of controlling it.
Describe the criteria on which causal inference is based.
Define the following terms for their relevance to epidemiology: Reliability, Validity (internal and external), Representativeness, Generalizability, Sensitivity, Specificity, and Predictive Value of a test.

Describe steps in disease outbreak investigation.

Demonstrate understanding of Ethical Practice in Epidemiology

Graduate Students also will:

demonstrate the ability to design, conduct, interpret, and report the results of relevant epidemiology research projects.

**Prerequisites:**

SAFE 474: STAT 330 (*Introductory Statistics*), or equivalent, or permission of instructor; MICR 350 recommended.

SAFE 674: Graduate standing, and STAT 330 (*Introductory Statistics*), or equivalent, or permission of instructor.

**Instructor:**

Margaret L. Khaitsa, BVM, MS, PhD, DACVPM

**Office:** 118, VanEs Hall

**Phone:** 701-231-5946

**E-mail:** Margaret.Khaitsa@ndsu.edu

**Mailing address:**

NDSU Fargo, ND 58105

**Required student resources:**

Course notes, mainly power point slides and audio recordings, will be supplied through online format using the Blackboard (http://blackboard.ndsu.nodak.edu)
No textbook purchase is required.

**Optional Reading Materials:**

The following texts and books are recommended as optional resources for this course.


ActivEpi 1.1 by David G. Kleinbaum - *Available for borrowing from the instructor*

**Needed Technology:**

This distance delivered course requires that students have a computer capable of e-mail, Internet connectivity, word processing, spreadsheet, presentation software, and audio playback. For example, the instructors recommend that students use Microsoft Word, Excel, and Power point.

Students will also need an adequate Internet connection to download medium to large files (e.g. 200 to 600 mbs). Students are urged to contact the instructor (Margaret.Khaitsa@ndsu.edu) if these technical requirements are burdensome.

**Virtual Office Hours:**

I encourage you to e-mail me Margaret.Khaitsa@ndsu.edu at any time; I will respond within 24 hours. I generally do not check e-mail between Saturday noon and Monday morning;

I encourage you to call me (701-231-5946) any time between 8:00 a.m. and 5:00 p.m. (central time) Monday through Friday; leave a message (your name, phone number, and a good time to call you) if I am not in or do not answer.

**Course Policies:**

**Course Availability** - This course is offered every spring semester. For spring 2011, the course will be available between January 10 to May 31, 2011.

**Assessment** -

All students - The instructor of course uses a combination of quizzes (5 tests), 5 short assignments, a case study, and a final exam to measure student learning.

Undergraduate Students (SAFE/MICR 474) - Tests constitute 50% of the final grade, Final exam is 25%, assignments are 12.5%, Case study is 10%, and class participation is 2.5% of the final grade,

Graduate Students – SAFE/MICR 674 - Tests constitute 33.3% of the final grade, Term paper 33.3%, Final exam is 16.7%, assignments 8.3%, Case study is 6.7%, and class participation is 1.7% of the final grade.
Graduate students’ research paper will be on one of the major topics in Epidemiology of their choice with instructor approval. Contact the instructor and have the subject for your research project approved by the instructor by February 15. The outline of your paper is due Feb 28, 1st draft- March 15, 2nd draft April 15, and the final project report is due April 30. These deadlines are firm and will be strictly adhered to.

Course organization- The course material will be organized in 10 modules as indicated below. Each module will have one or more topics as described in detail under course materials.

Module 1 Definition, Types and Uses of Epidemiology, Terminology

Module 2 Disease Progression, Ecology, Patterns, and Determinants

Module 3 Measures of Disease Frequency/Sampling

Module 4 Data Sources, Collection and Presentation

Module 5 Disease Surveillance

Module 6 Validity and Reliability of Diagnostic Tests

Module 7 Epidemiological Study Designs

Module 8 Bias

Module 9 Disease Outbreak Investigation

Module 10 Ethical Practice in Epidemiology:

Homework and Projects - Homework problems will be assigned regularly to give students experience in applying the methods taught in the course. Case studies will be used to help students see how these concepts are applied in practice. Students will be expected to work through the cases provided.

Tests will require mastery of the details and the principles of epidemiology taught. Tests will be composed of multiple-choice questions similar to the self assessment quizzes. Some of the questions will be case oriented, similar in format to the cases assigned as homework.

Test Dates - Each test/exam will be given only during the designated time periods (within 24 hours, 12:00 am to 12:00 am of the following day) on these dates unless notified otherwise. All tests/exams will be administered online.

Test 1 (module 1 & 2) February 04, 2011
Test 2 (module 3 & 4) **February 25, 2011**

Test 3 (module 5 & 6) **March 11, 2011**

Test 4 (module 7 & 8) **April 15, 2011**

Test 5 (module 9 & 10) **May 6, 2011**

Case study is due **April 30, 2011**

Final exam (comprehensive) will be taken during Finals week on **date assigned**.

**Final Exam:** The final exam will be comprehensive (covers all topics) and must be completed by everyone.

**Grading:**

**SAFE/MICR 474.**

Grading for this course will be based on 5 short assignments/exercises worth 5 points each for a total of 25 points, four tests worth 25 points each for a total of 100 points (one out of the 5 tests will be dropped), a case study worth 20 points, and class participation 5 points. The final exam will be comprehensive and worth 50 points. Final Grade will be based on the percentage of total points accumulated according to the following distribution:

<table>
<thead>
<tr>
<th># Of Total Points</th>
<th>Final Grade A</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 - 200</td>
<td>A</td>
</tr>
<tr>
<td>160 - 179</td>
<td>B</td>
</tr>
<tr>
<td>140 - 159</td>
<td>C</td>
</tr>
<tr>
<td>120 - 139</td>
<td>D</td>
</tr>
<tr>
<td>119 and below</td>
<td>F</td>
</tr>
</tbody>
</table>

**SAFE/MICR 674**

Students signed up for graduate credit must successfully complete a term paper over some aspect of contemporary epidemiology. *The topic must be approved by the instructor.* It will be worth 100 points. Additionally, graduate students will take all tests and must complete all exercises and case study, as described for **SAFE/MICR 474.**
The Final Grade will be based on the percentage of total points accumulated according to the following distribution:

<table>
<thead>
<tr>
<th># Of Total Points</th>
<th>Final Grade A</th>
</tr>
</thead>
<tbody>
<tr>
<td>270 - 300</td>
<td>A</td>
</tr>
<tr>
<td>240 - 269</td>
<td>B</td>
</tr>
<tr>
<td>210 - 239</td>
<td>C</td>
</tr>
<tr>
<td>180 - 209</td>
<td>D</td>
</tr>
<tr>
<td>179 and below</td>
<td>F</td>
</tr>
</tbody>
</table>

Grading: SAFE/MICR 474 and SAFE/MICR 674.

<table>
<thead>
<tr>
<th>SAFE/MICR 474</th>
<th>SAFE/MICR 674</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points (%)</td>
<td>Points (%)</td>
</tr>
<tr>
<td>Tests (4)</td>
<td>100 (50%)</td>
</tr>
<tr>
<td>Term paper</td>
<td>-</td>
</tr>
<tr>
<td>Final exam</td>
<td>50 (25%)</td>
</tr>
<tr>
<td>Exercises (5)</td>
<td>25 (12.5%)</td>
</tr>
<tr>
<td>Case study</td>
<td>20 (10%)</td>
</tr>
<tr>
<td>Class participation</td>
<td>5 (2.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>200 (100%)</td>
</tr>
</tbody>
</table>
Academic Dishonesty/Plagiarism - All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (http://www.ndsu.nodak.edu/policy/335.htm).

All students taking any course in the NDSU College of Agriculture, Food Systems and Natural Resources are under the Honor System (http://www.ag.ndsu.nodak.edu/colag/honor.htm). The Honor System is governed by students and operates on the premise that most students are honest and work best when their honesty, and the honesty of others, is not in question. It functions to prevent cheating as well as penalize those who are dishonest. It is the responsibility of the student to report any violations of the honor pledge to the instructor, honor commission, or the Dean of the College of Agriculture.

Some of you may be familiar with the Honor System from other NDSU agriculture courses in which you had to sign the following statement when taking an exam or quiz:

HONOR PLEDGE: Upon my honor, I have not given nor received aid in writing this examination

Academic conduct also is critical in the preparation of assignments and papers. Students are expected to adhere to appropriate practices when relying on the thoughts of others, for example, when using an idea from a publication or another person. Properly citing reference materials and submitting one's own work are important components of appropriate academic conduct.

It is a violation of university policy, unprofessional, and unethical to use someone else's words and ideas without identifying the quote and citing the source.

ADA - Any students who need accommodations in this course are encouraged to contact the instructor as soon as possible to make appropriate arrangements.

Considerations for a Distance Course:

A distance course poses additional and different challenges than a traditional face-to-face learning environment. The following list offers thoughts on the responsibilities of the student and instructors in this distance delivered course.

Instructor Responsibilities:

Make sure the course content meets the needs of the NDSU Food Safety program, and the interests of students taking the course.
Understand the context by which the students will be learning the material (what, how, when, where, and why).
Create, collect, plan, organize, and assess the content in a meaningful and timely way.
Openly communicate with and engage students.
Keep the presentation of material and the assignment expectations as clear and fair as possible.
Provide resources and advice to enhance learning and communication.
Give the students the opportunity to develop their auto-didactic skills.
Understand students' scheduling issues, and work with them to meet their needs as much as possible without compromising their or others' learning.
Provide student's the opportunity to comment on instruction and use feedback to improve the learning in the course.
Be available during Virtual Office hours (described in another section of syllabus).
Grade and provide feedback to students within a reasonable time after due dates for assignments, quizzes, and exams.

Learner Responsibilities:

Have a serious attitude and understand that learning takes effort.
Have a desire to acquire information and willingness to work and complete tasks in good faith.
Have a willingness to seek assistance when information is not clear.
Have a willingness to provide constructive and meaningful feedback to help improve instruction.
Take quizzes and exams, and complete assignments as scheduled.
Finish assignments early if you know in advance of a time conflict with a scheduled assignment due date.
A late assignment without a valid reason will not be graded.
If a death in the family has occurred, the student has 1 week to schedule a make-up time.
If an exam, quiz or assignment due date is missed due to illness, the student must get a doctor’s signature and phone number, and must re-schedule a make-up quiz or turn in the late assignment the following day.
Actively participate in the discussion board; this is where a significant amount of learning in this course will occur.
Lack of participation in the online discussions will hurt your chances of getting an A in this course.
Check Blackboard and/or email regularly for any updates related to the course.

Success Tips for this Course:

Access course information online regularly; do not put this off until the set class deadlines (that’s asking for trouble).
Actively participate in the discussion board where required. Interaction in the discussions with fellow students is where some of the learning for this class will occur. If you are not active, you will miss out on learning.
Take time to look up additional reading materials or references that may be provided (e.g., URLs and linked web sites).
Ask for clarification if anything is not clear to you. This will benefit not only you but also other students in the course, and will help instructors deliver the course better.

SAFE 474/674 Spring 2010, Tentative Schedule:
This syllabus provides a general plan for the course; slight changes may be applied.

**Missing a test** - Students will be expected to take tests during the designated testing periods. Exceptions will be allowed for illness, both personal or immediate family, if written documentation supporting the request is provided (e.g. doctor's excuse). A make-up test may consist of discussion or short answer questions or be given in another format.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Date</th>
<th>Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1-2 (2 weeks)</td>
<td>Jan 10-21</td>
<td>Module 1 (Definition, Types and Uses of Epidemiology, Terminology)</td>
</tr>
<tr>
<td>Week 3 (1 week)</td>
<td>Jan 24-28</td>
<td>Module 2 (Disease Progression, Ecology, Patterns, and Determinants)</td>
</tr>
<tr>
<td>Week 4-5 (2 weeks)</td>
<td>Jan 31-Feb11</td>
<td>Module 3 (Measures of Disease Frequency/Sampling)</td>
</tr>
<tr>
<td>Week 6-7 (2 weeks)</td>
<td>Feb.14-25</td>
<td>Module 4 (Data Sources, Collection and Presentation)</td>
</tr>
<tr>
<td>Week 8 (1 week)</td>
<td>Feb 28-March 4</td>
<td>Module 5 (Disease Surveillance)</td>
</tr>
<tr>
<td>Week 9 (1 week)</td>
<td>March 7-11</td>
<td>Module 6 (Validity and Reliability of Diagnostic Tests)</td>
</tr>
<tr>
<td>Week 10</td>
<td>March 14-18</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Week 11-12 (2 weeks)</td>
<td>March 21-April 1</td>
<td>Module 7 (Epidemiological Study Designs)</td>
</tr>
<tr>
<td>Week 13 (1 week)</td>
<td>April 4-8</td>
<td>Module 8 (Bias)</td>
</tr>
<tr>
<td>Week 14-15 (2 weeks)</td>
<td>April 11-22</td>
<td>Module 9 (Disease Outbreak Investigation)</td>
</tr>
<tr>
<td>Week 16</td>
<td>April 25-29</td>
<td>Module 10 (Ethical Practice in Epidemiology)</td>
</tr>
<tr>
<td>Week 17</td>
<td>May 2-6</td>
<td>Review/Dead week</td>
</tr>
<tr>
<td>Week 18</td>
<td>May 9-13</td>
<td>Finals Week</td>
</tr>
</tbody>
</table>

This syllabus provides a general plan for the course; slight changes may be applied.

**Missing a test** - Students will be expected to take tests during the designated testing periods. Exceptions will be allowed for illness, both personal or immediate family, if written documentation supporting the request is provided (e.g. doctor's excuse). A make-up test may consist of discussion or short answer questions or be given in another format.