

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

**SUBMITTED BY:**

Department	Biology	College/School	CNSM
Prepared by	Andrea Bersamin	Phone	474-6129
Email Contact	<a href="mailto:abersamin@alaska.edu">abersamin@alaska.edu</a>	Faculty Contact	Andrea Bersamin

**1. ACTION DESIRED**  
(CHECK ONE):

Trial Course	<input checked="" type="checkbox"/>	New Course	<input type="checkbox"/>
--------------	-------------------------------------	------------	--------------------------

**2. COURSE IDENTIFICATION:**

Dept	BIOL	Course #	394	No. of Credits	3
------	------	----------	-----	----------------	---

Justify upper/lower division status & number of credits: This course has STATS 200 (or higher) or permission of instructor as a prerequisite. 3 hours of instruction will be provided per week. Students need the general sophistication of upper-division status before taking on this integrative course.

**3. PROPOSED COURSE TITLE:** Fundamentals of Epidemiology

**4. To be CROSS LISTED?** YES/NO

<input type="checkbox"/> NO	If yes, Dept:	<input type="checkbox"/>	Course #	<input type="checkbox"/>
-----------------------------	---------------	--------------------------	----------	--------------------------

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

**5. To be STACKED?** YES/NO

<input type="checkbox"/> NO	If yes, Dept.	<input type="checkbox"/>	Course #	<input type="checkbox"/>
-----------------------------	---------------	--------------------------	----------	--------------------------

**6. FREQUENCY OF OFFERING:** Every Spring

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

**7. SEMESTER & YEAR OF FIRST OFFERING** (if approved) Spring 2011

**8. COURSE FORMAT:**

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

**COURSE FORMAT:** (check all that apply)

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 6 weeks to full semester
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	--

OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc)



9. CONTACT HOURS PER WEEK:

LECTURE hours/weeks     LAB hours /week     PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty/cd/credits.html> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

BIOL 394, Fundamentals of Epidemiology, 3 credits. Introduction to the basic concepts of epidemiology, with examples from human and veterinary medicine, including chronic and infectious disease epidemiology, social epidemiology, outbreak investigation, properties of tests, and an introduction to study design and surveillance.

11. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities  S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? YES  NO  X

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6  W = Writing Intensive, Format 7  Natural Science, Format 8

12. COURSE REPEATABILITY:

Is this course repeatable for credit? YES  NO  X

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?  TIMES

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?  CREDITS

13. GRADING SYSTEM: Specify only one.

LETTER:  PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

STAT 200X

These will be required before the student is allowed to enroll in the course.

RECOMMENDED

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

Has a memo been submitted through your dean to the Provost & VCAS for fee approval?  
Yes/No

**17. PREVIOUS HISTORY**

Has the course been offered as special topics or trial course previously?  
Yes/No

If yes, give semester, year, course #,  
etc.:

N/A

**18. ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

Classroom space will be needed. This course will be part of the instructor's regular workload.

**19. LIBRARY COLLECTIONS**

Have you contacted the library collection development officer ([kljensen@alaska.edu](mailto:kljensen@alaska.edu), 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

Yes

X

8/30. Karen Jensen directed me to the following resources which are adequate for the class: online and print Epidemiology journals, Epidemiology books that are available both in the library and via the Electronic Book Library.

**20. IMPACTS ON PROGRAMS/DEPTS**

What programs/departments will be affected by this proposed action?  
Include information on the Programs/Departments contacted (e.g., email, memo)

Biology and Wildlife will house the course.

**21. POSITIVE AND NEGATIVE IMPACTS**

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

This course introduces the basic concepts of epidemiology, using examples from human and veterinary medicine. The course will likely complement a number of existing programs within the Biology and Wildlife department including biomedical sciences and wildlife biology. No negative impacts are anticipated. This course will be part of the instructor's regular workload.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

This course will contribute to UAF's growing biomedical program as well as serve students with an interest in veterinary and wildlife disease processes. The course will cover topics that are shared by human and veterinary medicine including: measures of morbidity and mortality, properties of tests, study design, outbreak investigations, surveillance, causal inference and chronic and infectious disease epidemiology. More broadly, the class should also improve students' scientific literacy.

I surveyed members of the premed society asking about their interest in the class and have received enthusiastic support. I would like to offer the course at the 300 level and understand that the Biology and Wildlife Department has a need for courses at this level.

**20. IMPACTS ON PROGRAMS/DEPTS**

What programs/departments will be affected by this proposed action?  
Include information on the Programs/Departments contacted (e.g., email, memo)

Biology and Wildlife will house the course.

**21. POSITIVE AND NEGATIVE IMPACTS**

Please specify **positive and negative** impacts on other courses, programs and departments resulting from the proposed action.

This course introduces the basic concepts of epidemiology, using examples from human and veterinary medicine. The course will likely complement a number of existing programs within the Biology and Wildlife department including biomedical sciences and wildlife biology. No negative impacts are anticipated. This course will be part of the instructor's regular workload.

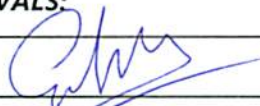
**JUSTIFICATION FOR ACTION REQUESTED**

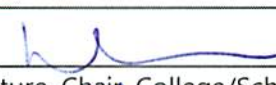
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

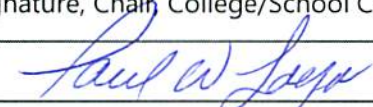
This course will contribute to UAF's growing biomedical program as well as serve students with an interest in veterinary and wildlife disease processes. The course will cover topics that are shared by human and veterinary medicine including: measures of morbidity and mortality, properties of tests, study design, outbreak investigations, surveillance, causal inference and chronic and infectious disease epidemiology. More broadly, the class should also improve students' scientific literacy.

I surveyed members of the premed society asking about their interest in the class and have received enthusiastic support. I would like to offer the course at the 300 level and understand that the Biology and Wildlife Department has a need for courses at this level.

**APPROVALS:**

 Signature, Chair, Program/Department of: Biology & Wildlife Date Sept 1, 2010

 Signature, Chair, College/School Curriculum Council for: \_\_\_\_\_ Date 9/9/2010

 Signature, Dean, College/School of: \_\_\_\_\_ Date 9/10/10

\_\_\_\_\_  
Signature of Provost (if applicable) Date \_\_\_\_\_

**Offerings above the level of approved programs must be approved in advance by the Provost.**

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

Signature, Chair, UAF Faculty Senate Curriculum Review Committee

Date

--

**ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)**

Signature, Chair, Program/Department of:

Date

--

Signature, Chair, College/School Curriculum Council for:

Date

--

Signature, Dean, College/School of:

Date

--

**APPROVALS:**

	Date	
--	------	--

Signature, Chair,  
Program/Department of:

	Date	9/9/10
---	------	--------

Signature, Chair, College/School Curriculum Council  
for:

	Date	
--	------	--

Signature, Dean, College/School of:

	Date	
--	------	--

Signature of Provost (if applicable)

Offerings above the level of approved programs must be approved in advance by the Provost.

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

	Date	
--	------	--

Signature, Chair, UAF Faculty Senate Curriculum Review  
Committee

**ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)**

	Date	
--	------	--

Signature, Chair,  
Program/Department of:

	Date	
--	------	--

Signature, Chair, College/School Curriculum Council  
for:

	Date	
--	------	--

Signature, Dean, College/School of:

**BIOLOGY 394  
FUNDAMENTALS OF EPIDEMIOLOGY  
Spring 2011- 3 Credits  
Time: TBD  
Location: TBD**

**Prerequisites: STATS 200 or permission of instructor**

### **Instructor Information**

Andrea Bersamin, Ph.D. is an assistant professor in the Biology Department and the Center for Alaska Native Health Research

Email: [abersamin@alaska.edu](mailto:abersamin@alaska.edu)

Office Hours: by appointment

Office: 234 AHRB

Telephone: (907)474-6129

### **Course description**

Epidemiology is the study of the distribution and determinants of disease, or other health-related outcomes, in human and animal populations. *Fundamentals of Epidemiology* introduces the basic concepts of epidemiology, with examples from human and veterinary medicine, including chronic and infectious disease epidemiology, social epidemiology, outbreak investigation, properties of tests, and an introduction to study design and surveillance.

### **Course goals**

To provide students with an overview of the fundamentals of epidemiology.

### **Learning objectives**

Upon completion of this course, you will be able to do the following:

- Understand the contributions of epidemiology to clinical research, medicine and public health
- Identify key sources of data for epidemiological purposes.
- Explain the population perspective and describe public health problems
- Apply and interpret measures of disease occurrence and correlates in populations
- Explain the concept of risk
- Use basic methods for investigating disease outbreaks
- Explain relative strengths and limitations of different epidemiologic study designs
- Identify and control major sources of error in epidemiological studies
- Evaluate epidemiologic evidence by applying criteria for causal inference
- Use epidemiologic methods to evaluate public health interventions
- Appreciate complexities in applying scientific evidence in making policy



## Instructional Methods

The course will include lectures, class discussions, case studies, text book and journal article readings, and assignments. Every week there will be two hours of lecture and one hour dedicated to discussion, case-studies, or in-class assignments. ***Student participation is important and this requires that all students come prepared having read the required readings in advance.***

## Course Readings

### Required:

- Gordis L. *Epidemiology*, 4th ed: Saunders Elsevier, 2008
- Additional readings will be assigned to supplement the main textbook or as part of various homework assignments; these will be made available on Blackboard.

***Optional*** (if you are particularly interested in a topic and desire additional information, these are excellent texts that can be used to supplement the primary text and lectures):

- Abramson JH and Abramson ZH. *Making Sense of Data: A Self Instruction Manual on the Interpretation of Epidemiological Data*. 3rd ed. Oxford: Oxford University Press, 2001.
- Aschengrau A and Seage III GR. *Essentials of Epidemiology in Public Health*. 2nd ed. Sudbury MA: Jones and Bartlett Publishers, 2008.
- *Applied Epidemiology: Theory to Practice*. 2nd ed. Brownson R and Petitti D eds. Oxford: Oxford University Press, 2006.
- Freidman GD. *Primer of Epidemiology*. 5th ed. New York: McGraw Hill, 2004.
- Friis RH and Sellers TA. *Epidemiology for Public Health Practice*. 4th ed. Sudbury MA: Jones and Bartlett Publishers, 2009.
- Giesecke J. *Modern Infectious Disease Epidemiology*.
- Gregg MB. *Field Epidemiology*. 2nd ed. Oxford: Oxford University Press, 2002.
- Heller RF. *Evidence for Population Health*. Oxford: Oxford University Press, 2005.
- Last J. *A Dictionary of Epidemiology*. 4th ed. Oxford: Oxford University Press, 2001.
- *Risk Communication and Public Health*. Bennett P and Calman K eds. Oxford: Oxford University Press, 1999.
- Rose G. *Rose's Strategy of Preventive Medicine*. Oxford: Oxford University Press, 2008.
- Rothman KJ, Greenland S and Lash TL. *Modern Epidemiology*. 3rd ed. Lippincott Williams & Wilkins, 2008.
- Smith RD. 2006. *Veterinary Clinical Epidemiology: a problem-oriented approach*. 3rd Ed. Taylor & Francis, Boca Raton, FL.
- Thrusfield M. 2005. *Veterinary Epidemiology*. 3rd Ed. Blackwell Science, London (SF780.9 T78)
- Young TK. *Population Health: Concepts and Methods*. 2nd ed. Oxford: Oxford University Press, 2005.

WHO Statistical Information System <http://www.who.int/whosis/en/index.html>  
 PubMed database (Medline) <http://www.ncbi.nlm.nih.gov/pubmed/>  
 The Cochrane Library <http://www.cochrane.org/reviews/index.htm>  
 The Community Guide <http://www.thecommunityguide.org/index.html>  
 US Preventive Services Task Force (USPSTF) <http://www.ahrq.gov/clinic/uspstfix.htm>  
 Demographic and health surveys (DHS) <http://www.measuredhs.com/>  
 Health Systems Database: <http://healthsystems2020.healthsystemsdatabase.org>  
 CDC Morbidity and Mortality Weekly Report: <http://www.cdc.gov/mmwr/>  
 Alaska Health and Social Services Department of Epidemiology: <http://www.epi.hss.state.ak.us/>

**Student Evaluation**

**Points Possible:**

Exams	3 @100 points
Assignments	10@ 10 points each
Class discussions	50 points

*Total Possible Points: 450*

**Grades will be on a straight percentage basis.**

A= 94-100%; A-=90-93.9%  
 B+= 87-89.9%; B= 84-86.9% ;B-= 80-83.9%  
 C+= 77-79%; C= 74-76.9% ; C-= 70-73.9 %  
 D+= 67-69%; D = 64-66.9%; D-= 60-63.9%  
 F= 59% and below

**Course Policies**

**Communication:** Announcements and schedule changes will be made by e-mail or on Blackboard. It is your responsibility to check your e-mail or Blackboard at least twice weekly. I encourage you to contact me with any comments or questions. If you don't understand something please ask.

**Attendance:** Daily attendance and participation are expected.

**Exams:** There will be 2 midterm exams and 1 comprehensive final exam. Exams will include T/F, multiple-choice, matching, short answer and essay questions. Exams will be based on lectures, readings, and assignments. There will be NO make-up exams. Under very unusual circumstances early exams will be offered with approval from the instructor; arrangements must be made well in advance.

**Assignments:** There will be 10 assignments over the course of the semester. Detailed instructions will be provided in class.

**Extra Credit:** Extra-credit opportunities will be available throughout the course. They will be presented in class, unannounced.

**Withdrawal:**

Jan. 28: Deadline for 100 percent refund of tuition and fees  
Feb. 4: Deadline for student-initiated and faculty-initiated drops (course does not appear on academic record)  
Feb. 4: Deadline for 50 percent refund of tuition (tuition only, no fees refunded)  
Mar. 25: Deadline for student-initiated and faculty-initiated withdrawals (W grade appears on academic transcript)

**Honor Code and Plagiarism:** You are expected to uphold the UAF standard of conduct for students relating to academic dishonesty. You assume full responsibility for the content and integrity of the academic work you submit. For the student code or additional information, please use the following URL <http://www.uaf.edu/catalog/current/academics/regs3.html>

### **UAF Disability Services**

**Disabilities Services:** The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities. **\*\* If you require any assistance due to documented disability, please let me know by the 2<sup>nd</sup> week of classes and I will be happy to make whatever accommodations are necessary.**

### **Detailed schedule of topics, concepts, key terms, readings, and assignments**

Concepts and key terms are provided for each week of the course, and these should be used to ensure that you've understood the reading materials and lectures.

### **Introduction to Epidemiology**

**January 20**

#### **Concepts and key terms:**

- Definitions of epidemiology and its contribution to other disciplines
- Key historical events in epidemiology
- Key features and uses of descriptive epidemiology
- Key features and uses of analytic epidemiology
- Applications of epidemiology in public health practice
- Primary, secondary and tertiary prevention
- Exposure and outcome

#### **Readings:**

Gordis, Chapter 1

### **Studying Populations**

**January 25**

#### **Concepts and key terms:**

- Population vs. an individual perspective

- Epidemiological transition
- Heterogeneity of populations
- Dynamic population factors: birth rate, fertility and mortality rates
- High risk populations

**Readings:**

Terris. 1979. The Epidemiologic Tradition

Rose. 1985. Sick individuals and sick populations

**Dynamics of Disease Transmission**

**January 27**

**Concepts and key terms:**

- Stages of disease
- Epidemiologic triad
- Modes of transmission of communicable disease in a population
- Endemic, epidemic and pandemic
- Herd immunity
- Attack rate
- Acute outbreak investigation

**Readings:**

Gordis, Chapter 2

**Measuring Disease: Morbidity**

**February 1**

**Concepts and key terms:**

- Calculate and interpret the following measures of morbidity:
  - ratios
  - proportions
  - incidence rates, including attack rate
  - prevalence
- Relationship between incidence and prevalence
- Surveillance in public health

**Readings:**

Gordis, Chapter 3

**Measuring Disease: Mortality**

**February 3**

**Concepts and key terms:**

- Calculate and interpret the following measures of morbidity:
  - Mortality rate
  - Case-fatality rate
  - Proportionate mortality

- Direct and indirect age adjustment
- Years of potential life lost
- Cohort effect

**Readings:**

Gordis, Chapter 4

**Disease Detection and Population Screening: validity and reliability  
February 8 and 10**

**Concepts and key terms:**

- True positive, false positive, true negative and false negative test results
- Consequences of false positive and false negative test results
- Sensitivity, specificity, positive and negative predictive value
- Effect of prevalence on predictive value
- Validity and reliability

**Readings:**

Gordis, Chapter 5

**EXAM I  
\*\*\*\*\* February 15 \*\*\*\*\***

**Intervention Studies  
February 17 and 22**

**Concepts and key terms:**

- Double-blind randomized controlled trial
- Placebo or control group
- Purpose of randomization and blinding
- Generalizability
- Non-compliance
- Strengths and limitations of trials
- Ethical considerations of conducting trials
- Three major US randomized trials

**Readings:**

Colford. 2005. A Randomized, Controlled Trial of In-Home Drinking Water Intervention to Reduce Gastrointestinal Illness. *Am J Epi*

CONSORT guidelines

Gordis, Chapters 7 and 8

**Cohort, Cross-sectional, and Ecological Studies  
February 24 and March 1**

**Concepts and key terms:**

- Cohort study design, strengths and limitations
- Cross-sectional study design, strengths and limitations
- Ecological study design, strengths and limitations
- Ecological fallacy
- Prospective and retrospective studies

**Readings:**

Gordis, Chapter 9 and 10

**Case-Control Studies**

**March 3**

**Concepts and key terms:**

- Case-control study design, strengths and limitations
- Selection of cases and controls
- Matching
- Recall bias

**Readings:**

Gordis, Chapter 10 and 13

**Estimating Risk**

**March 8 and 10**

**Concepts and key terms:**

- Relationship between exposures and outcomes
- Odds ratio and a relative risk
- Absolute risk
- Attributable risk

**Readings:**

Gordis, Chapter 11 and 12

**Spring Break**  
**March 15 and 17**

**Causal Inference**

**March 22**

**Concepts and key terms:**

- Association vs. causation
- Criteria for causality, Koch's postulates
- Real or spurious association
- Necessary and sufficient

**Readings:**

Gordis, Chapter 14

**Bias, Confounding and Interaction**  
**March 24 and 29**

**Concepts and key terms:**

- Bias, confounding and error
- Interaction
- P-value

**Readings:**

Gordis, Chapter 15

Exam II  
March 31

**Role of Genetic and Environmental Factors**  
**April 5 and 7**

**Concepts and key terms:**

- Diseases with known genetic origin
- Use of genetic markers
- Family studies, twin studies, adoption studies, migrant studies
- Gene X environment interactions

**Readings:**

Gordis, Chapter 16

**Translating Epidemiological Evidence in Practice**  
**April 12 and 14**

**Concepts and key terms:**

- Efficacy, effectiveness, and efficiency
- Steps involved in health planning
- examples of disease prevention and health promotion strategies
- Examples of interventions to address the social determinants of health
- Vertical and horizontal approaches for improving health
- Methodological issues in epidemiology: volunteer bias, lead time bias, overdiagnosis bias
- Cost benefit analysis

**Readings:**

Framework for program evaluation in public health. *MMWR* 1999;48(No. RR-11): 1-40.  
<ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4811.pdf>  
Gordis, Chapter 17 and 18

### **Social Determinants of Health April 21 and 26**

#### **Concepts and key terms:**

- Social epidemiology and social determinants of health
- Discrimination
- Biological expressions of social inequality
- Ecosocial theory of disease distribution
- Social justice

#### **Readings:**

Krieger. (2007). Why Epidemiologists Cannot Afford to Ignore Poverty. *Epidemiology*  
Krieger. (2001) Theories for social epidemiology in the 21<sup>st</sup> century: an ecosocial perspective.  
*Int. J. Epi*

#### **Film:**

Unnatural Causes: In Sickness and in Wealth

### **Epidemiology and Public Policy April 28**

#### **Concepts and key terms:**

- Population vs. high-risk approach to prevention
- Epidemiology and clinical medicine
- Risk assessment
- Publication bias
- Sources and impact of uncertainty

#### **Readings:**

Taubes G. Do we really know what makes us healthy? *The NY Times Magazine*. Sept. 16, 2007.  
<http://www.nytimes.com/2007/09/16/magazine/16epidemiology-t.html>  
Gordis, Chapter 19

### **Ethical and professional issues in Epidemiology May 3**

#### **Concepts and key terms:**

- Privacy and confidentiality
- Geneva convention and Belmont report
- Race and ethnicity in epidemiological studies
- Conflict of interest



**Readings:**  
Gordis, Chapter 20

**Conclusion and Review**  
**May 5**

**Exam III**  
**TBA**