



EAST TENNESSEE STATE  
UNIVERSITY

College of Public Health

East Tennessee State University  
Department of Biostatistics and Epidemiology  
EPID 5100: Analytic Methods in Public Health  
4 credits

**Class Day & Time:** Tuesday/ Thursday, 9-10:50  
**Class Location:** Millennium Center, 137A  
**Instructor:** Bill Brooks, DrPH, MPH  
**Office:** 902 W Maple St., Rm. 203  
**Contact Info:** Email: brooksb1@etsu.edu (Preferred method of contact)  
Please use your student's ETSU account when e-mailing the instructor.  
**Office Hours:** By Appointment Via Zoom

#### REQUIRED TEXTBOOK

Celentano, David, et al. **Gordis Epidemiology 6<sup>th</sup> edition**. Philadelphia, PA: Elsevier, 2019

David M. Diez, et al. **OpenIntro Statistics, 2015**. Available as free E-book  
at [https://www.openintro.org/stat/textbook.php?stat\\_book=os](https://www.openintro.org/stat/textbook.php?stat_book=os).

Julie Vu, et al. **Introductory Statistics for the Life and Biomedical Sciences, 2020**. Available as free E-  
book at [https://www.openintro.org/go/?id=biostat0&referrer=/book/biostat/index.php\\_p?stat\\_book=os](https://www.openintro.org/go/?id=biostat0&referrer=/book/biostat/index.php_p?stat_book=os).

#### CATALOG DESCRIPTION

Provides an overview of principles and concepts of epidemiology and biostatistics as well as quantitative data collection and management methods applied to public health data. Provides essential instruction on the use of Excel, SPSS and SAS software. Topics may include dynamics of disease in populations, characteristics of study designs and their application, measures of frequency and associations as indicators of public health impact, introduction to the elements of statistical inference, probability distribution, estimation of means and rates, and causation.

#### COURSE PURPOSE

The purpose of this course is to provide a foundation in quantitative evidence-based approaches to public health. Data collection and analysis methods are evaluated to demonstrate their appropriate public health application. Public health data and results are interpreted and critically appraised.

Statistical software packages are incorporated to enhance the student's proficiency in collection, management, analysis and presentation of public health data.

COMPETENCIES AND LEARNING OBJECTIVES

This course addresses the following **MPH Foundational Competencies**.

1. **Apply epidemiological methods to the breadth of settings and situations in public health practice.**
  - a) Describe key features and applications of person, place and time to health, disease, injury and disability measures of incidence and prevalence
  - b) Identify the appropriate uses of epidemiologic study designs accounting for their strengths and weaknesses
  - c) Outline and explain a model of causation
  - d) Identify techniques to reduce bias during the design and analysis phases of study designs
  - e) Define confounding and list methods for its control
2. **Select quantitative and qualitative data collection methods appropriate for a given public health context.**
  - a) Describe the processes and uses of data collection methods for descriptive and analytic epidemiology given public health issues
  - b) List and assess the quality and utility of US and global sources of population data
  - c) Describe the steps for conducting a reliable and valid screening program for a public health issue
  - d) Outline the essential activities of disease surveillance
3. **Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.**
  - a) Calculate and interpret commonly used rates for morbidity and mortality
  - b) Explain data measurement scales associated with public health data and describe their implications for selection of appropriate statistical techniques
  - c) Calculate and interpret measures of risk including, absolute risk, relative risk, odds ratio, attributable risk, population attributable risk
  - d) Define and compute basic statistics such as variable, mean, variance and probability
  - e) Compute sampling distributions and confidence intervals
  - f) Apply appropriate statistical methods for evaluation of the relationship between two continuous variables
  - g) Apply appropriate statistical methods for comparison of mean values of more than 3 groups
  - h) Apply appropriate statistical methods for inference, and select the appropriate statistical techniques for prediction of continuous outcomes using one independent variable
4. **Interpret results of data analysis for public health research, policy or practice.**

- a) Prepare and apply appropriate graphs, tables and figures using data analysis results from public health research
- b) Explain the significance of data analysis results from public health research

**19. Communicate audience-appropriate public health content, both in writing and through oral presentation.**

- a) Articulate the use of epidemiologic and biostatistical methods and their application to a current public health issue
- b) Interpret graphs, tables and figures to communicate public health findings efficiently and effectively to various audiences

**Covid-19 and Attending Class on Campus**

Please wear a mask or other appropriate face covering to class. Wearing a mask that covers your nose and mouth communicates the care and respect you have for yourself, the care and respect you have for those you live with, and the care and respect you have for other members of this classroom community. The best evidence we have, from public health professionals, is that wearing masks is one of the best ways to protect against the spread of COVID-19 and other airborne illnesses. For the safety of your classmates, if you forget your mask I will have a few available each day to distribute. If you choose not to wear a mask, you will not be able to attend class face-to-face. Students with medical conditions that inhibit their ability to wear masks should register through disability services.

For details about ETSU's mask policy: <https://www.etsu.edu/policies/health-safety/face-coverings.php>

COURSE OUTLINE AND ASSESSMENT

<b>Date/ Week</b>	<b>Topics/Competencies</b>	<b>Assessments (s)</b> <i>Assigned in the week listed; due at the next class meeting</i>	<b>Required Readings</b>	<b>Software for Public Health Research and Practice</b>
Aug 24/26	Course Overview and Intro to Epi Method 1a, 2a	Quiz 1 (Chapters 1&2)	Gordis Chapters 1&2	Make sure you are able to access AWS.
Aug 31/Sept 2	Data Visualization and Summary 2a, 2b, 3b, 4a	<b>Quant Assignment 1:</b> Data Visualization and Summary	Diez: 1.2, 2.1.2, 2.1.3, 2.1.5,	Excel
Sep 7/9	Disease Occurrence: Morbidity and Mortality 2c, 2d, 3a	Quiz 2 (G. Chapters 3&4)	Gordis Chapters 3&4	
Sep 14/16	Variance and Standard Deviation 3d	<b>Quant Assignment 2:</b> Variance and SD	Diez Sections: 2.1.4	Excel
Sep 21/23	Observational Studies 1b	Quiz 3 (G. Chapter 7)	Gordis Chapter 7	
Sep 28/30	Probability Theory and Sampling Distributions 3d, 3e	Quiz 4 (Diez Sections)	Diez Sections: 3.1-3.2, 3.4.1-3.4.2, 3.5, 4.1, 4.3.1, 4.5	
Oct 5/7	Cohorts, Cases, and Risk Calculations 1a, 1b, 3c	Quiz 5 (G. Chapters 8 &12)	Gordis Chapter 8 & 12	
Oct 12/14	Exam I			

OFFICIAL SYLLABUS WILL BE PROVIDED IN THE COURSE

<b>Date/ Week</b>	<b>Topics/Competencies</b>	<b>Assessments (s)</b> <i>Assigned in the week listed; due at the next class meeting</i>	<b>Required Readings</b>	<b>Software for Public Health Research and Practice</b>
Oct 19/21	Confidence Intervals and Hypothesis testing 3d, 3e	Quiz 6 (CIs and Hypothesis Testing)	Vu Sections: 4.1, 4.2, 4.3 Diez Sections: 5.1	
Oct 26/28	Attributable Risk and Prevention Potential 3b, 3c	Quiz 7 (G. Chapter 13)	Gordis Chapter 13 Ch 7-8/Friis	SPSS
Nov 2/4	Comparison of Means (t-test and ANOVA) 3d, 3e, 3g	<b>Quant Assignment 3: T-tests and ANOVA</b>	Diez Sections: 7.1-7.3, 7.5.1-7.5.5	SPSS
Nov 9/11	Association and Causal Inference 1c, 1d, 1e	Quiz 8 (G. Chapters 14 & 15)	Gordis Chapters 14 & 15	
Nov 16/18	Chi-square Tests and Correlation Analysis 3d, 3h	<b>Quant Assignment 4: Chi-square and Correlation Analysis</b>	Diez Sections: 8.1.4, 6.4	SPSS
Nov 23/ 25 <sup>th</sup> Thanksgiving (No Class)	Simple linear regression 3d, 3h, 4a, 4b, 19a, 19b	<b>Final Analysis Report</b>	Diez Sections: Chapter 8 Vu Sections: 7.1-7.4	SPSS, Word
Nov 30/Dec 2	Open for Review			
Dec 9	Exam 2			

**Assessment of Student Learning**

Major Course Assignments	Competencies Assessed	Learning Objectives Assessed
Quizzes - 8		
Exam 1		1a, 1b, 1d, 2b, 2d, 3a, 3b, 3d, 3e, 3f, 4a, 4b, 19a, 19b
Exam 2		1a-e, 2a, 2b, 3c, 3g, 3h, 4b, 19a
Quantitative Assignment 1: Data Visualization and Summary	3, 4, 19	3b, 3d, 4a, 19a
Quantitative Assignment 2: Variance and SD	3, 4, 19	3b, 3d, 3e, 3f, 4b, 19a
Quantitative Assignment 3: T-tests and Analysis of Variance	3, 4, 19	3b, 3c, 4a, 4b, 19a
Quantitative Assignment 4: Chi-square and Correlation Analysis	3, 4, 19	3g, 4a, 4b, 19a
Final Analysis Report		

**COURSE FORMAT**

In order to do well in this course, to meet the professional competencies, and to be able to accomplish the learning outcomes, students should pay attention to the course's content, successfully complete the assignments, and keep up-to-date with reading and course activities. Some specific features of the course are given below.

**Desire2Learn**

This course uses Desire2Learn (D2L) as the website support for learners. The syllabus and other materials, including announcements, will be posted on D2L. Students have the responsibility and are expected to check the website frequently for announcements, course materials, and assignments.

**Topic PowerPoints and Lecture Videos**

Topics will be presented using Recorded Lectures and PowerPoint slides that will be posted to the D2L website. The content used in the lectures and slides will help focus the material for the in-class activities and examinations. The PowerPoint slides should not be used instead of assigned readings, but as a complement to help understand the assigned course readings.

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### MAJOR ASSIGNMENTS AND LEARNING ACTIVITIES

**Quizzes (8)** – Quizzes will cover topics discussed in that week’s module and will be taken on d2l. Students may use the book and their notes when taking these quizzes. Students may NOT work together. If it is discovered that students violated this rule, every student involved will receive a zero on the relevant quiz. Just don’t do it. It’s not worth it.

**Exam 1** - Exam will cover topics discussed in the first half of the semester. Students may use the book and their notes when taking this exam. Students may NOT work together on the exam. If it is discovered that students violated this rule, a zero will be given on the exam for every student involved. Still not worth it.

**Exam 2** - Exam will cover topics discussed in the second half of the semester. This will NOT be a cumulative exam. Students may use the book and their notes when taking this exam. Students may NOT work together on the exam. If it is discovered that students violated this rule, a zero will be given on the exam for every student involved. Just don’t do it. Definitely still not worth it.

**Quantitative Assignment (4)** - assignments will cover the methods and tools used to conduct descriptive and analytic biostatistics. Example: Use a public health data set and Excel or SPSS software to perform data analysis (t-test, chi-square, ANOVA, correlation analysis and regression analysis) and provide an interpretation of the results.

**Final Analysis Report** – students will submit a report on the data analyses done in previous quantitative assignments (QA: 3 and 4). This needs to be a professional product of high quality that is fit to be submitted to public health partner organizations, supervisors, government agencies, etc.. Grading will be based on clarity and quality.

### GRADING AND GRADING SCALE

Grades are based on the following assignments:	
Quizzes - 8	20%
Four quantitative assignments	20%
Final Data Report	20%
Exam 1	20%
Exam 2	20%

The final letter grade is assigned according to College of Public Health guidelines:

A 95-100%	B+ 89-91%	B- 83-85%	C 77-79%
A- 92-94%	B 86-88%	C+ 80-82%	F <77%

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### ATTENDANCE POLICY

Students are expected to attend classes regularly and on time and are responsible for giving explanations/rationale for absences and lateness directly to the course instructor. In cases of absence, the student is responsible for verifying the circumstances to faculty and for discussing arrangements with faculty for completion of coursework and assignments.

### MISSED/LATE CLASS ASSIGNMENTS

Students are expected to complete assignments on time. **Permission from Dr. Brooks is required in advance for late assignments.**

### MENTAL HEALTH

Students often have questions about mental health resources, whether for them-selves or a friend or family member. There are many resources available on the ETSU Campus, including: ETSU Counseling Center (423) 439-3333; ETSU Behavioral Health & Wellness Clinic (423) 439-7777; ETSU Community Counseling Clinic: (423) 439-7679.

- If you or a friend are in immediate crisis, call 911.
- Available 24 hours per day is the National Suicide Prevention Lifeline: 1-800-273-TALK (8255).

### PLAGIARISM POLICY

Henry Campbell Black defines plagiarism as “The act of appropriating the literary composition of another, or parts of passages of his writing, or the ideas or language of the same, and passing them off as the product of one’s own mind” (Black’s Law Dictionary, West Publishing Company, St. Paul, Minnesota, 1968, p. 1308). In other words, plagiarism involves using someone else’s words or ideas without giving proper credit to the original author. Even if one does not copy the words exactly or even if one copies only a small part of someone else’s work, one must cite the name of the original author and provide a reference to that person’s work (e.g., title of work, year of publication, and name of publisher) using a format based on the publication manual of a nationally recognized scholarly association, such as the American Psychological Association or the Modern Language Association. One should enclose an exact quotation in quotation marks or indent the quotation, depending upon the style manual used. A page number or numbers must be cited for each quoted passage. Even if one does not use an author’s exact words, if one uses an author’s ideas one must provide documentation to give credit to the author. These standards apply to print and non-print media and include the Internet.



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### ETSU HONOR CODE

East Tennessee State University is committed to developing the intellect and ethical behavior of its students. Students found to be in violation of policies on plagiarism, cheating, and/or fabrication will be held accountable for their actions. Any knowledge of academic misconduct should be reported. Students are expected to act with honesty, integrity, and civility in all matters.

### ACADEMIC MISCONDUCT PROCEDURES AND HEARINGS

Academic misconduct will be subject to disciplinary action. Any act of dishonesty in academic work constitutes academic misconduct. This includes plagiarism, the changing or falsifying of any academic documents or materials, cheating, and the giving or receiving of unauthorized aid in tests, examinations, or other assigned school work. Penalties for academic misconduct will vary with the seriousness of the offense and may include, but are not limited to: a grade of "F" on the work in question, a grade of "F" of the course, reprimand, probation, suspension, and expulsion. For a second academic offense the penalty is permanent expulsion.

### ACADEMIC ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

It is the policy of ETSU to accommodate students with disabilities, pursuant to federal law, state law and the University's commitment to equal educational opportunities. Any student with a disability who needs accommodations, for example arrangement for examinations or seating placement, should inform the instructor at the beginning of the course. Faculty accommodation forms are provided to eligible students by Disability Services. Disability Services is located in the D.P. Culp Center, Room 326, telephone 439-8346. [Website](#).

### INCLEMENT WEATHER POLICY

The policy on closing the university due to inclement weather states that ETSU and its branch campuses will normally remain open during bad weather. The president of the university, under extreme conditions, may choose to officially close or suspend selected activities of the university or branch campuses. The decision to close the university or to cancel some or all classes will be made and announced as soon as possible to accommodate students who must commute. An official statement of closing will be broadcast over several area radio and television stations. The Center for Adult, Commuter and Transfer Services hotline may also be called regarding school closings. The hotline number is 439-5641.

Students are to attend classes unless otherwise notified by local media. If a student cannot attend class, the student is to contact the appropriate instructor(s) if possible. If not, the student must contact the instructor(s) immediately upon returning to the campus to negotiate an excused class absence and make up any missed work. If a student is stranded on campus due to inclement weather, facilities are

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available in university residence halls for an overnight stay. Students should report to the campus security building on the east side of campus.

## NON-DISCRIMINATION POLICY

East Tennessee State University is an AA/EEO employer and does not discriminate on the basis of race, color, national origin, sex, disability, or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Interim Title IX Coordinator and may be contacted at: 205 Burgin E. Dossett Hall, Johnson City, TN 37614, 423-439-4445, [kellycm1@etsu.edu](mailto:kellycm1@etsu.edu) or via this webpage: <https://www.etsu.edu/equity/adherence.php>. Additionally, the Title IX Coordinator is designated to monitor and oversee Title IX complaints.

## UNIVERSITY CAREER SERVICES

All undergraduate and graduate students are encouraged to make use of the University Career Services, located on the 2nd floor of the Culp Center, behind the bookstore. Staff employed by the center are professionally trained to assist with career planning, job search skills and resume writing. Contact information for the University Career Services staff may be found at <http://www.etsu.edu/students/careers/default.aspx>. You may wish to take advantage of a skill building workshop or to schedule an appointment with them for one-on-one advice. This is a valuable university resource that you should use.