Syllabus

Graduate Programs in Public Health

GPH 719 – Research Methods
(3 credits)
Spring Term, Session A

Course Description:
The course is designed to introduce core topics necessary to understand and conduct scientific research – particularly in the public health field. Students will work to understand the importance of proper study and experimental design paying particular attention to formulating appropriate specific aims. Foundational issues in sampling, data collection and structure, survey design and administration, and analytic interpretation will be covered.

Course Goal:
To equip public health professionals with the tools necessary to read and critique scientific literature, as well as to foster the skills to design and implement scientific inquiries based on appropriate hypothesis formulation.

This course addresses the following ASPH Competencies:
The Graduate Programs in Public Health curriculum competencies are founded upon the competencies from the Association of Schools of Public Health (2006).

<table>
<thead>
<tr>
<th>ASPH-based Competencies</th>
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<tbody>
<tr>
<td>A) Biostatistics</td>
<td>Describe the roles biostatistics serves in the discipline of public health. Describe basic concepts of probability, random variation and commonly used statistical probability distributions. Apply descriptive techniques commonly used to summarize public health data. Apply common statistical methods for inference Interpret results of statistical analyses found in public health studies.</td>
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<tr>
<td>C) Epidemiology</td>
<td>Apply the basic terminology and definitions of epidemiology. Draw appropriate inferences from epidemiologic data.</td>
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<tr>
<td>E) Social and Behavioral Sciences</td>
<td>Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions. Apply ethical principles to public health program planning, implementation and evaluation.</td>
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<tr>
<td>F) Communication and Informatics</td>
<td>Use information technology to access, evaluate, and interpret public health data.</td>
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</table>

At the conclusion of the course, participants will be able to accomplish the following course learning objectives:
1. Discuss the research process from hypothesis formulation to interpretation of results.
2. Describe basic design strategies used in public health and be aware of concerns over internal and external validity.
3. Be able to critically evaluate a research design.
4. Be able to apply a research design appropriate for a given set of specific aims.
5. Describe principles of proper sampling and the consequences of not having a representative sample.
6. Discuss the basic principles behind developing survey and evaluation instruments and evaluating their validity and reliability.
7. Be able to make appropriate inferences from common statistical procedures.
8. Be able to independently design a small-scale research project.
9. Be prepared for more advanced study in research methodology.

**Student Evaluation Criteria:**

<table>
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<tr>
<th>Course Requirement</th>
<th>Percent of Grade</th>
<th>Criteria for points</th>
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<tr>
<td>Weekly reading assignments in text and other sources</td>
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</table>
| Participation in weekly forum discussions               | 10               | 4-Submission content is applicable  
4-quality & 2-timeliness                                                            |
| Written Assignment 1: Sample surveys                    | 6                | 2-correct scales or indices identified; 2-appropriate statements made about survey inferences; 1-correct sampling method identified; 1-writing clarity and length |
| Written Assignment 2: Threats to validity                | 8                | 3-appropriate threats to validity identified and justified; 2-appropriate design described for testing hypotheses; 2-any concerns over paper’s conclusions described what could happen if not addressed; 1-clarity of writing and length |
| Written Assignment 3: Smoking and lung cancer           | 6                | 3-obstacles to proving causality clearly described; 2-Proper discussion of design to evaluate exposure-disease association in humans; 1-clarity of writing and length |
| Written Assignment 4: Mercury and autism                 | 8                | 3-proper discussion of which set of conclusions is more valid; 3-thorough examination of analytic issues in DeSoto & Hitlan analysis; 1-Statement of confidence in conclusions in DeStot & Hitlan with supporting discussion; 1-clarity of writing and length |
| Quiz: Chapters 1-4                                      | 8                | Points awarded proportionally based on correct responses                           |
| Quiz: Chapters 5-7                                      | 8                | Points awarded proportionally based on correct responses                           |
| Quiz: Chapters 9-11                                     | 8                | Points awarded proportionally based on correct responses                           |
| Quiz: Chapters 12 and 14                                | 8                | Points awarded proportionally based on correct responses                           |
| Written Assignment 5: Research design critique          | 22               | 8-description of concerns to internal and external validity; 12-identification of appropriate concerns in mock letter; 2-clarity of writing and length |
| Completion of CITI course                               | 8                | Points awarded upon successful completion of online CITI module                   |
UNE’s Quality Points/Scale assigned to grades are as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points Range</th>
<th>Notes</th>
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<tbody>
<tr>
<td>A</td>
<td>4.00</td>
<td>94-100 points Outstanding</td>
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<tr>
<td>A-</td>
<td>3.75</td>
<td>90-93 points Excellent</td>
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<tr>
<td>B+</td>
<td>3.50</td>
<td>87-89 points Competency achieved to high standard</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
<td>84-86 points Competency achieved</td>
</tr>
<tr>
<td>B-</td>
<td>2.75</td>
<td>80-83 points Satisfactory competency</td>
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Note: All grades below 80 points are considered failing.

Required Reading:


Course Outline:
Each week runs from Wednesday morning to Wednesday night at midnight. The eight course weeks are as follows:

- **Week 1** January 9-January 16
- **Week 2** January 16-January 23
- **Week 3** January 23-January 30
- **Week 4** January 30-February 6
- **Week 5** February 6-February 13
- **Week 6** February 13-February 20
- **Week 7** February 20-February 27
- **Week 8** February 27-March 3 (SUNDAY)

Course Requirements

**Posting to the Forum Discussion:** Each student is expected to post at least twice each week. One posting should be an original contribution to the discussion. A second or sequential posting may be in response to a classmate’s posting. **Initial discussion postings** to the class website must be submitted by **Sunday at midnight**. For most weeks, that means you must have completed the reading by this time. **Second postings must be completed by Wednesday midnight** of the week the question is assigned.

**Written assignments and chapter quizzes are due by Wednesday midnight of the week they are assigned, except in week 8 when the course ends on Sunday.** Late written assignments will earn a maximum of 4 points. Late quizzes will not be given no credit. The CITI course must be completed by the last day of the course.

Assignments are informed by assigned reading, and by the online lecture. No weekly written assignment should exceed **2 standard pages**, single-spaced (1.5 spacing is preferred), with adequate margins and a minimum of 12-point serif print. Please be as clear and to the point as possible.

**Student Academic Success Center (SASC):** The UNE Student Academic Success Center offers online support services. Henri Mosher, Online Support Specialist, will work directly with you to increase your writing skills or to assign a tutor to help you with a specific course. This is an excellent resource for any student. You can find his contact information at this link: [http://www.une.edu/studentlife/portland/las/linespecialist.cfm](http://www.une.edu/studentlife/portland/las/linespecialist.cfm)

Henri has also developed a special portal for students in the Graduate Program in Public Health. Using this portal you can access tutorials on a variety of topics, such as writing research papers and using the AMA style. The link for the portal is: [https://sites.google.com/a/une.edu/learning-assistance-une-portland/public-health-assistance-page](https://sites.google.com/a/une.edu/learning-assistance-une-portland/public-health-assistance-page)
Safe Assign: The UNE Academic Integrity Policy will be strictly followed (See policy statement below in “Additional Course Information”). Safe Assign is utilized now by all courses in the Graduate Programs in Public Health. Safe Assign is a plagiarism prevention service offered by Blackboard. Please be aware that this service helps educators prevent plagiarism by detecting unoriginal content in student papers. If you are unclear what constitutes plagiarism, you can learn about it by clicking on this link: http://www.youtube.com/watch?v=TdMg7Yu4mPs&feature=related

The CITI Human Subjects Protection course must be completed by the last day of the course, but can be started immediately. To complete the training you need to go to www.citiprogram.org. The course you should select is “Social & Behavioral Research Investigators” under the first section of training, labeled “Question 1.” Once you log in to the system, you will see a link labeled “Add a course or update your learner groups for University of New England.” Click that link, and under Question 1, select the program I have listed above. It will be the second radio button. You will then be able to cover the course material and complete the necessary quizzes. The training can take 4 to 6 hours but need not be completed all in one sitting.

Class Outline
Pre-course Work
January
- Purchase the required textbook.

Week 1: January 9-January 16

Foundations and Sampling
Module 1 introduces common terminology in research and sampling methods used in data collection. Issues in research ethics are explored in the CITI course.
Lecture 1: Liam O’Brien, PhD

- Readings:
  - Textbook Chapter 1 (pages 3-29)
  - Textbook Chapter 2 (pages 33-51)

- Forum Questions: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
  1. Introduce yourself by Sunday midnight. Briefly, tell us who you are, what you do, and whether you’ve had any previous public health experience.
  2. Some government econometric statistics are derived from samples of U.S. households. If you were asked to obtain a representative sample of 50,000 households, describe a process for doing so.

- Written Assignment: No written assignment this week

- CITI Course: Register online for the human subjects protection course run by CITI. Complete the course by the end of the term

Week 2: January 16-January 23

Measurement and Surveys
Module 2 provides a foundation for survey methods used in public health research including survey properties and construction.
Lecture 2: Liam O’Brien, PhD

- Readings:
  - Textbook Chapter 3 (pages 56-97)
Forum Question: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
1. Describe your view of the difference between reliability and validity. If you could choose only one of these two properties for a survey to have, which would you choose and why?
2. If you were asked to evaluate the effectiveness of a tobacco prevention intervention given in schools, what type of survey would you recommend using. What are the advantages and disadvantages of the type of survey you have chosen?

Quiz: Complete quiz on chapters 1 through 4 via Blackboard.

Week 3: January 23-January 30

Scales, Indicies, and the Value of Qualitative Data
Module 3 describes scales and indices and provides contexts in which qualitative data is a useful adjunct to quantitative data.
Lecture 3: Liam O’Brien, PhD

Readings:
1. Textbook Chapter 5 (pages 126-140)
2. Textbook Chapter 6 (pages 142-149: do not read 6-2)

Forum Questions: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
1. Describe a situation in which the collection of qualitative data would complement quantitative information.

Written Assignment: Think back to the last survey you filled out (either online, by phone, or on paper). What type of responses were elicited? How were the sample of people who filled it out selected? Would you have confidence that the results were accurate? Support your statements.

Week 4: January 30-February 6

Introduction to Design Issues
Module 4 describes the importance of internal validity in research designs and gives an overview of threats to validity.
Lecture 4: Liam O’Brien, PhD

Readings:
1. Textbook Chapter 7 (pages 158-175)

Forum Questions: None this week.

Written Assignment: Identify any potential threats to internal or external validity in Boffetta et al. (2010) article. Do you notice any potential problems with the conclusions? If you were to design a study to evaluate the same hypotheses, how would you design it?

Quiz: Complete quiz on chapters 5 through 7 via Blackboard.
Week 5: February 6-February 13

Experimental and Quasi-Experimental Designs
Module 5 introduces basic concepts in experimental designs. Quasi-experimental designs are also discussed.

Lecture 5: Liam O’Brien, PhD

→ Readings:
  1. Textbook Chapter 9 (pages 186-207): Skip chapter 8
  2. Textbook Chapter 10 (pages 210-229)

→ Forum Questions: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
  1. Fitzmaurice (2001) describes two methods for analyzing change. If you were evaluating the effectiveness of a treatment for hypertension given at two different doses, what design would you employ?

→ Written Assignment: Although there is a widely accepted link between smoking and lung cancer, no definitive experiment has ever been done to prove causality. Why is this the case? What design would you recommend using to determine whether there is a probably link between exposure and disease in this setting?

Week 6: February 13-February 20

Advanced Design Topics
Module 6 builds on the basic design components introduced in Module 5 and discusses strategies for research design construction.

Lecture 6: Liam O’Brien, PhD

→ Readings

→ Forum Questions: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
  1. Describe two different studies – one that would best be conducted using the RE design and the other that would best be conducted using the NEGD design.

→ Written Assignment: No written assignment this week.

→ Quiz: Complete quiz on chapters 9 through 11 via Blackboard.

Week 7: February 20-February 27

Introduction to Analytic Methods and Mixed Methods Analysis
Module 7 discusses descriptive techniques for displaying and summarizing data.

Lecture 7: Liam O’Brien, PhD

→ Readings
  1. Textbook Chapter 12 (pages 252-281)
Forum Questions: post original contribution by midnight Sunday, and post second by midnight on Wednesday.
1. Discuss the implications of having a sample size that is too small. Can you envision any problems with having a sample size that is “too large?”

Written Assignment: Discuss the analysis performed by DeSoto and Hitlan. Which conclusion reached about the association between blood mercury levels and autism (theirs or Ip et al, which is referenced in the article) do you agree with more? Support your position from a statistical point of view.

Week 8: February 27-March 3 (Sunday)

Analysis for Research Design and Tying It All Together
Module 8 provides a background in common statistical inference techniques and discusses their proper use.
Lecture 8: Liam O’Brien, PhD

Readings
1. Textbook Chapter 14 (pages 294-330)
2. Harris, et al (1999) “A Randomized, Controlled Trial of the Effects of Remote, Intercessory Prayer on Outcomes in Patients Admitted to the Coronary Care Unit.” Archives of Internal Medicine

Forum Questions: post original contribution by midnight Friday and post second by midnight on Saturday.
1. If you were asked to evaluate a drug treatment for hypertension given at two doses, how many measurements (on each subject) would you need to take? If you were only interested in how blood pressures change according to treatment group, how would you design the study/experiment?
2. What analytic method(s) would be best to use in the study/experiment described above?

Quiz: Complete quiz on chapters 12 and 14 via Blackboard.

Final Research Critique Exercise: Consider the Harris et al (1999) article on intercessory prayer’s effect on cardiac outcomes. Critically review the design and analysis of the study. Identify any threats to internal or external validity. Write a mock “letter to the editor” taking a position on the article’s conclusions supporting your arguments for or against the methods used.
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<th>Weeks</th>
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<th>Associated Activities and Assignments</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>1. Become comfortable with common terminology used in public health research. 2. Understand common ways to sample from a population. 3. Gain insight into ethical issues in research.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health A2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions A9. Interpret results of statistical analyses found in public health studies C6. Apply the basic terminology and definitions of epidemiology C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions E9. Apply ethical principles to public health program planning, implementation and evaluation</td>
<td>Chapter 1, Chapter 2</td>
<td>Lecture 1</td>
<td>Forum questions week 1, CITI course</td>
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<tr>
<td>Week 2</td>
<td>1. Be able to describe the important properties of surveys.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health A2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions</td>
<td>Chapter 3, Chapter 4</td>
<td>Lecture 2</td>
<td>Forum questions week 2, quiz 1</td>
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<tr>
<td>Week 3</td>
<td>1. Gain an understanding of the construction of scales. 2. Become familiar with common types of scales. 3. Describe the value of qualitative data in public health research.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions</td>
<td>Chapter 5, Chapter 6</td>
<td>Lecture 3</td>
<td>Forum questions week 3, written assignment week 3</td>
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<tr>
<td>Week 4</td>
<td>1. Be able to describe threats to internal validity. 2. Be able to describe basic issues in experimental design.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health A2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions A9. Interpret results of statistical analyses found in public health studies C6. Apply the basic terminology and definitions of epidemiology C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions</td>
<td>Chapter 7, Boffetta et al (2010)</td>
<td>Lecture 4</td>
<td>Forum questions week 4, written assignment week 4, quiz 2</td>
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<tr>
<td>Week 5</td>
<td>1. Be able to identify different experimental designs. 2. Be able to describe types of quasi-experimental designs.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health C6. Apply the basic terminology and definitions of epidemiology C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions</td>
<td>Chapter 9, Chapter 10, Fitzmaurice (2001)</td>
<td>Lecture 5</td>
<td>Forum questions week 5, written assignment week 5</td>
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<tr>
<td>Week 6</td>
<td>1. Describe how proper experimental design reducing validity threats. 2. Be able to build appropriate designs for public health research.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions</td>
<td>Chapter 11</td>
<td>Lecture 6</td>
<td>Forum questions week 6, quiz 3</td>
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### Additional Course Information

#### Assessment of Learning:
Feedback from students will be requested formally and informally throughout the course to assess the level of individual learning. The course is modeled on the principles of adult learning and provides an environment for learning in which the student is self-directed and takes responsibility for independent learning.

#### Academic Integrity Statement:
The University of New England values academic integrity in all aspects of the educational experience. Academic dishonesty in any form undermines this standard and devalues the original contributions of others. It is the responsibility of all members of the university community to actively uphold the integrity of the academy; failure to act, for any reason, is not acceptable.

Charges of academic dishonesty will be reviewed by the dean of the appropriate College and, if upheld, will result at minimum in a failing grade on the assignment and a maximum of dismissal from the University of New England. Academic dishonesty includes, but is not limited to the following:

1. Cheating, copying, or the offering or receiving of unauthorized assistance or information.
2. Fabrication or falsification of data, results or sources for papers or reports.
3. Action, which destroys or alters the work of another student.
4. Multiple submission of the same paper or report for assignments in more than one course without permission of each instructor.
5. Plagiarism, the appropriation of records, research, materials, ideas or the language of other persons or writers and the submission of them as one’s own.

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<th>Assessment</th>
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<tr>
<td>Week 7</td>
<td>1. Understand the importance of proper database management. 2. Recognize common descriptive techniques for displaying data. 3. Describe common descriptive summary measures for data.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health A2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions A5. Apply descriptive techniques commonly used to summarize public health data A6. Apply common statistical methods for inference A9. Interpret results of statistical analyses found in public health studies C6. Apply the basic terminology and definitions of epidemiology C9. Draw appropriate inferences from epidemiologic data F8. Use information technology to access, evaluate, and interpret public health data</td>
<td>Chapter 12, DeSoto and Hitlan (2007)</td>
<td>Lecture 7</td>
<td>Forum questions week 7, written assignment week 7</td>
<td>Points assigned to forum questions, written assignments, and quizzes based on criteria outlined in syllabus</td>
</tr>
<tr>
<td>Week 8</td>
<td>1. Describe common statistical techniques for interpreting data. 2. Determine appropriate techniques for data analysis based on research designs.</td>
<td>A1. Describe the roles biostatistics serves in the discipline of public health A2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions A5. Apply descriptive techniques commonly used to summarize public health data A6. Apply common statistical methods for inference A9. Interpret results of statistical analyses found in public health studies C6. Apply the basic terminology and definitions of epidemiology C9. Draw appropriate inferences from epidemiologic data E5. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions F8. Use information technology to access, evaluate, and interpret public health data</td>
<td>Chapter 14, Harris et al. (1999)</td>
<td>Lecture 8</td>
<td>Forum questions week 8, quiz 4, final research design critique</td>
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</table>
Course Evaluation Policy:
Course and Instructor evaluations are one of the most important tools that we have for evaluating the quality of your education, and for providing meaningful feedback to course instructors on their teaching. In order to assure that the feedback is both comprehensive and precise, we need to receive it from everyone, so course and instructor evaluations are a required element of every course.

PLEASE NOTE: Evaluations will be made available at the beginning of Week 8. You will not receive your final grade until you have completed your course evaluation.

AMA Writing Style Statement:
In keeping with the requirements of the “American Journal of Public Health,” the American Medical Association Manual (AMA) of Style, 9th edition is the required writing format for this course and is available at both UNE libraries under the title “AMA Manual.” Online resources:
http://www.une.edu/library/gethelp/writing/index.cfm

Conversion from .docx to .doc:

Student Handbook Online - Policies and Procedures:
http://www.une.edu/studentlife/handbook/
The policies contained within this document apply to all students in all colleges of the University on the Biddeford Campus and the Portland Campus as well as off-campus students and distance learners. It is each student’s responsibility to know the contents of this handbook.

UNE Student Support Services:
http://www.une.edu/studentlife/portland/las/index.cfm
Student Academic Success Center, provides a comprehensive array of academic support including professional writing tutors available to you. Also, the Center has developed a site specifically for assisting all public health students:
https://sites.google.com/a/une.edu/learning-assistance-une-portland/public-health-assistance-page

Students with Disabilities Statement:
Any student with a documented disability needing academic adjustments or accommodations is requested to speak with the professor prior to or during the first week of class. All discussions will remain confidential. All students should register with the ADA services prior to the start of coursework for special accommodations.

UNE Catalog Online -- Graduate Programs in Public Health:
http://www.une.edu/registrar/catalog/1112/graduate/majorqph.cfm

UNE Course Withdrawal:
http://www.une.edu/registrar/catalog/1112/graduate/majorqph.cfm
Please contact the Office of Graduate Programs in Public Health to either drop or withdraw from a course.

UNE Libraries:
- Graduate Programs in Public Health Databases: http://www.une.edu/library/mguide/pubheal.cfm
- Library Tutorial: http://www.une.edu/library/gethelp/tutorials/index.cfm
- Library Access for all students: If this is your first course, a UNE ID card will be mailed to you prior to the course start date.
- Library Questions: http://www.une.edu/library/refrequest.cfm or phone library staff at (207) 602-2361 or (207) 221-4330.

Information Technology Services (ITS)
- ITS Contact: Toll Free Help Desk 24 hours/7 days per week at 1-877-518-4673
- Blackboard Browser Requirements and Adjustments: http://www.une.edu/its/webct/student.cfm
- Further Assistance: If problems are not resolved in a timely manner or if you feel you need us to step-in, please contact the Office of the Graduate Programs in Public Health as soon as possible so we can assist
you. Contact the program office via email: dbisaillon@une.edu, jredman1@une.edu, and/or cbaeder@une.edu.