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## PUBH 520.50: Biostatistics

Marcia A. Ciol

*University of Washington - Bothell Campus*

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**PUBH 520**  
**Biostatistics**  
**3 credit hours**  
**Autumn Semester 2013**

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Notes: (1) This syllabus is subject to change by the instructor. Any changes will be announced on Moodle 2.  
(2) All times referred to in this syllabus are in Mountain Standard Time.

**INSTRUCTOR**

Marcia A. Ciol, PhD  
Research Associate Professor, Biostatistician  
Department of Rehabilitation Medicine, School of Medicine  
University of Washington

**Contact Info:**

Office Room: BB948 – Health Sciences Building, University of Washington, Seattle, WA  
email: [marciac@uw.edu](mailto:marciac@uw.edu)

**Availability:**

Dr. Ciol will be available via e-mail for all students. If you wish to speak with Dr. Ciol by telephone, the easiest thing to do is to contact her by e-mail, and she will arrange for a telephone conversation or meeting with you. She will make every attempt to reply to your e-mail message within twenty-four hours during weekdays. Dr. Ciol will post exceptions as a class announcement on Moodle 2.

**Adjunct Faculty:**

Julie Stevens, MPH will be assisting with all organizational aspects of the class. Ms. Stevens can be reached at [julie.stevens@umontana.edu](mailto:julie.stevens@umontana.edu).

**TECHNICAL ASSISTANCE :**

Moodle 2 technical support is available at (406) 243-4999 or [http://umonline.umi.edu/tech\\_support/default.php](http://umonline.umi.edu/tech_support/default.php).  
UMOnline student resources are available at <http://umonline.umi.edu/student/default.php>.

**COURSE**

**Description:**

This course is designed for graduate students and practitioners in public health and related fields. The course introduces basic vocabulary, concepts, and methods of biostatistics. The goal is to provide an introduction to how biostatistics works to improve the health of the people of Montana and other rural areas around the world. Topics will include descriptive statistics, probability, random variables, probability distributions, statistical inference, chi-square analysis, linear regression, and correlation.

**Prerequisite:**

None

**COMPETENCIES**

**Course:**

At the end of the course you should be able to:

1. Comprehend fundamental biostatistical concepts, and be prepared to use that understanding in the design, execution, communication, or interpretation, of public health or related research.
2. Gain facility with the language of symbols used in the expression of biostatistical analysis tools in order to more fully understand the logic of various approaches and therefore facilitate their correct application.
3. Apply basic descriptive and inferential statistical techniques, taking into account measurement scales, study design, and methodological assumptions and requirements.
4. Understand and appreciate the role of biostatistics and biostatisticians in public health and related sciences.

5. Reason effectively about basic problems associated with public health in rural areas.

Program Competencies:\*

1. Prepare Community Data for Public Health Analyses and Assessments
2. Contribute to Public Health Program and Policy Development
3. Communicate in Public Health Settings
4. Practice Public Health with People from Diverse Populations
5. Collaborate with the Community in the Practice of Public Health
6. Base Public Health Practice on Scientific Evidence
7. Participate in Financial Planning and Management of Public Health Units
8. Exercise Public Health Leadership and Systems Thinking
9. Respond to Public Health Issues in Rural Settings
10. Uses Global Insight in Responding to Local Public Health Hssues

\* For a listing of learning objectives corresponding to each competency see <http://www.health.umt.edu/schools/pch/documents/Competencies-StudentVersion2012.pdf>

**FORMAT**

Protocol:

Online using Moodle 2.

Components:

The course will consist of self-study, discussion, and a project.

1. A self-study format will be used with readings, interactive activities, SPSS activities, and problem sets. Requirements are described below under SELF-STUDY.
2. The conceptual understandings and applied skills developed through this self-study will form the basis for additional development during the weekly Question Discussion Forum and the Student Discussion Forum on the Moodle 2 discussion forum. The Question Discussion Forum and Student Discussion Forum are described below under DISCUSSION.
3. A project will be the capstone to the learning in this course. This will be in lieu of a final exam. Requirements are described below under PROJECT.

Clock:

For the on-line clock, the week starts on Sunday, 12:01 a.m. and ends on Saturday at midnight.

**NEEDED TOOLS**

Books:

1. Selvin, S. 2004. Biostatistics: How It Works. Prentice Hall. ISBN-13: 978-0130466167.
2. (optional) Moore, D.S. and Notz, W.I. 2008. Statistics: Concepts and Controversies, 7th Edition. W.H. Freeman. ISBN-13: 978-1429237024
3. Additional readings may be posted on Moodle 2.

Computer:

Access to a Windows-based computer for use with the SPSS activities. Other operating systems can be used but potential differences may arise as these activities were designed for Windows.

Software:

Internet browser  
Microsoft Word  
SPSS

Option 1: You can purchase the SPSS version 21.0 (or higher) Standard Graduate Pack from the UM Bookstore for approximately \$200. This includes the needed add-on modules (Advanced and Regression). This is a four-year license.

Option 2: You can lease the SPSS version 21.0 (or higher) Standard Graduate Pack for six months or for 12 months. This software is available as a download or a disk from e-academy (<http://www.onthehub.com/spss/>) This is a 6-12 month rental at approximately \$55-\$90.

Option 3: This software is available for use in some computer labs on campus.

Calculator:

Scientific calculator capable of data summation and calculating both common and natural logs (bases 10 and e).

## SELF-STUDY

Categories of Work:

Work for each week will be organized into the following six categories: Aims/objectives review, readings, interactive activities, SPSS activities, problem sets, and Aims/Objectives mastery.

1. **Aims and objectives review** helps you to organize your learning. Review the aims and objectives at the start of your work to familiarize yourself with what you should know about and what you should be able to do.  
DEADLINE: The aims and objectives review is to be completed by Monday at noon.
2. **Readings** for Weeks 1-15 will be from the (required) Selvin and (optional) Moore/Notz textbooks. Any other readings will be posted on Moodle 2. Use the Student Discussion Forum to pose questions to, or weigh into the discussions of questions posed by, your class colleagues.  
DEADLINE: The readings are to be completed by Monday at midnight.
3. **Interactive Activities** (IA) are a custom package of multiple-choice questions. Any feedback about these interactive activities should be sent by e-mail to the instructor.  
POINTS: The IA allows unlimited responses per question to maximize your learning experience. However, a penalty factor of 20% of the question's value will be deducted per wrong attempt. At the completion of the activity, you will be able to view your grade. After viewing this grade, you do not need to submit it to the instructor. The software application submits the grade to the instructor automatically.  
DEADLINE: Interactive activities are to be completed by midnight on Tuesday.
4. **SPSS activities** (SA) use the SPSS statistical software package. These are tutorial in nature and designed to help you understand material and carry out methods learned in this Lesson. Use the Student Discussion Forum to resolve any problems that surface in your computer work.  
POINTS: You will receive points for turning in your completed SPSS output files (**Note: you must turn in must be a spv file, pdf or any other formats will not be accepted**).  
IDENTIFICATION: Follow the instructions given in the SA for how to name your SPSS output files.  
DEADLINE: The SPSS output files are to be submitted by midnight on Wednesday.  
SUBMISSION: The completed SPSS output files are to be turned in using the Moodle 2 Assignment feature. Note: If you are submitting multiple SPSS output files for one assignment, please note that you need to attach them all at one time.
5. **Problem sets** are at the end of each chapter of the Selvin textbook. Problem sets are to be done with pencil, paper, and calculator. Use the Student Discussion Forum to get any needed help from your class colleagues.  
POINTS: You will receive points for turning in steps showing how you got from the question to the solution. Individual problems will not be graded.  
DEADLINE: Completed problem sets are to be submitted by midnight on Saturday.  
SUBMISSION: Please scan and save your problem sets as a pdf or jpeg. Submit via Moodle 2 classroom.  
IDENTIFICATION: On the top of each page, include the following:  
Your name (last, first), Week number.

6. ***Aims and objectives mastery*** help you to complete your learning. Review the aims and objectives at the end of your work to make sure you have mastered each of them. Use the Student Discussion Forum to organize a discussion about any objectives that remain unclear.

DEADLINE: The aims and objectives mastery is to be completed by Saturday at midnight.

## **DISCUSSION**

Question Discussion Forum:

Objective: To prepare additional interactive activity questions for possible use by future classes.

Interactive Activity Questions: These are to be based on the week's readings. They should focus on rural health issues. They are to use the same structure as the interactive activity questions prepared by the instructor, i.e., they should be multiple choice with four options, where each option is followed by an explanation of why that option is right or wrong. The questions should be prepared as a Word document.

Leaders: During the first week of class, the instructor will create a schedule assigning students to lead the Question Discussion Forum in specific weeks. Each assigned student will prepare a draft interactive activity question during each of their assigned weeks.

TIPS: Be creative when you write the questions! Come up with a question that you think will be helpful to future students as they prepare to improve the health of people in rural areas around the world. The Interactive Activity questions that you'll be working on each week as part of your self-study will give you ideas, hopefully!

The responses that you write to each possible answer to your question should not give away the answer! The responses should be 'teaching moments' that lead students in the direction of the answer. Remember, students will have a chance to choose another answer each time they've chosen a wrong answer.

DEADLINE: 'Initial' draft interactive activity questions are to be posted on the Moodle 2 Question Discussion Forum by midnight on Monday.  
'Next' draft interactive activity questions that incorporate all student feedback are to be posted on the Moodle 2 Question Discussion Forum by noon on Thursday.  
'Final' draft interactive activity questions that incorporate all student and instructor feedback are to be posted on the Moodle 2 Question Discussion Forum by midnight on Saturday.

*Please note that a discussion is not considered finished until the instructor has approved the final question. Because of this, **the discussion on a question may continue into the following week.** It is important to continually check the discussion board until the instructor has signed off on the question.*

Discussants: All students are to participate in the Question Discussion Forum by making suggestions for improving the draft interactive activity questions. Question Discussion Forum participation constitutes a portion of the grade.

TIPS: You will be expected to participate in all discussion threads.

I will be looking for comments that add something new and of substance to the discussion.

Discussion comments may address statistical matters or matters related to question format or style, although comments that address statistical matters will be rated more highly.

DEADLINE: There are two phases of discussion. The first phase allows students to discuss and problem solve without input or prompts from the instructor. The second phase involves feedback and dialogue with the instructor.

**PHASE ONE:** All students are required to make an initial post in the Question Discussion Forum every week by midnight on Tuesday. Participation in phase one consists of this initial posting, plus additional periodic posting and monitoring from midnight on Tuesday through noon on Thursday.

**PHASE TWO:** Participation in phase two consists of periodic posting and monitoring from noon on Thursday through Friday at 3:00 pm, or until the completion of the discussion

(which may continue into the following week). During this time the instructor will provide feedback.

#### Project Discussion Forum:

Objective: To discuss statistical issues related to the project.

Leader: The instructor will lead the Project Discussion Forum during week 13.

Discussants: All students are to participate in the Project Discussion Forum. Project Discussion Forum participation constitutes a portion of the grade.

DEADLINE: All students are required to participate in the Project Discussion Forum by midnight on Thursday. Participation consists of periodic posting and monitoring throughout the entire period of the Forum.

#### Student-only Discussion Forums:

Each week there will be a student-only forum. The forum will focus on any questions or issues that you have about the readings, problem sets, or SPSS activities. These forums will give you a chance to work directly with your peers. **The student-only discussion forums will not be graded.**

### **PROJECT**

#### Database:

For the project, you will identify a database that has 4 variables in it: 2 quantitative variables (e.g., height and weight), and 2 categorical variables (e.g., gender and whether the person completed high school).

You may identify this database early in the quarter, but by Week 8, you need to have my approval to use it. To obtain approval, send me an email ([marciac@uw.edu](mailto:marciac@uw.edu)) with details of the database and questions that you would like to answer with it. If I feel that the database is not appropriate, I will let you know so you have time to get another one before Week 14.

#### Data Management:

In Week 14, you will create this database in, or import it into, SPSS.

#### Data Analysis:

In Week 15, you will apply all appropriate methods learned in this class using your database.

#### Biostatistical Communication:

In Week 16, you will write a report that includes your applications written up as textbook-like examples.

DEADLINE: The project is to be completed in Week 16 by Monday at noon.  
SUBMISSION: The summary report is to be turned in using the Moodle 2 Assignment feature.  
IDENTIFICATION: On the top of the summary report, include the following:  
Your name (last, first), Week number, "Summary Report".  
FILESAVE: Save your summary report as a Word document with the file name  
YourLastName\_summaryreport (e.g., Ciol\_summaryreport)

See: Project Q&A document posted in Week 14.

### **ASSESSMENT**

This course will use the traditional letter grade option with the use of pluses or minuses.

1. Interactive activities 24% [2% for each of 12]
2. SPSS activities 14% [2% for each of 7]
3. Problem sets 24% [2% for each of 12]
4. Question Discussion Forum participation 24% [2% for each of 12 weekly postings to discussion board]
5. Project Discussion Forum participation 2% [1% for each of 2 weekly postings to discussion board]
6. Project 12%

### **COMMUNICATION**

Announcements:

Class announcements will be posted in Moodle 2 by the instructor.  
Moodle 2 system administrators will sometimes post announcements about the Moodle 2 system.

Discussion forum:

A discussion forum is appropriate for questions or discussions that would normally occur in the classroom.  
Remember that the discussion forum is public and your classmates can read what you post there.

e-mail:

E-mail should be used for "private" communication with the instructor or other students. Any questions regarding grades or communication about more personal issues should be handled via email. Important: Please put "BIOSTAT" in the subject line for e-mail communication with the instructor. This helps the instructor in organizing and responding to e-mail communications.

Logging In:

You are expected to log in every MWF to read current announcements that have been posted. You may do this at any time of day. The instructor will generally respond to discussions, answer e-mails, etc. within 24 hours.

**WARNINGS**

Failure to Follow Instructions:

Work submitted by a method other than specified in this syllabus will not receive points.

Late Work:

Late work will not receive points unless there are very serious and verifiable extenuating circumstances. If you wish to request permission to submit a work product late, you must contact Dr. Ciol well before the assignment deadline.

**ADDENDUMS**

For the **University of Montana Mission Statement**, the **School of Public and Community Health Science's Mission Statement**, and information about **tutorials, accessibility, and plagiarism** see: <http://publichealth.health.umt.edu/content/curriculum>.

**ACADEMIC CALENDAR**

**Autumn Semester, 2013**

August 26 (Mon).....	Classes Begin
September 2 (Mon).....	Labor Day Holiday
November 11 (Mon).....	Veterans Day Holiday
November 27-29 (Wed-Fri).....	Thanksgiving Vacation
December 6 (Mon).....	Last Day of Regular Class

