

Biostatistics for Biology Majors (BIOL 214) syllabus

Spring, 2015

$$f(y) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{y-\mu}{\sigma}\right)^2}$$

I. Basic course information:

Lecture instructors:

MWF class: Professor Marieke E. Kester, mkester2@gmu.edu

TR early afternoon class: Professor Arndt F. Laemmerzahl, alaemmer@gmu.edu

TR late afternoon class: Professor Karoline Oldham, koldham@gmu.edu

Course coordinator: Arndt F. Laemmerzahl

office: Exploratory Hall, 1209

phone: 993-5603. Please do NOT leave voice mail.

e-mail: alaemmer@gmu.edu. The best way of getting in touch.

office hours: see the web page information below:

There is a web page that will have homework assignments posted and contains lecture notes for Professor Laemmerzahl's section. It's at:

<http://mason.gmu.edu/~alaemmer/bio214/main.html>

This page also contains some useful information for the other classes.

Instructors may also make extensive use of blackboard and/or have their own web page. You will be informed about this by your instructor.

II. Books, manuals, etc.

Text: Statistics for the Life Sciences. Samuels, Witmer, and Schaffner, 4th edition.

The 4th edition has been out for a while, so you should be able to find a used copy. (*There is a 5th edition; we will **not** be using it (it doesn't offer much that the 4th doesn't).*)

If you really need to save money, you can use a 2nd or 3rd edition. There are a few things missing, but they'll work. They are usually much cheaper (as little as \$10.00 for a 2nd edition on Amazon).

Important: regardless of which edition you use or where you get it, you will need it almost right away for homework assignments and other things. It is your responsibility to get the text on time (saying "I don't have my text yet" is not an excuse)!

Also note that electronic versions of the text are not recommended as you are not allowed to use them on exams (you may be allowed to use regular versions on exams).

Software: R statistical software - available at <http://www.r-project.org/>

This is open source software and is free. It is also better than most other non-free statistical software, and is available for Windows, Mac-OS, and Linux.

Please follow the instructions on the course web page to install this software.

Instructions for using R will be available during recitation.

Note that R can be a bit of a pain to use until you get used to it. Nevertheless, you will be required to learn R. *Important: despite what some people say, **Excel is NOT a statistical package** and you are not allowed to use Excel for any actual analyses.*

Calculator: You will need a calculator that has statistical functions. Chances are that if you own a “fancier” (e.g. scientific) calculator it will include these functions. There are some TI's available for under \$20.00 that will do (try the TI-30X IIS). You can use whatever brand you wish, but it is *your responsibility* to figure out how it works.

III. Exams:

Three regular exams and a final (but see comment on quizzes). Your lowest regular exam will be dropped (this does **not** include the final). Because you are allowed to drop an exam, ***there is no possibility of a makeup exam under any circumstances.*** Each regular exam is worth 20% of your grade, the final is worth 25% of your grade (but see below under *Quizzes*)

Exam I, Thursday February 12 / Friday February 13

Exam II, Thursday March 19 / Friday March 20

Exam III, Thursday April 16 / Friday April 17

Final exam times:	MWF 8:30 - 9:20	Friday 5/8 @ 7:30 a.m. (sorry folks!)
	TR 1:30 - 2:45	Tuesday 5/12 @ 1:30 a.m.
	TR 5:55 - 7:10	Thursday 5/7 @ 4:30 p.m.

Your instructor will decide on the precise structure of your exam, and will inform you on the first day of the semester. Your instructor will also inform you as to how much time you will have for the exam.

There may be an open book component.

But note the following:

You need to make sure you know how your calculator works (no computers!).

You will still need to show all the steps in each problem. You will not get full credit if you just write down an answer your calculator spits out!

Generally, exams are not cumulative, but you may need to know some of the material covered by a previous exam to understand the material on the current exam. This is particularly true of the final.

Quizzes: You may or may not have pop quizzes in your lecture. This is up to the discretion of your instructor. Your instructor may decide to include quizzes right from the start, or wait until later in the semester (this is particularly true if attendance becomes an issue in your lecture section). If your section does include quizzes, 5% of your grade will come from quizzes, and the final will drop in value to 20%.

Your instructor will warn you should pop quizzes become necessary.

IV. Homework & Recitation.

Recitation is an important part of the course, and is worth 35% of your grade. It is an opportunity for you to ask questions, get personal attention, and learn how to use statistical software. Recitation has two main parts, and a few minor parts:

1) You will be given homework assignments every week. All problems will need to be completed by the following week. About half of these will be discussed in class, the other half will be handed in and graded. You will not know which are which. ***Each student will lead at least two homework discussions during the course of the semester.*** You will be selected at random to lead a discussion.

Depending on the size of your recitation section and other factors, you may need to lead more than two homework discussions.

If you do not know how to do a particular problem, ask your recitation instructor!

2) ***If you are not present when you are called up for your presentation, you will get a “0” for your presentation.***

3) Late homework assignments are penalized as follows (remember each homework assignment is worth 2 points (= 2%)):

Handed in on time: **full points/credit.**

Handed in late but on the same day: **- 0.5 points.**

Handed in the following day, up to (but before) the start of the following recitation: **- 1.0 points.**

Handed in anytime during the following recitation: **-1.5 points.**

Homework assignments more than a week late are not accepted and are worth 0 points.

Your instructor may make exceptions for unusual or unforeseen circumstances, but it is your responsibility to contact your instructor about this.

4) The remainder of your time in recitation is an opportunity to use/discuss R. As the semester progresses you will need to make use of R to solve homework problems. If you do not know how to use R, you will not be able to do all of the problems. ***Not knowing how to use R (or claiming “R is not working”) is NOT an excuse for failing to do homework assignments.***

5) There will be two or three short unannounced quizzes. Quizzes will be fairly simple and based on that week's homework assignment. *They may also include aspects of R (you may have a quiz based entirely on R).*

6) On occasion, we may also carry out a simple experiment that will help you understand the material from lecture. Be prepared to spend just a little time doing things like rolling dice, counting beans, etc.

7) Your recitation instructor will provide you with more details about recitation.

V. Grading

Your final grade will be based on your percent out of 100. The following grading scale will be used:

96-100 = A+	90 - 95 = A	86 - 89 = B+	80 - 85 = B
76 - 79 = C+	70 - 75 = C	60 - 69 = D	0 - 59 = F

You will notice that (-) grades are not used.

VI. Miscellaneous

Honor code: if you are caught cheating, you will be taken to the honor committee. No arguments. Although quite rare, they have expelled people even for a first offense.

You are responsible for information and announcements presented in class and/or through e-mail. Not being in class or not checking your e-mail is not an excuse. Make sure your GMU e-mail is working - this is *your* responsibility!

Please do not be disruptive in class. No one is forcing you to be in class. If you want to have a conversation, use your phone, etc., please do it outside of class or you may be asked to leave.

Missed class : if for some reason class is canceled, then the following class will cover the material for the missed class. This is particularly important should an exam day be canceled for whatever reason (the exam will take place during our next scheduled class).

If you are having problems please see your instructor. Your instructor is here to help you learn this material **and** help you pass this class. They will do what they can to make sure that you make it through this class successfully. *Please don't wait too long if you are having difficulties.*

Finally, please try to be in class. You've probably heard it a million times already, but it's particularly true in this class. ***You will almost certainly not do well if you are absent too often.*** Also, remember that if attendance drops too low, quizzes may be instituted as a means to ensure attendance.

VII. Course outline (may change as the semester progresses):

<i>Date (week)</i>	<i>Lecture topic</i>	<i>Recitation topic</i>	<i>Approx. text chapters</i>
Jan. 20 - Jan. 23 (no Monday classes)	Introduction Data organization	Introduction Measuring experiment	1, 2
Jan. 26 - Jan. 30	Descriptive statistics Samples and populations	Installing R (Monday recitations combine weeks 1 & 2)	2, 3
Feb. 2 - Feb. 6	Probability Binomial distribution	Homework discussion	3
Feb. 9 - Feb. 13	Conditional probability Review Exam I (Thur./Friday)	Homework discussion	3
Feb. 16 - Feb. 20	Normal distribution Other distributions	Homework discussion	4
Feb. 23 - Feb. 27	Parameters and estimates Sampling distributions	Homework discussion	5,6
March 2 - March 6	Confidence intervals One sample t-test Hypothesis tests Sign test	Homework discussion	6,7 9.4 (2 nd and 3 rd ed.) 8.4 (4 th ed.)
March 9 - March 13	<i>No classes - spring break</i>	<i>No classes - spring break</i>	
March 16 - March 20	Catch up/review Exam II (Thur./Friday)	Homework discussion	
March 23 - March 27	Two sample tests	Homework discussion	7 9 (2 nd and 3 rd ed.) 8 (4 th ed.)
March 30 - April 3	Goodness of fit tests	Homework discussion	10 (2 nd and 3 rd ed.) 9 (4 th ed.)
April 6 - April 10	Contingency table tests	Homework discussion	10
April 13 - April 17	Correlation Review Exam III (Thur./Friday)	Homework discussion	12
April 20 - April 24	Regression	Homework discussion	12
April 27 - May 1	Regression Optional topics Review	Homework discussion	12, 13
May 4	Monday classes (only) meet if needed. Catch up and/or review.	No recitation	

VIII. Information that applies to all classes at GMU:

(Some of this is a bit repetitive, but important. It applies to *all* your classes at GMU.)

Academic integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit to those people in the proper, accepted form. When doing homework, the work must be yours. It is totally unacceptable to copy the work of another student in this course in any form.

GMU email accounts

Students must use their Mason email accounts—either the existing “MEMO” system or a new “MASONLIVE” account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

USEFUL CAMPUS RESOURCES:

Writing center:

A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

University libraries (“Ask a Librarian”)

<http://library.gmu.edu/mudge/IM/IMRef.html>

Counseling and psychological services (CAPS):

(703) 993-2380;
<http://caps.gmu.edu>

University policies:

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.

Disability Resource Center

If you are a student with a disability and you need academic accommodations, please contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through that office.