

# BioStatistics – Fall 2022 (Draft)

(BioSci 465)

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**Lecture times:** None. Everything is online.  
**Office hours:** Please email for an appointment.

**Course topics:** Introductory statistics with application to biology. Includes descriptive statistics, hypothesis testing, t-tests, ANOVA, regression, and Chi-square.

**Required items:** Tophat.com subscription (~\$30 for one semester), online textbook (\$45) and access to electronic device for answering questions and completing assignments (all through TopHat). This includes laptop, smartphone, tablet or cell phone with text capability.

You can purchase the TopHat subscription and book through TopHat directly or the UWM virtual bookstore ([uwm.ecampus.com](http://uwm.ecampus.com)).

**The course join code on TopHat is 560936.**

**I will also send you an invite through TopHat.**

**Be sure to sign up with your UWM email address so your grades are registered properly.**

**Required Textbook:** The textbook is electronic and is called “Statistics for Social Science” by Steve Hayward. This is an electronic book available from TopHat.com. I have edited it extensively and, to reduce confusion, I have called it “Biostatistics – Fall 2020”. Note that you have ‘lifetime’ access to the book with your purchase.

**Required TopHat subscription:** To use the textbook and answer homework and other assignments you will also need a TopHat subscription (\$30 per semester; see their web site for other options).

You will need to register online at <https://tophat.com/> as a student and pay the fees there, if you have not registered for another class at UWM that uses TopHat. The current **advertised fees are about \$30 for the term, \$48 for a year, and \$96 for four years.** Note that the textbook is another \$45 (about).

The tophat site has instructions on how to use the system. **You will need a computer, cell-phone, or tablet, to be able to answer the online questions and assignments on TopHat.**

### **Class format**

Course material will be delivered via online textbook using TopHat. I will also post online **some** of my lecture slides in PDF format, if you would like to look at those, but the quizzes and tests will be based primarily on the book material.

***Make sure you check your UWM email account regularly, and please email me if you cannot access anything !! I sometimes forget to “publish” some things and they are not visible to you.***

**Textbook Questions (Learning Check) using TopHat (~35% of total grade; ~110 pts).** Each chapter in the TopHat “textbook” has questions imbedded in the chapter; these are the **Learning Check** questions to help make sure you understand the material as you read it. **Note that these are separate from the end of chapter questions (see below).** You have **TWO** attempts to get these questions correct, and the grades are scaled 70% for the correct answer and 30% for participation.

**End of Chapter quizzes using TopHat (~40% of total grade; ~120 points).** Each chapter in the textbook also has some questions at the end. **These “end of chapter questions” are in a different folder than the questions mentioned above. These questions should be answered after you read the chapter.** You have only **ONE** attempt to get these questions correct.

**Two examinations (~25% of total grade; ~75 pts total).** Exams are online through TopHat and are **available when you are ready to take them.**

The first exam covers chapters 1 to 5 and the second covers chapters 6 to 10. Each exam consists of approximately 35-40 questions. **The exams are also taken through TopHat (ie, online).** The exams will be multiple choice and include definitions, decision-making and problem-solving. **There is relatively little number-crunching in the exams.** Exams will mostly cover the material in the chapters mentioned above, ***but they will rely upon understanding material covered earlier in the semester.*** During exams some computation will be required; however, all necessary formulae and statistical tables will be provided. **These are “open book” tests, but they are timed (75 min each) so you need to know your material. Most people finish early.**

**As noted in the “Academic Misconduct” policy (see below) you are required to complete the quizzes and exams on your own, without assistance from others.**

**Answers to the Chapter questions will be available after you answer them, but not the answers to the exams, because I re-use some of those questions. If you want to know the answer to a particular question, then please email me.**

**Extra credit (5%):** An additional 5 percentage points will be added to the final grade based on one assignment using statistical software. The extra credit assignment using statistical software, either R or JMP, will be posted on Canvas, and I will email everyone when it is available. R is free for downloading from [www.r-project.org](http://www.r-project.org). **UWM has a site license for JMP, so undergraduates can also get it for free from the UWM Software Store.** Unfortunately, **grad students** and faculty have to pay for it (\$50 per year). **However, these programs are already installed on computers in the library and other open computer labs,** so you can also do the assignment without installing anything if you want to use one of the campus computers.

**Evaluation:** Grades will be based on the **two exams, answers to questions in the textbook and the in-class “end of chapter” questions as follows:**

Graduate students will be required to write a report testing a hypothesis they developed and using statistical data and software (eg, R or JMP) for analysis. This will be 15% of the grade (see below), and I will send more details by 18 Oct.

Grades will be allocated in the following manner:

**Undergraduates:**

- Textbook Questions ~35%
- End of chapter questions ~40%
- Two Exams ~25%.

**Graduate students:**

- Textbook Questions 30%,
- End of chapter questions 35%,
- Two Exams 20%
- **Report 15%.**

**Attendance and Assignment requirements:** **Attendance is NOT required since this is an entirely online class.** Note that you need to finish all assignments **by the last day of classes (14 Dec).** **Missed assignments will result in a zero for the grade, unless excused.**

Letter grades will be assigned based on the final total points listed below.

A	92 – 100%		C	71 – 75%
A-	89 – 91%		C-	68 – 70%
B+	86 – 88%		D+	65 – 67%
B	82 – 85%		D	61 – 64%

B-	79 – 81%		D-	56 – 60%
C+	76 – 78%		F	0 - 55%

**Need for Special Accommodation** \* Students who require note-taking or test-taking accommodations in order to meet any of the requirements of this course, please contact me as soon as possible to make suitable arrangements.

**Topics are subject to change.**

The class is online and you can finish it at your own pace, so the dates are just a guideline.

Lecture slides will be available online but are not required reading.

Week	Dates	Lecture topics	chapter in TopHat textbook	(subject to change)
1	6, 8 Sep	Introduction, Types of Data and variables, Sampling Methods, Hypotheses & Predictions	1	Lec 1,2
2	13, 15 Sep	Descriptive Statistics, Sampling distributions, confidence intervals	2	3,4
3	20, 22 Sep	Probability, Binomial Distribution	3	5,6
4	27, 29 Sep	Hypothesis testing	4	7
	3 Oct	Last day to drop full-term courses without a "W" on record. Tuition and fees apply		
5	4, 6 Oct	Chi-square goodness of fit, tests of independence	5	8, 9, 10 (review)
6	~10 Oct	Exam I (covers chapters 1 to 5)		
7	11, 13 Oct	Normal Distribution & One sample tests, Two-sample tests,	6	11, 12
8	18, 20 Oct	t-tests pt3, Non-parametric tests	7	13, 14
9	25, 27 Oct	Intro to Anova, Two-factor ANOVA		14,15
10	1, 3 Nov	More on ANOVA/Exper. Design, Intro to Regression	8	16,17
	13 Nov	Last day to drop or withdraw from full-term courses. Tuition and fees apply.		
11	8, 10 Nov	Regression pt 2, Non-param & logistic Reg	8 cont.	18
12	15, 17 Nov	Multiple regression & ANCOVA, Big Picture Review		19, 20

15	28 Nov -13 Dec	<b>Exam II</b> (covers chapters 6 to 10)		
	<b>14 Dec</b>	<b>Last day of classes</b>		
		There is <b>NO Final Exam</b> in this course		

## Some University Guidelines of Interest

### Academic Misconduct

The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. A more detailed description of Student Academic Disciplinary Procedures may be found in Regents Policy Statements, UWS Chapter 14 and UWM Faculty Document #1686.

### Complaint Procedures

Students may direct complaints to the head of the academic unit or department in which the complaint occurs. If the complaint allegedly violates a specific university policy, it may be directed to the head of the department or academic unit in which the complaint occurred or to the appropriate university office responsible for enforcing the policy.

### Grade Appeal Procedures

A student may appeal a grade on the grounds that it is based on a capricious or arbitrary decision of the course instructor. Such an appeal shall follow the established procedures adopted by the department, college, or school in which the course resides. These procedures are available in writing from the respective department chairperson or the Academic Dean of the College/School.

A more detailed description of the grade Appeal Policy may be found in UWM Selected Academic and Administrative Policies, Policy #S-28 and UWM Faculty Document #1243.

### Sexual Harassment

Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the careers, educational experience, and well being of students, faculty, and staff. The University will not tolerate behavior between or among members of the University community which creates an unacceptable working environment.