

Applied Statistics For Life Sciences

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Teaching Assistants	Chen, Xiaohui Office: SH204 xchen8@wpi.edu	SH204: WF 10-11am or by appointment
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Course Web Site: Course materials can be found on Canvas (<http://canvas.wpi.edu/>)

Course Description and Objectives

This is the first class in statistics related to life sciences. It is foundational to many other courses (e.g., those in BME), and is valuable to your IQP, MQP and future career.

Topics:

- Principles of experimental design
- Graphical and numerical summary of data
- Probability distribution models, sampling distribution
- Point estimation, confidence interval
- Parametric and non-parametric hypothesis testing
- Comparisons of paired samples and categorical data analysis

Goals:

- Understand philosophic ideas of statistical thinking: The view of uncertainty, and fundamental ideas for dealing uncertainties.
- Understand relevant statistical concepts and terminologies: Proper language of statistics and probability.

- Understand how math is used for relevant quantification and calculation.
- Establish skills of carrying out proper calculations by hand.
- Establish skills of carrying out calculations and analyzing data by computer.

Note: Credit may not be earned for both this course and for MA 2611. Recommended background: MA 1022.

Textbook

Samuels, Witmer, Schaffner, *Statistics for the Life Sciences (Fifth Edition)*.

Lectures

Time: MTRF : 1:00-1:50 pm. Higgins Labs 218

Lecture slides will be posted on Canvas. However, these slides will be **incomplete**. Please follow the lectures for more class notes. You can print out the slides before the class and take notes on them.

Unless informing the professor in advance, lecture attendance is highly encouraged for this course. If you cannot make it to some lectures, please notify Prof. Wu in advance, and get the class notes from a classmate.

Labs

Time:	B01: TR, 9:00 am - 9:50 am	Kaven Hall 202
	B02: TR, 10:00 am - 10:50 am	Kaven Hall 202
	B03: TR, 11:00 am - 11:50 am	Kaven Hall 202

Take the section you registered. Your lab grades will contribute to the final class grade.

One important component of this course is to introduce you a statistical computing software and train your skills of using it. We will use R, a very popular statistics program.

- To download and install R: <http://www.r-project.org>. It is free!
- A comprehensive R tutorial: <http://cran.r-project.org/doc/manuals/R-intro.html>.
- Sample R codes will be provided to you. Meanwhile, you are responsible to understand the codes, and gain the ability to search for new solutions for given tasks.

Homework

All homework will be done through an online homework system WeBWorK.

A few notes:

- Canvas and WeBWorK are integrated now. To access the homework, choose “Assignments” button from the course page on Canvas, click the corresponding assignment, and then you will be directed to WeBWorK.
- WeBWorK indicates the due time for each homework (under the “Set Info” on the right side of the page). Late submissions will NOT be accepted because answers will be automatically displayed after the due time.
- Some problems may allow more than one attempt, which will also be indicated.
- If you have questions, please ask the professor and/or the TAs first. Students are welcome to group for learning class materials, but homework is strictly individual effort. WeBWorK is an automatic system; different students may have different homework questions too.
- For some questions asking for filling in the calculated answers, **you need to include enough (usually 3-4) decimal points for sufficient accuracy.**
- You can ask question through each WeBWorK problem; the professor or TAs will be able to see what you did and respond.
- You can go back to WeBWorK as many times as you want before the due time. Your progress will be saved.
- Please **check your grades on WeBWorK directly**, and ignore the HW grades shown on Canvas if there is any difference. It has been reported that some technique problems exist in the communication of these two systems. Therefore, in the end, your HW grades will be directly downloaded from WeBWorK, not from Canvas.

Exams

Midterm	Nov 15, Friday, in class
Final	Dec 13, Friday, in class

Exams are closed-book, but **one double-sided hand-writing** letter-size cheat sheet is allowed for each student. You should bring a scientific calculator into the exams. Smartphone, tablet, kindle and computer are not allowed. The final exam is comprehensive.

No makeup exam will be given unless approved BEFORE the exam due to LEGITIMATE reasons, such as uncontrollable obligations. Please be understanding that the dignity of class policy should in principle not be compromised by conflicts due to students’ personal plans, such as an early travel to friends and family before the term ends. Students have the responsibility to arrange their personal life appropriately (help is available from advisors and the university too). A makeup exam is different from the original one, and could be harder. Make sure you do not select classes with conflicting exam time.

Grade

Source	Percentage
Labs	15%
Homework	30%
Midterm	25%
Final	30%
Class Attendance	3%
Total	103%

Tips of Success

- Actively participate the lectures. Do not check emails, text, or do irrelevant stuffs in the class. Ask questions!
- Read through relevant text chapters before class, which will be given in advance.
- Review class notes and textbook after the class.
- Complete homework on time.
- Attend all the labs and submit all required lab reports on time.
- Prepare carefully for exams by going over the lecture notes, homework and sample questions. Make sure you are skillful enough to handle the similar problems in limited class time.
- If you are having trouble with the class, talk to me as early as possible. Seek helps from me and the TAs whenever you need. Take advantage of the office hours!
- Be respectful to your classmates, TAs, and professor.
- Always send e-mails from your WPI e-mail account. E-mails sent from other accounts (gmail, yahoo etc.) may be filtered out. When you send professor / TA emails, include the course number MA2610.
- Math Tutoring Center (MTC) is located in Stratton Hall 002A and is open Monday-Friday.
- Do NOT request extra work for extra credit after the course is OVER. Do what you can when you still have chance.

Students with Disabilities

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Office of Disability Services (<https://www.wpi.edu/offices/office-disability-services>) as soon as possible to ensure that such accommodations are implemented in a timely fashion. If you are eligible for course adaptations or accommodations because of a disability (whether or not you choose to use these accommodations), or if you have medical information that I should know about please make an appointment with me immediately.

Academic Honesty

Each student is expected to familiarize himself/herself with WPI's Academic Integrity policies (<https://www.wpi.edu/about/policies/academic-integrity>). All acts of fabrication, plagiarism, cheating, and facilitation will be prosecuted according to the university's policy. If you are ever unsure as to whether your intended actions are considered academically honest or not, please contact me.