STP231-86107
Statistics for Biosciences
Fall 2016
T Th 9:00-10:15am ECA 225

Instructor: Neil Hatfield
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Office Number: ECA 348 (How to Find My Office)
Course Website: imathas.rationalreasoning.net; Course ID: 180; Enrollment Key: 86107
Homework assignments and lectures will be posted on CourseForum.

Course Description: Concepts and methods of statistics, display and summary of data, interval estimation, and hypothesis testing with an emphasis on applications in the biological sciences.

Prerequisites and Placement: Students of STP231 are expected to have completed MAT142 (College Mathematics) or MAT117 (College Algebra) with a grade of C or higher.

Textbook and Reading Materials: There is no official text for this section of STP231. However, please be aware that if you transfer to another section, they do have a required text. Additional reading materials will be made available to students at the course website and fall under Educational Fair Use guidelines.

Technology & Calculator: This course will make use of different forms of technology including but not limited to: a scientific/graphic calculator, spreadsheet software, statistical analysis software.

- Required: You will need access to a computer for this course. If you do not have one, there are multiple computer labs across campus you may use. On days where a computer is needed in class, be sure to partner with someone who has brought one.
- Required: You will need to download and install a statistics software package from the list below. I will use JMP (Pro) 12.1 in class.
    - JMP 12.1 or JMP Pro 12.1 for Windows or Mac; recommended. Free to ASU students via MyApps.
    - R 3.3.1 ("Bug in Your Hair") for Windows, Mac, and Linux.
        - Free download: https://cran.r-project.org/
        - Recommended Front End: RStudio, Free: https://www.rstudio.com/products/rstudio/download/
- Required: You will need access to and Office Suite for this course. Some of your assignments (and possible tests) will be available in Word format for you to fill in. You will need to either have Microsoft Word (at least Office 2007 for Windows, Office 2011 for Mac) or use LibreOffice. If an assignment is to be submitted electronically, you will be told the appropriate file extension (e.g. *.docx or *.xlsx). It is your responsibility to ensure you submit files on time and with the correct extension.
  WARNING: Google Docs has a tendency to cause other programs to delete lines of text that contain mathematical symbols. It is the student's responsibility to ensure that the instructor can read the student's responses as he/she intended.
- Required: You will need Internet access. Many of your course assignments will be done through the course website. Additionally, course materials (handouts, slides, videos) will be accessible via the Internet.

- Optional: A scientific/graphing calculator may be used for this class. If you already have a graphing calculator, you may use it. Examples of highly recommended models are the TI 83/84 or Casio 9850 GB Plus. Instruction on how to use your calculator is beyond the scope of this course. Should you want assistance, please your instructor during office hours/or make an appointment. Please be aware that your instructor is aware of the plethora of ways that user created programs on a graphing calculator can be used to violate ASU's Academic Integrity policies.
- In addition, please examine the Cell Phone and Technology Policies listed below.

Course Goals:

1. To support students in developing ways of thinking about data that will guide them as critical consumers of Statistics in today's age and society.
2. To support students in developing coherent meanings for specific statistical concepts (and mathematical concepts) so that the use of the statistics becomes useful in their academic, professional, and personal lives.
3. To support students in improving their problem-solving abilities.
4. To learn how to make logical and verbal arguments.

Concepts Covered: This course will aim to cover the following concepts:

- Data, Data Visualizations, Stochastic (Random) Variables
- Exploratory Data Analysis
- Descriptive Statistics
- Two-way (Contingency) Tables
- Probability and Distributions
- Sampling Distributions
- Confidence Intervals
- Hypothesis Testing

Course Structure: The class will be a mix of lecture, discussion, and group work. While the instructor will record and post each class, class attendance is essential for your success. Discussion is an important part of your learning. During class you will be expected to be prepared and will be called on to explain your thinking.

Rules of Engagement: Your success in mathematics, engineering, and the sciences requires that you:

1. **Speak with Meaning**
   What you say should carry meaning *to others*. Reference quantities—NO pronouns. Explain and justify your approach.
2. **Exhibit Intellectual Integrity**
   Base your conjecture on a logical foundation; don't pretend to understand when you don't.
3. **Strive to Make Sense**
   Persist in making sense of your peer's thinking.
4. **Respect the Learning Process of Others**
   Allow others the opportunity to think, reflect and construct. When assisting your peers, pose questions to help them construct meaning rather than show them how to get the answer.

Grading Policy:

1. **Exams:** There will be 2 exams given during the semester. The best possible preparation for the exams is regular attendance and completion of assigned homework. Your calculator memory may be viewed during any exam and will be cleared if anything suspicious is noted. The instructor has the right to regard finding suspicious material in your calculator memory as cheating. Making up a missed exam will be set up on a case-by-case basis. Requests should include legitimate reasons with sufficient/appropriate written documents (e.g. a doctor's note).

2. **Final Exam:** All students are required to take the final exam during the scheduled time Thursday, December 8th, from 7:30 am to 9:20.

3. **Homework (General Assignments):** Throughout the semester, you will have homework assignments, which are to be completed as assigned. These assignments will be comprised of problem solving and will require you to reveal your reasoning, justification and reflection on your thinking. You are responsible for completing the homework assignments prior to the announced deadline. Your instructor will review your homework and your grade is based on completion, accuracy, neatness, and work shown. **Late homework is not accepted.**

4. **Quizzes:** There may be announced or un-announced ("pop") quizzes held during the class sessions during the course. Making up quizzes will be permitted under the instructor's discretion in line with the attendance and university policy.

5. **Data Analysis Project:** Statistics (and mathematics) is an interactive field where you must engage with data to help you develop ways of thinking that will serve you well in your future endeavors. Thus, there will be an on-going data analysis project this semester. Over the course of the semester you will prepare a paper focused on the exploratory data analysis for an adopted data set. Further details about this project will be given in class.

6. **Attendance:** Your success in this class is dependent upon your attendance. You are required to attend class at each class meeting. If you must miss class, please contact your instructor via email prior to the class. Your instructor reserves the right to decide whether an absence is excused. The Mathematics Department attendance policy will be enforced in this course. **The number of absences cannot exceed 13.333% of the class meetings.** This course meets two days per week, for 15 weeks, therefore the maximum number of allowed absences is four (4). **Students who exceed the number of allowed absences are eligible to receive, but <u>not automatically</u>, a grade of EN (Failure for Non-attendance).**

7. **Participation:** In addition to attending class, you are also expected to participate in any course activities planned for the class session. Participation is defined as contributing to statistical discussions relative to your assignments, completing assignments, and presenting your statistical thinking to the class. Failure to actively participate during class will result in a loss of participation points allotted for each class session. Examples of non-participation include, but are not limited to, working on non-statistical content or assignments from other courses, texting during class, or engaging in discussions with students on topics outside of mathematics.

8. **Extra Credit:** Extra credit is not a student right, but a privilege granted at the instructor's discretion. Please do not ask me to give you extra credit. I will let everyone about extra credit opportunities throughout the semester. Extra credit opportunities will only be made to the class as a whole and never to students on an individual basis.

9. **Academic Integrity:** Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic

dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity.

Grading Procedure: Your grade is dependent upon how well you demonstrate your comprehension of the subject through application and completion of the items listed above in this syllabus.

1. **Grade Allocation by Assessment Category**

Assessment	Percent Allocation	Tentative Grade Scale
2 Exams	40 % (20 % each)	A: 90—100%
Final Exam	25%	B: 80—89%
Data Analysis Project	15 %	C: 70—79%
Homework and Quizzes	15%	D: 60—69%
Attendance/Participation	5%	E: Below 60%

2. **Dropped Assessments:** No exam grade will be dropped from the calculation of your overall grade. The lowest grade from the Homework and Quizzes category will be dropped.
3. **Extra Credit:** If and when extra credit opportunities are made available that are outside of an assessment (i.e. not an extra credit question on an exam), the points for completing the opportunity will be included in the Homework and Quizzes category.

Getting Help and Tutoring: Learning mathematics and statistics can be a very difficult endeavor. Do not despair though. There are a variety of ways that you can get help. The following list is numbered *for a reason*: this is the sequence that I highly recommend you follow for getting assistance for this course outside of class time.

1. **Re-watch the Lectures.** I record each and every lecture and post these videos to Youtube/iMathAS. These videos are not for you to watch only when you miss class, but as a way for you to review the material and critically think about the discussions we had during class. In addition to class videos, I also occasionally post videos to help clarify some concept that gets brought up in/out of class that deserves some attention. I recommend that you get in the habit of reviewing these videos each and every week.

2. **Use the iMathAS Forums.** Both iMathAS has discussion forums where you can pose questions related to the course material. You will be able to see the questions that other students have posted, as well as answers that I or other students have posted.

3. **Form Study Groups.** Group work does not end with the end of a class session. Feel free to form your own study groups (which may be different from your EDA project groups). Just realize that you are individually responsible for your homework.

4. **Email Your Question(s) to Your Instructor.** I'm always happy to respond to questions via email. You can also send me messages about particular homework questions through iMathAS.

5. **Your Instructor's Office Hours.** I will hold office hours every week (unless otherwise announced). For the Fall 2016 semester, my office hours are: Tuesday and Thursdays, 10:30 am to 12:00 pm. Additional times may be made by appointment; just email me.

6. **ASU Mathematics Community Center and Tutor Center.** The Mathematics Community Center (WXLR-303) and the Tutor Center (WXLR-116) are free, drop-in tutoring sites for mathematics and statistics courses. **To be admitted, each student must have a valid ASU Sun Card.** Information can

be found online at https://math.asu.edu/resources/math-tutoring-center. Each week, I (and several others) will be in this lab. When I have the schedule, I will post this information for you. Please note that I cannot vouch for the quality of other tutors.

7. **ASU Tutoring and Academic Success.** The various colleges and departments on campus provide counseling, tutoring in math (and many other subjects), supplemental instruction, and other types of support to students. Information can be found online at https://students.asu.edu/academic-success. Please note that I cannot vouch for the quality of tutors.

Cell Phone Policy: Upon entering class all cell phones. If there is a call you are expecting (e.g., you have a sick family member) let me know before class. Furthermore, texting during class time will not be tolerated. Should your cell phone go off during class due to either a phone call or a text message, any of the following consequences may be invoked:

- Loss of the attendance/participation points for the day
- Request to bring a sharable snack/treat for the class for the following class meeting (failure to do so will result in the application of a different consequence)
- That your cell phone be turned off and stowed in your bag (not clothing pockets)
- That your cell phone be turned off and placed on the front table for the remainder of class
- Any combination of the above.

Repeat offenses will be treated on a sliding scale, i.e. multiple and/or steeper consequences. I will hold myself to this standard as well, but if my phone goes off I'll just bring treats.

Technology Policy: I recognize that in today's age some students prefer to take notes via their laptop computers, iPads, or other tablet devices. I am not opposed to you doing this. However, I do ask that you do not let the use of your computing device become a distraction to your participation in class. Further, your use of the computing device should not impede your learning or the learning of others around you. To this end, I will ask that you not be on any websites that do not directly pertain to our class. This means that the use of Facebook (or other social networking sites), Redit, Tumblr, YouTube, Pinterest and other such websites are not allowed during class time. In addition, working on projects/homework (including emails) for other classes will not be allowed. Should I deem that your use of computing device is not inline with this policy, any of the following consequences may be invoked:

- Loss of attendance/participation points for the day
- That your computing device be turned off and stowed in your bag
- That your computing device be turned off and placed on the front table for the remainder of class
- Any combination of the above.

Repeat offenses may result in a student being asked (aka told) to not use computing devices in the class for the remainder of the semester.

Disabilities: If you have a disability, please notify me and your other instructors and the ASU Disability Resource Center (https://eoss.asu.edu/drc) at 480-965-1234 as soon as possible so that accommodations can be made. Accommodations will only be made to students who are registered with the DRC.

Disclaimer: It is the student's responsibility to know all of the information contained in this syllabus. Any changes to the syllabus and course calendar will be announced in class. Students are responsible for these changes whether in attendance or not. It is also the student's responsibility for reviewing the college policies included in the college catalog and the student handbook.

First Year Mathematics Courses: Fall Semester 2016
Departmental and University Policies and Procedures

Course withdrawal (online):	Wednesday, November 2, 2016
Complete withdrawal:	Friday, December 2, 2016

Course Withdrawal: A student may withdraw from a course with a grade of W during the withdrawal period. The instructor's signature is not required. It is a student's responsibility to verify that that they have in fact withdrawn from a class.

Instructor-Initiated Drop: At the instructor's discretion, any student who has not attended class during the first week of classes may be administratively dropped from the course. However, students should be aware that non-attendance will NOT automatically result in their being dropped from the course. **Thus, a student should not assume they are no longer registered for a course simply because they did not attend class during the first week. It is the student's responsibility to be aware of their registration status.**

The grade of Incomplete: A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who is doing **acceptable work** from completing a **small** percentage of the course requirements. The student must provide written documentation and be passing the class at the time to receive an Incomplete. Make-up final exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed. *The Dean of the student's college must approve any exceptions to these rules.*

Final Exam Make-up Policy: The final exam schedule listed in the Schedule of Classes (https://students.asu.edu/final-exam-schedule#Fall%202016) will be strictly followed. Except to resolve those situations described below, no changes may be made in this schedule without prior approval of the Dean of the college in which the course is offered. Under this schedule, if a conflict occurs, or a student has more than three exams on one day, the instructors may be consulted about an individual schedule adjustment necessary, the matter may be pursed further with the appropriate dean(s). This procedure applies to conflicts among any combination of Downtown Phoenix campus, Tempe campus, Polytechnic campus, West campus, and/or off campus class. Make-up final exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

Honor Policy: The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the University or other sanctions as specified in the University Student Academic Integrity Policy. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities.

The grade of XE: A grade of **XE** is reserved for "failure for academic dishonesty." The XE grade may be petitioned after 1 year.

Ethics: It's highly unethical to bring to your instructor's attention the possible impact of your mathematics grade on your future plans, including graduation, scholarships, jobs, etc. For the university's complete policy regarding ethics, including cheating, plagiarism and other forms of academic dishonesty, see the Student Academic Integrity Policy at the following web address: http://provost.asu.edu/academicintegrity

Student Conduct Statement: Students are required to adhere to the behavior standards of the Arizona Board of Regents Policy Manual Code of Conduct, Academic Affairs Manual ACD 125 Computer, Internet, and Electronic Communications, and the ASU Student Academic Integrity Policy. Students are entitled to receive instruction free from interference by other members of the class. If a student is disruptive, an instructor may ask the student to stop the disruptive behavior and warn the student that such disruptive behavior can result in withdrawal from the course. An instructor may withdraw a student from a course when the student's behavior disrupts the educational process according to procedures of the Student Services Manual SSM 201-10.