BIOSTATISTICS (BIOL-UA 42)
PROFESSOR MARY KILLILEA
TUES AND THURS 11:00 – 12:15
GCASL_383
SYLLABUS FALL 2019

MY CONTACT INFORMATION:

Email: mek5@nyu.edu
Phone: 212-998-8268 (x88268 from a campus phone)
Office hours: Thursday 3:00 – 4:00 and by appointment
Office location: Silver 602

REQUIRED TEXT:

Whitlock, MC and D Schluter (2015). The Analysis of Biological Data. 2nd Edition. Roberts and Company Publishers. Greenwood Village, CO. 700 p. (also on reserve at the library).

RECOMMENDED TEXTS:

Crawley, MJ (2007) The R Book. John Wiley and Sons, West Sussex, England. Available online.

Dalgaard, P (2008) Introductory Statistics with R. 2nd ed. Springer, New York, NY 363 p.

PREREQUISITES: Principles of Biology I & II

COURSE DESCRIPTION: The ability to organize and analyze biological data is an essential research tool. This course provides an introduction to the methods used to analyze biological data. The course will introduce topics such as describing and displaying data, probability, hypothesis testing, how to design experiments, and many others. Hands on experience will be provided through weekly exercises using biological data and *R*, a free open source statistical software.

GRADING:
The final grade for this course will be based on:

Three Exams	60%
Weekly homework assignments (Ten total)	30%
Recitation Attendance	5 %
Participation	5 %

1. Exams:

- Exams are based upon lectures, readings, and homework assignments. Lecture notes will be posted, but will not cover all of the material presented in lecture. It is important to attend the lectures, come on time and stay for the entire lecture.
- **Attendance for exams is mandatory**. The possibility for a makeup exam will be considered if you have a serious medical or family emergency. I need to be notified by phone or email before the exam time and there will only be one such opportunity for a makeup exam. Makeup exams will not be provided in the event of transportation problems, etc. You will receive a zero for a missed, unexcused exam.
- If you feel you were not given adequate points for an exam question you must hand in a one paragraph printed explanation of why you think you deserve more credit and your review will be considered. Your written request should respectfully explain the nature of your concern, and if applicable include rationale and/or supporting documentation. Your request must be submitted within one week of receiving your grade.

2. Homework assignments:

- Homework assignments will be assigned and collected at the beginning of recitation. Homework assignments must be turned in on time. Unexcused late assignments will not be accepted and graded as a zero. In extreme cases, late assignments may be accepted if you request an extension (in writing) from Prof. Killilea one week in advance.
- Any questions about assignment grades must be turned in (in writing) to your TA within one week after the grades are posted. After one week, grades will not be reviewed. Additionally, if you turned in an assignment and did not get credit you must inform us one week after the assignment grades are posted. If you tell us in the last few days of the semester you WILL NOT get credit.

3. Recitation Attendance:

Attendance in your assigned recitation is required unless excused by Prof. Killilea before class. An unexcused absence from recitation will result in a 0 for any homework assignments due that day and a deduction in the attendance grade for the class. You must be on time to receive full credit for your attendance.

4. Participation

Participation will be evaluated through short online and in class assessments.

POLICIES:

1. All students must adhere to the academic integrity policies of NYU (more on this below).
2. Come to lecture prepared and plan to stay the entire time. This means you must read the assigned chapter from your textbook prior to class.
3. Do not disrupt the course. Do not use your cell phone and do not record lectures. Please keep eating during class to a minimum and clean up all trash. Respect me and your classmates. Disruptive conduct during lecture can result in disciplinary action as per academic policy.

DISABILITY DISCLOSURE STATEMENT:

Academic accommodations are available to any student with a chronic, psychological, visual, mobility, learning disability, or who is deaf or hard of hearing. Students should please register with the Moses Center for Students with Disabilities at 212-998-4980.

NYU's Henry and Lucy Moses Center for Students with Disabilities
726 Broadway, 2nd Floor
New York, NY 10003-6675
Telephone: 212-998- 4980
Voice/TTY Fax: 212-995- 4114
Web site: http://www.nyu.edu/csd.

ACADEMIC INTEGRITY STATEMENT:

CAS Academic Policies (From http://cas.nyu.edu/page/academicintegrity):

I. A COMMUNITY OF THE MIND

The College is a "community of the mind." Its students, faculty, and staff all share the goal of pursuing truth through free and open inquiry, and we support one another's endeavors in this regard. As in any community, membership comes with certain rights and responsibilities. Foremost among these is academic integrity. Cheating on an exam, falsifying data, or having someone else write a paper undermines others who are "doing it on their own"; it makes it difficult or impossible to assess fairly a student's interest, aptitude, and achievement; and it diminishes the cheater, depriving him/her of an education. Most importantly, academic dishonesty is a violation of the very principles upon which the academy is founded. Thus, when students enter the College, one of the first things that they are asked to do is to sign a community compact, recognizing these principles of academic integrity. For this reason also, violations of these principles are treated with the utmost seriousness.

II. SOME GUIDELINES

Academic honesty means that the work you submit - in whatever form - is original. Students are expected - often required - to build their work on that of other people, just as professional researchers and writers do. Giving credit to someone whose work has helped you is expected; in fact, not to give such credit is a crime. Plagiarism is the severest form of academic fraud. Plagiarism is theft. Obviously, bringing answers into an examination or copying all or part of a paper straight from a book, the Internet, or a fellow student is a violation of this principle. But there are other forms of cheating or plagiarizing which are just as serious, for example:

- presenting an oral report drawn without attribution from other sources (oral or written);
- writing a paragraph which, despite being in different words, expresses someone else's idea without a reference to the source of the idea;
- submitting essentially the same paper in two different courses (unless both instructors have given their permission in advance);
- giving or receiving help on a take-home examination or quiz unless expressly permitted by the instructor (as in collaborative projects)
- presenting as your own a phrase, sentence, or passage from another writer's work without using quotation marks;

- presenting as your own facts, ideas, or written text gathered or downloaded from the Internet;
- submitting another student's work with your name on it;
- purchasing a paper or "research" from a term paper mill;
- "collaborating" between two or more students who then submit the same paper under their individual names.

Term paper mills (web sites and businesses set up to sell papers to students) often claim they are merely offering "information" or "research" to students and that this service is acceptable and allowed throughout the university. THIS IS ABSOLUTELY UNTRUE. If you buy and submit "research," drafts, summaries, abstracts, or final versions of a paper, you are committing plagiarism and are subject to stringent disciplinary action. Since plagiarism is a matter of fact and not intention, it is crucial that you acknowledge every source accurately and completely. If you quote anything from a source, use quotation marks and take down the page number of the quotation to use in your footnote.

When in doubt about whether your acknowledgment is proper and adequate, consult your instructor. Show the instructor your sources and a draft of the paper in which you are using them. The obligation to demonstrate that work is your own rests with you, the student. You are responsible for providing sources, copies of your work, or verification of the date work was completed. While all this looks like a lot to remember, all you need to do is to give credit where it is due, take credit only for your original ideas, and ask your instructor or adviser when in doubt.

Consult the APA, MLA, or Chicago style guides for accepted forms of documentation. You can access these resources, as well as additional information on proper citations on the [NYU Libraries Citation Style Guide](#).

III. PROCEDURES AND SANCTIONS
The penalty for academic dishonesty is severe. The following are the procedures as approved by the Faculty of Arts and Science. See also the *College Bulletin*.

1. If a student cheats on an examination or in laboratory work or engages in plagiarism, appropriate disciplinary action should be taken. The Department can take the following actions:

   a) The faculty member, with the approval of the Director of Undergraduate Studies (Director), may reduce the student's grade or give the student an F in the course.

   b) If after lowering the grade or assigning an F the department believes a more severe penalty (i.e., probation, suspension, expulsion) is warranted, it can refer the case to the Dean or his/her representative (Associate Dean for Students) for further action.
2. In all cases of either (a) or (b), the Director shall inform the Department Chair of any action in writing and send copies of this letter to the Dean and to the student. The letter shall include the nature of the offense, the penalty, and the right of the student to appeal such penalty. A copy of the letter shall be kept in a confidential chairman's file and not in the student's departmental file. The Dean's office copy shall also be kept in a confidential file. (The Professor and/or the Director is encouraged to meet with the student and discuss the nature of the offense and the action taken.)
3. For cases involving a first offense at New York University, the Dean shall send the student by registered mail a notice that a second offense will result in a one-semester suspension, or a more

severe penalty. (The student is also called in to discuss the offense, and review the consequences of the disciplinary action.)

4. For cases involving a second offense, the Dean shall proceed as follows:

   a) Upon receiving a second Director's letter concerning a given student, the Dean shall convene a three-member *ad hoc* committee, with no member being from the department involved, to examine the evidence. This *ad hoc* committee shall consider if there are reasonable grounds to believe that cheating/plagiarism has occurred and if so, shall affirm the suspension penalty. It shall report its conclusion to the Dean within three business days.

   b) If the committee affirms the suspension, the Dean shall send the student by registered mail the suspension letter within two business days of receiving the report. The letter shall advise the student of his or her right to appeal. The student shall have two business days from the letter's delivery to request an appeal of the suspension as provided in Section 5 (below). The suspension shall ordinarily be stayed during the pendency of appeal.

   c) If the committee does not affirm the suspension, the report shall be kept on file for a one-year period.

5. The student in all cases has the right to appeal to the Dean. In the event of an appeal, the Dean shall elicit a written complaint from the faculty member and proceed as described above.

	Lecture Topic	Chapter(s) of Whitlock and Schluter to read prior to lecture	Recitation
Week 1 Sept 3 - 5	Course Introduction, Statistics and samples; Displaying data	1 and 2	Introduction to R; Writing scripts
Week 2 Sept 10 - 12	Describing data; Estimating with uncertainty	3 and 4	Displaying and Describing data in R **Assignment 1 due**
Week 3 Sept 17 - 19	Probability; Hypothesis testing	5 and 6	Estimating with uncertainty and Probability in R **Assignment 2 due**
Week 4 Sept 24 - 26	Analyzing proportions; Fitting probability models to frequency data	7 and 8	Hypothesis testing and Analyzing proportions in R **Assignment 3 due**
Week 5 Oct 1 - 3	Contingency analysis; Exam Review	9	Fitting probability models and Contingency analysis **Assignment 4 due**
Week 6 Oct 8 - 10	Normal Distribution and Inference for a normal population; Practice Problems	10 and 11	Normal distribution in R **Assignment 5 due**
Week 7 Oct 15 - 17	*No Class October 15 - Administrative Day* **Exam 1 Oct 17**		Exam Review
Week 8 Oct 22 - 24	Comparing two means Handling violations of assumptions,	12 and 13	Comparing 2 means **Assignment 6 due**
Week 9 Oct 29 -Oct 31	Comparing means of more than two groups (ANOVA); Designing experiments	14 and 15	Handling violations of assumptions and ANOVA **Assignment 7 due**
Week 10 Nov 5 - 7	Exam 2 Review Correlation	Interleaf 7 16	Exam Review **Assignment 8 due**
Week 11 Nov 12 - 14	**Exam 2: Nov 12** Correlation and Regression (Problem sets)	17	Correlation and regression
Week 12 Nov 19 - 21	Multiple explanatory variables Meta-analysis	18	Multiple explanatory Variables **Assignment 9 due**
Week 13 Nov 26 - 28	Multiple explanatory variables (Problem sets) *No class: Thanksgiving*	21	*No class: Thanksgiving*
Week 14 Dec 3 - 5	Statistics in the literature	19	Computer Intensive Methods **Assignment 10 due**
Week 15 Dec 10 - 12	Exam Review **Exam 3: Dec 12**		Exam 3 review, Evaluations