

Outline: Biostatistics - Biology 322 3 credits 2016

The goal of this course is to provide the student with an overview of statistical methods in data collection, presentation, and analysis. We will cover common statistical tests-their applications and limitations. The tutorial (laboratory) will include work using calculators, Excel, and SPSS. After this course, I hope the student will be prepared with a basis on which he/she can learn to use more complicated analyses.

The course includes methods for the biological sciences; experimental design; data description; binomial, Poisson and Normal distributions; statistical inference; hypothesis testing; chi-square; one and two sample tests of the mean; analysis of variance including 2-way and nested; correlation; regression; and analogous non-parametric techniques. Consult the course description in the calendar for additional information.

Instructor: Dr. Mary Maly Telephone: 848-2424-3395
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..... Lec 01	-T-J---	11:45-13:00 LOY	SP110 LOY
Tut (lab) 01	---T---	13:15-16:00 LOY	CC 203 LOY
Tut (lab) 02	-W---	13:15-16:00 LOY	CC 203
Tut (lab) 03	--Th---	13:15-16:00 LOY	CC 203
Tut (lab)04	----F--	13:15-16:00 LOY	CC 203
Tut (lab)05	-W-	16:15-19:00 LOY	CC 203

Required Materials:

Laboratory manual in Biostatistics (Available at Loyola bookstore)
Lecture outline in Biostatistics (Available at Loyola bookstore)
SPSS instructions (website); statistical tables (website- library course reserves)
Calculator and USB or other storage devices

Optional : text Zar Biostatistics (Available at Loyola bookstore & on reserve in Library)
Hawkins , Biomeasurement (on reserve in Library)

Evaluation

Laboratory (= tutorial) assignments (ALL 12-LABS): 15 points

Laboratory assignments are due the week following the laboratory at the beginning of the period unless otherwise stated. If you miss a lab, I suggest you make it up by coming to another lab that week, but you are exempt with a valid (documented) excuse. There will be individual and group assignments and if you miss a group assignment or due date it is up to you to notify your group.

Laboratory quizzes (7 of 8): 15 points

Quizzes will be given the first 10 minutes of the laboratory. **No make-up quizzes . You may arrange to take one with another section. If you miss one for a valid (documented) excuse, I will calculate your grade on a total of fewer quizzes.**

During term examinations (2): 30 points

There will be two closed book examinations given in class. Calculators required, tables provided. **No make-up exams** **The final replaces missed exams. However, if you miss an exam for a valid reason, please give me a written excuse because it may be important in calculating your grade.**

Laboratory exam: 15pts

There will be an open book laboratory examination given during the laboratory period.

I will give a make-up examination if you miss the lab exam for a valid (written) excuse. This exam can replace the marks for the laboratory reports.

You must pass the 30% laboratory component (reports + lab exam) to pass the course.

Final examination: 25 points

Cover the entire course. Closed book. Calculators required. Tables provided. The final exam can replace the lab quizzes and/or in term examinations.

Bonus Assignments: 1pt

Up to 1 pt, depending on how many you do will be added to your final grade.

I will use the following grading scheme: A⁺ = ≥90, A = 85-89, A⁻ = 80-84, B⁺ = 77-79, B = 74-76, B⁻ = 70-73, C⁺ = 67-69, C = 64-66, C⁻ = 60-63, D⁺ = 57-59, D = 54-56, D⁻ = 50-53, F = <50

“In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change”.

Note the University definition of plagiarism. While you may consult with others assignments labeled individual are expected to be written by one person and not to be identical to another persons's assignment.

Plagiarism:

The most common offense under the Academic Code of Conduct is plagiarism which the Code defines as “the presentation of the work of another person as one's own or without proper acknowledgement.”

This could be material copied word for word from books, journals, internet sites, professor's course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. “Presentation” is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words:

Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it!

(Source: The Academic Integrity Website:

<http://protest.concordia.ca/academicintegrity/plagiarism/>)

Last date to withdraw with tuition refund: September 19, 2016.

Last date to withdraw: November 6, 2016..

Laboratory schedule:

Dates	Lab #
Sept 6, 7, 8, 9	Lab 1
Sept 13, 14, 15, 16	Lab 2 Quiz1 on experimental design
Sept 20, 21, 22, 23	Lab 3 Quiz 2 on frequencies and descriptive statistics Lab 1 due: Lab 2 due submit separately
Sept 27, 28, 29, 30	Lab 4 Quiz 3 on Binomial, Poisson, and Normal Lab 3 due
Oct 4, 5, 6, 7	Lab 5 Quiz 4 on sampling dist. of mean, Normal, t, con. limits, Lab 4 due
Oct 11, 12, 13, 14	Lab 6 Quiz 5 on hypothesis testing and one sample tests Lab 5 due
Oct 18, 19, 20, 21	Lab 7 No quiz Lab 6 due
Oct 25, 26, 27, 28	Lab 8 Quiz 6 on two sample tests Lab 7 due
Nov 1, 2, 3, 4	Lab 9 Quiz 7 on Anova, assumptions, transformations Lab 8 due
Nov 8, 9, 10, 11	Lab 10 No quiz Lab 9 due
Nov 15, 16, 17, 18	Lab 11 Quiz 8 on regression and correlation Lab 10 due
Nov 22, 23, 24, 25	Lab exams on SPSS ** Lab 11 due
Nov 29, 30, Dec 1, 2	Lab 12 this lab is to be completed in the lab period Lab 12 due

Labs will be given in the computer room, CC203 unless otherwise announced. They begin at 13:15. Lab quizzes will be given in the first 10 minutes of the period unless otherwise announced.

** If you miss the lab exam with a valid excuse arrange to take it with another section or to take a makeup at a later date.

Lecture Schedule: Approximate dates		
Lecture	Topic	Reading in notes
1. Sept 6	Collection of data	1-6
2. Sept 8	Organization, presentation of data	7-12
3. Sept 13	Descriptive statistics	13-17
4. Sept 15	Binomial and Poisson Distributions	18-23
5. Sept 20	Normal distribution	24-28
6. Sept 22	Sampling distribution of the mean, Confidence limits	29-36
7. Sept 27	Hypothesis testing	37-40
8. Sept 29	Hypothesis testing cont	41-43 (44,45) optional
9. Oct 4	Single sample tests of the mean using normal, t, binomial, Poisson	46-51
10. Oct 6	2-sample tests of the mean using t	52-58
11. Oct 11	Tests of Assumptions, F distribution, intro to ANOVA	59-66
12. Oct.13	Single classification (1 way) Anova	64-68
13. Oct 18 or 20	Single-classification Anova Cont	66-70
Oct 18 or 20	Midterm 1 Lec 1-9	1-51
14. Oct 25	Transformations, Multiple comparisons	70-79
15. Oct 27	Two factor(2way) Anova, Repeated Measures	80-87
16. Nov 1	Nested Anova	88-98
17. Nov 3	Regression	99-105
Nov 8 or 10	Second in term exam lec 9-16	46-98
18. Nov 8 or 10	Correlation	106-111
19. Nov 15	Non parametric Alternatives to common tests	112-125
20. Nov 17	Review for lab exam in lecture	
21. Nov 22	Chi square goodness of fit	126-140
22. Nov 24	Chi square contingency	141-144
Nov 29, Dec 1	Review for final	

Topic	Reading in Zar 4 th ed	Reading in Zar 5 th ed
Collection of data	1.1, 1.2, Ch. 2, 7.2	1.1, 1.2, Ch 2, pg 142
Organization, presentation of data	1.2 - 1.4	1.3 - 1.4
Descriptive statistics	3.1 - 3.4, 4.1 - 4.6	3.1 - 3.4, 4.1 - 4.6
Binomial and Poisson Distributions	25.1-25.4	24.1,25.1
Normal distribution	6.1-6.2	6.1
Sampling distribution of the mean, Confidence limits	6.3, 6.4	6.2, 7.3, 7.4, 7.5, 7.6
Hypothesis testing	7.1-7.4	6.3
Hypothesis testing cont	7.6	6.3
Single sample tests of the mean using normal, t, binomial, Poisson	7.1, 7.2	7.1, 7.2, 24.5, 25.4
2-sample tests of the mean using t	8.1, 8.4, 9.1, 9.3	8.1, 9.1
Tests of Assumptions, F distribution	6.5, 7.14, 8.5	(6.5, 6.6, 7.16), 8.5
Single classification Anova	10.1	10.1
Single Classification Anova Cont		
Transformations, Multiple comparisons	Ch. 13, 17.10, 11.1, 11.4	Ch. 13, 17.10, 11.1, 11.3
Two factor(2way) Anova, Repeated Measures	12.1-12.5	12.1-12.4
Nested Anova	15.1	15.1
Regression	16.1 – 16.4	17.1 – 17.4
Correlation	19.1, 19.2	19.1, 19.2
Non-parametric alternatives to common tests	8.9, 8.10, 9.5, 10.4, 12.8, 19.9, 24.1	8.10, 8.11, 9.5, 10.4, 12.7, 19.9, 24.6
Chi square goodness of fit	25.1-25.4, 22.1-22.6	22.1-22.3, 24.4, 25.3
Chi square contingency	23.1-23.6	23.1-23.6

This course is taught by a part-time professor

