Attention!

This is a *representative* syllabus.

The syllabus for the course when you enroll may be **different**.

Use the syllabus provided **by your instructor** for the most up-to-date information. Please refer to your instructor for more information for the specific requirements for a given quarter.

Syllabus for Stat 2480: Statistics for the Life Sciences

Instructor:
Office:
Office Hours:
Office Phone:
E-mail:
Course meeting times and locations:

Required Text: The Analysis of Biological Data, by M. C. Whitlock and D. Schluter, Roberts & Co., 2009.

Software: We will use the R Statistical Software environment for this course. This software is installed in the lab classroom, as well as in most computer labs on campus. It is free software that you can download and install on your personal machines as well (`http://www.r-project.org/`). Your TA will help you learn to use R for statistical analysis during lab, but you should also expect to put in time outside of lab doing data analysis with R for homework.

Website: Please visit `http://www.carmen.osu.edu/`. Check Carmen periodically for announcements about the class and other class material.

Course Description: Statistical methods play an important role in the analysis of data collected in the biological sciences. This course will provide an introduction to the analysis of biological data in a statistical framework. The topics covered include the definition of probability and manipulation of probabilistic quantities; the common discrete and continuous distributions used in modeling biological phenomena; experimental design; and statistical methods for testing hypotheses.

Course Goals: This course satisfies the learning goals of the GEC Data Analysis requirement. In particular, in Statistics 2480 students are expected to understand statistics and probability, comprehend mathematical methods needed to analyze statistical arguments, and recognize the importance of statistical ideas. These goals will be achieved by detailed study utilizing example data from the life sciences.

Course Objectives:

- To introduce you to methods of collecting data
  - By providing examples of methods of random sampling
  - By explaining correct procedures for designing experiments and observational studies
  - By explaining uses and misuses of sample surveys
- To enable you to use statistical tools for presentation of data and to understand presentations of data
  - By discussing when different types of graphical displays are appropriate and explaining proper methods of constructing graphical displays
  - By using appropriate summary statistics to describe the distribution of data
  - By introducing statistical terminology used to describe data and distributions

- To enable you to analyze data
  - By constructing and interpreting confidence intervals
  - By conducting and interpreting hypothesis tests
  - By using simple linear regression for bivariate data
- To enable you to understand basic probability and statistical concepts
  - By presenting and applying rules of probability
  - By study of the common discrete and continuous distribution used to model biological data
  - By discussing sampling distributions and the use of the Central Limit Theorem as the foundation of inference
- To enable you to evaluate statistical procedures and summaries
  - By discussing assumptions and conditions for analysis procedures
  - By identifying sources of bias in sampling, experiment, and survey methods
  - By discussing appropriate nature and scope of conclusions for analysis procedures
  - By discussing case studies in the life sciences

Homework: Homework problems will be assigned and graded for each topic covered in the course. Homework must be turned in during class on the date it is due, generally the lab period each week. If you are unable to attend class when the homework is due, you must bring it to me in my office earlier in the day. Please write your name on the top of each page of your assignment, and staple the pages together.

Recommended Homework Exercises: Each homework assignment will include exercises that are "recommended, but not due". These are fair game in terms of concepts for exams. Solutions to these exercises can be found in the back of the textbook.

Exams: There will be three in-class exams. The first exam will be given during the seventh week of classes, the second will be given during the eleventh week of class, and the third will be given during the final exam period. Statistical tables will be provided as needed. Calculators may be used on the exams, but the calculators on cell phones, PDAs, or any other communication device are NOT allowed.

Notes for use on the exams: You may use one 8.5 x 11 inch sheet of paper (both sides), with whatever facts, formulas, or explanations you find helpful, for the first exam. Two sheets of paper (as described above) may be brought to the second exam, and three sheets of paper (as decribed above) may be brought to the third exam.

Makeup exams: If you absolutely need a makeup exam and have a valid excuse, please see me (not your lab instructor) for the necessary arrangements. However, you must notify me in advance in such a situation. A make-up exam must be taken within a week of the missed exam. Exceptions to this policy will be permitted only in extreme situations such as serious injury immediately prior to an exam or severe illness requiring hospitalization.

Full credit on homework and exam problems: You need to show your justification for or work on each homework or exam problem. Answers without work will not receive full credit.

Final Grade: Your final course grade will be based on the following weighting of assessment components:

Homework – 25%	Exams 1 and 2 – 20% each
Lab – 10%	Final Exam – 25%

Grading Scale:
Grades will be assigned according to the scale below, with course components weighted as listed above. Please note that 25% of your course grade is based on homework assignments. This means that if you fail to turn in any of the homework assignments, the highest course grade you could receive is 75%.

92-100 = A
90-92 = A-
88-90 = B+
82-88 = B
80-82 = B-
78-80 = C+
72-78 = C
70-72 = C-
68-70 = D+
60-68 =D
< 60 = E

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5- 487). For additional information, see the Code of Student Conduct (`http://studentaffairs.osu.edu/info_for_students/csc.asp`).

In particular, please note that although students are often encouraged to work together on homework assignments, all students must submit their own written work IN THEIR OWN WORDS.

E-mail Correspondence: In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account. If you have not activated your OSU email account, you can activate your account at `https://acctmgt.service.ohio-state.edu/cgi-bin/KRB1EntryAdd`.

Special Accommodations: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; `http://www.ods.ohio-state.edu/`.

Drop dates: TBA

Tentative Lecture and Lab Schedule

Lecture No./Lab	Date	Topic	Textbook Readings
1	1/7/13	Introduction, methods for displaying data	Ch. 1
2	1/9/13	Descriptive statistics	Ch. 2 and 3
Lab 1	1/11/13	Lab Exercise 1: Intro to R	
3	1/14/13	Probability	5.1-5.7
4	1/16/13	Probability	5.1-5.7
Lab 2	1/18/13	Lab Exercise 2: Random Sampling **HW #1 Due**	
	1/21/13	**No class - Martin Luther King Day**	
5	1/23/13	Bayes Theorem	5.7 - 5.9
Lab 3	1/25/13	Problem Solving **HW #2 Due**	
6	1/28/12	Probability distributions	5.4
7	1/30/13	Binomial distribution	7.1-7.4
Lab 4	2/1/13	Lab Exercise 3: The Binomial Distribution **HW #3 Due**	
8	2/4/13	Testing a proportion	7.1-7.4
9	2/6/13	Discrete data, χ^2 test	8.1-8.5
Lab 5	2/8/13	Lab Exercise 4: Confidence Intervals **HW #4 Due**	
10	2/11/13	Poisson distribution	8.6
11	2/13/13	Review for Exam #1	
Lab 6	2/15/13	Problem Solving **HW # 5 Due**	
12	2/18/13	**Exam #1**	Ch. 1-8
13	2/20/13	Odds Ratios	9.1-9.2
Lab 7	2/22/13	Return Exams	
14	2/25/13	Contingency tables	9.3-9.4
15	2/27/13	Normal distribution	10.1-10.5
Lab 8	3/1/13	Lab Exercise 5: Normal Probability Plots **HW # 6 Due**	
16	3/4/13	Sampling distributions	10.6
17	3/6/13	Estimating means, confidence intervals	11.1-11.2
Lab 9	3/8/13	Lab Exercise 6: Central Limit Theorem **HW # 7 Due**	

	3/11/13	**No class - spring break**	
	3/13/13	**No class - spring break**	
18	3/18/13	Hypothesis test for a single mean	11.3-11.4
19	3/20/13	Hypothesis test for a single variance	11.5
Lab 10	3/22/13	Problem Solving	
		HW # 8 Due	
20	3/25/13	Review for Exam #2	
21	3/27/13	**Exam #2**	Ch. 9-11
Lab 11	3/29/13	Return Exams	
22	4/1/13	Comparing two means	12.1-12.3
23	4/3/13	Comparing two means,	12.4-12.7
		Comparing two variances	
Lab 12	4/5/13	Lab Exercise 7: Hypothesis Testing	
		HW # 9 Due	
24	4/8/13	Experimental design	Ch. 14
25	4/10/13	Correlation & regression	Ch. 16
Lab 13	4/12/13	Problem Solving	
		HW # 10 Due	
26	4/15/13	Linear regression	17.1-17.3
27	4/17/13	Linear regression	Ch. 17
Lab 14	4/19/13	Lab Exercise 8: Linear Regression	
		HW # 11 Due	
28	4/22/13	**Course summary & review**	All material

FINAL EXAM: Date and time TBA