Course Approval Form

For approval of new courses and deletions or modifications to an existing course.

registrar.gmu.edu/facultystaff/curriculum

Action Requested:

- [x] Create new course
- [ ] Delete existing course
- [ ] Modify existing course (check all that apply)
  - [ ] Title
  - [ ] Credits
  - [ ] Repeat Status
  - [ ] Grade Type
  - [ ] Prereq/coreq
  - [ ] Schedule Type
  - [ ] Restrictions
  - [ ] Other: _____

Course Level:

- [x] Undergraduate
- [ ] Graduate

College/School: College of Science
Department: Biology Program
Submitted by: Larry L. Rockwood
Ext: 3-1031
Email: lrockwoo@gmu.edu

Subject Code: BIOL
Number: 214
(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Effective Term:

- [x] Fall
- [ ] Spring
- [ ] Summer

Year 2011

Title:
Current:
Banner (30 characters max including spaces):
New: Introduction to Biostatistics

Credits: (check one)

- [x] Fixed 4 or
- [ ] Variable to

Repeat Status: (check one)

- [x] Not Repeatable (NR)
- [ ] Repeatable within degree (RD)
- [ ] Repeatable within term (RT)

Maximum credits allowed:

Grade Mode: (check one)

- [x] Regular (A, B, C, etc.)
- [ ] Satisfactory/No Credit
- [ ] Special (A, B C, etc. +IP)

Schedule Type Code(s): (check all that apply)

- [x] Lecture (LEC)
- [ ] Lab (LAB)
- [x] Recitation (RCT)
- [ ] Internship (INT)
- [ ] Independent Study (IND)
- [ ] Seminar (SEM)
- [ ] Studio (STU)

Prerequisite(s):

Corequisite(s): BIOL 213

Instructional Mode:

- [x] 100% face-to-face
- [ ] Hybrid: ≤ 50% electronically delivered
- [ ] 100% electronically delivered

Special Instructions: (list restrictions for major, college, or degree; hard-coding; etc.)

Are there equivalent course(s)?

- [ ] Yes
- [x] No

If yes, please list _____

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	**Notes** (List additional information for the course)
An introduction to statistics used in the life sciences.	

Indicate number of contact hours: Hours of Lecture or Seminar per week: 3 Hours of Recitation per week 1

When Offered: (check all that apply) [x] Fall [x] Summer [x] Spring

Approval Signatures

Department Approval Date

College/School Approval Date

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member

Provost Office

Graduate Council Approval Date

For Registrar Office's Use Only: Banner_____Catalog_____

revised 2/2/10

Course Proposal Submitted to the COS Curriculum Committee

1. COURSE NUMBER AND TITLE: BIOL214: (4:3:1)

Course Co-requisites: BIOL 213

Catalog Description: An introduction to statistics used in the life sciences.

2. COURSE JUSTIFICATION:

Course Objectives: The objectives are to introduce biology majors to the types of statistical analysis used in the life sciences, to improve their mathematical skills, to introduce them to a software package that is used by many biologists in the analysis of data, and to develop statistical skills that will be used in ensuing courses such as genetics and ecology.

Course Necessity: This will become part of the new Biology core curriculum and will be taken in the first or second semester of the student's coursework for the major.

Course Relationship to Existing Programs: A required course in the new Biology core curriculum.

Course Relationship to Existing Courses: NA

3. APPROVAL HISTORY:

4. SCHEDULING AND PROPOSED INSTRUCTORS:

Semester of Initial Offering: Fall 2011

Proposed Instructors: Dr. Arndt Laemmerzahl

5. TENTATIVE SYLLABUS: See attached

Biology 214: Introduction to Biostatistics

Myra L. Samuels and Jeffrey A. Witmer. Statistics for the Life Sciences, Third Edition.
2002. Pearson.

Software:

R statistical software. R is open source, and available for free at:
http://www.r-project.org/

R is command line based, but a workable GUI (Graphical User Interface) is available at:
http://socserv.mcmaster.ca/jfox/Misc/Rcmdr/

R runs on Windows, MacOS, and Linux. It is actively supported and improved by a large Community of users (particularly statisticians). It is true that it is more difficult to use than software like Minitab, but it is a lot more powerful, has no limitations (unlike many "student" versions), and does things more logically from a statistical perspective. Finally, even in more advanced courses, or in thesis/dissertation work, R should easily be able to analyze anything.

Course policies

There will be three exams and a final. Unannounced quizzes may also be given:
The worst regular exam will be worth 50, the middle exam 100, and the best exam 150. The final will be worth 120.

Quizzes will be worth 30.

Make up exams are only permitted in two circumstances:
1) Prior notification and approval by your instructor.
2) Emergency situations (which will require documentation).

Recitation:

Recitation is an essential part of the course. There are three components to recitation:
1) Trying out some simple experiments. These experiments are mostly examples of the procedures discussed in class. Some examples might be counting and classifying corn kernels, measuring and comparing heights of people etc.

2) Learning and getting comfortable with R. R can be a bit challenging, so some of the time during recitation will be spent getting R up and running. How to use R to do statistical tests, enter data, plot graphs, and so on, will also be a part of recitation.

3) Discussing homework problems. Homework problems are essential to help provide an understanding of the concepts in statistics. Recitation will offer a time to get help with problems, discuss problems with fellow students, and possibly to present problems.

Not all three components will be part of recitation every week.

Recitation will be worth 150, divided roughly as follows:
Experiments and write ups: 30 points

Learning R and R assignments: 30 points

Homework assignments: 90 points

Grades:
Your grade will depend on your percentage out of 600 (the total available in the course).

Number of Points out of 600	Grade
≥540	A
≥480	B
≥420	C
≥360	D
≤360	F

Course outline

Week One	The purpose of statistics and some simple examples
Week Two	How to organize and present data; notation (simple plots, sigma).
Week Three	Descriptive statistics (means, variances)
Week Four	Samples, populations, and randomness
Week Five	Probability, and Probability distributions (normal, binomial, Poisson, others)
Week Six	Sampling distributions and Confidence intervals
Week Seven	Hypothesis testing - one sample tests
Week Eight	Two sample tests (t-tests, MWU, possibly the sign test)
Week Nine	One sided tests
Week Ten	Non-parametric tests, Chi-square based tests (Goodness of fit, Contingency Tables)
Week Eleven	Correlation
Week Twelve	Regression
Week Thirteen	Analysis of Variance
Week Fourteen	Analysis of Variance
Final Exams	