**EEOB 3494 – entering independent Research**

**3 Credit Hours**

**SPRING 2018 - Call #29262**

**Tentative Syllabus**

**Lecture:** Tuesdays and Thursdays 12:45-2:05 pm Derby Hall 029, computer/regular classroom

Green House 740, labs

**Instructor:** Dr. Zeynep Benderlioglu

**Office Address 1**: Biological Sciences Green Houses, Rm 717, 332 W. 12th Ave.,

**Mailbox**: AL 300, 318 W. 12th Ave.

**Office Hours**: By appointment

**e-mail**: benderlioglu.1@osu.edu

**Phone**: 614 292 5965

**Textbooks:** Selected on-line book chapters can be purchased through the web sites below:

1. *Statistics for the Behavioral Sciences,* 3rd ed. 2014, Nolan SA, Heinzen TE, Worth*.,* Web link:

[*http://www.amazon.com/Statistics-Behavioral-Sciences-Susan-Nolan/dp/1464109222/ref=dp\_ob\_title\_bk*](http://www.amazon.com/Statistics-Behavioral-Sciences-Susan-Nolan/dp/1464109222/ref%3Ddp_ob_title_bk)

**Chp2 & Chps 6-16**. *2. Research Methods, 9th ed. 2013.* McBurney & White, Wadsworth Publishers.

Web link: <https://www.cengagebrain.com/shop/ProductDisplay?urlRequestType=Base&catalogId=10057&categoryId=&productId=584099&errorViewName=ProductDisplayErrorView&urlLangId=-1&langId=-1&top_category=&parent_category_rn=&storeId=10151>

**Chps 2-8, Chps 11-14, & Appendix A**
 *3. Research Design and Methods: A Process Approach,* 9th ed. 2013. Bordens K, Abbott BB. McGraw-Hill.

Web link: <http://www.amazon.com/Research-Design-Methods-Process-Approach/dp/0078035457>

**Chp 11 & Chp 16**.

**Statistics Textbook**:

*4. Applied Statistics and the SAS Programming Language 5th Edition* (hard copy). 2006. Cody, R, Smith J. Pearson/Prentice Hall.

Web link: <http://www.amazon.com/Applied-Statistics-Programming-Language-Edition/dp/0131465325>

**Course Description**

This course is designed to prepare undergraduate students to become independent researchers. The main emphasis is given to experimental/quantitative research design.  Related topics will include hypothesis testing, sampling, non-experimental designs, and research ethics. Applied statistics, data analysis using SAS statistical software, poster presentation, and graphing tools will also be given throughout the course. As research funding is an essential part of conducting experimental studies, students will be guided through the process of grant writing. Public understanding of science is an integral part of the scientific inquiry. Accordingly, an outreach program will also be implemented. Columbus Metroparks, Columbus Zoo, OSU Planetarium, and Columbus City Schools have all been past partners in this class to teach basic science, biodiversity, and conservation with live animals to elementary and middle school children and their families.

**Learning Objectives:**

a. Students will learn basic principles of experimental/quantitative research

b. Students will be able to design their own projects, lay out an implementation plan, and apply for funding

c. Students will be able to use statistics and data analyses tools for their proposed study

d. Students will gain necessary communication and critical thinking skills for scientific inquiry

e. Students will gain a greater understanding of animal diversity and address broader implications of a research question

**Course Website:** <https://carmen.osu.edu/>

The address printed here will bring you to the login page for Carmen. If you are unfamiliar with CARMEN, instructions are available at the Center for Life Sciences Education office (260 Jennings Hall).

**Electronic Communication:** Students are welcome and encouraged to e-mail the instructor. Course updates and other course related communication will be posted on CARMEN and will be distributed as a course-wide email to all name.#’s registered for the course. It is expected that all students will check their e-mail and CARMEN web site regularly for updates, lecture notes, hands-out and assignments.

**Evaluation**

There will be several homework assignments and exams throughout the semester. The students will also engage in outreach activities for local grade schools. In addition, each student will orally present a research proposal in class. As the semester progresses, students will develop their proposals into fully written grants for potential funding. Before an assignment’s due date, a handout on how to complete the assignment will be posted on Carmen. These guidelines should be followed closely as they constitute what your assignments/exams should cover and what sources you should be using. The grades will be assessed according to the following scheme:

*1*. *Outreach* (**10 points total**).

a. Presentations/engagement in hands-on activities with grade schools (**5 points**).

 **Important Note**: You can NOT earn this credit if you did not complete signature animal factsheet below.

 b. Signature animal factsheet for outreach activities (**5 points**).

 **Important Note**: You can NOT earn this credit if you are not present in outreach activities involving local schools [see item a) above].

*2. Research Methods Quiz (****5 points****)*

*3. Homework assignment # 1*: Design an Experiment (**10 points**)

*4. Homework assignment # 2*: Budget Proposal (**5 points**)

*5. Oral Presentations* (**10 points**)

*6. Grant Proposal* (**15 points**)

*7. Statistics Midterm* (**15 points**)

*8. Statistics Final Exam* (**15 points**)

*9. Attendance* (includes class participation) (**15 points**)

**Total: 100 points**

**Grade Scale:** Your final grade will be based on the following scale:

94-100 A

90-93 A-

87-89 B+

84-86 B

80-83 B-

77-79 C+

74-76 C

70-73 C-

67-69 D+

60-66 D

59 and below E

There are no extra credits. However, minor adjustments may be made on the basis of improvement and/or participation. Course policies regarding the assignments are outlined below.

**Course Policies**

**Late Assignments:** It is extremely important that you follow the deadlines. If you were to apply for research money, the funding agencies would not accept your proposal after the due date. Similarly, if you were scheduled to give a talk and did not show up on time, it will have important adverse consequences for your future career. In order to emphasize this point, I will not accept late assignments. Failure to deliver your proposal, or show up for your presentation/exam will result in **0 points**. If you were too ill, you are required to contact me within 24 hours of the class period in which the assignment/exam was due. You must provide written documentation from a medical unit regarding the illness covering the assignment period. If you had other excuses that are personal in nature, I will consider those on an individual basis. I will reserve the right to decide what constitutes a “legitimate excuse.” Lack of transportation, travel to sports, or family events are **NOT** considered legitimate excuses. You are given ample time for preparing an assignment and flexibility in scheduling your presentation. Please plan accordingly.

**Codes of Conduct in Class:** This class involves interactive hands-on activities with laboratory animals, in-class discussions, and working with grade schools. Therefore, please consider the following:

a. Be on time. Late arrivals and early departures are very disruptive, especially if you are visiting a school, or, someone is presenting in class.

b. Be respectful of the animals you are working with. If you are uncomfortable with studying any of the animals, let the instructor know. You will NOT handle any animal that would sting or bite you under any circumstances.

c. Turn off your cell phone, beeper, smartphone, and any other device that you text, or listen to. **Use of such devices is strictly prohibited in class.**

d. Be patient with kids, respectful to teachers, and school property. Your job is to instill curiosity in young minds, NOT fear. Some kids will scream when you show the animals. Gently guide them to the interesting facts about the animals. Don’t worry if you are uncomfortable yourself. Your instructor, or, a designated person will be supervising the activities and doing the handling, if necessary.

**Class participation:** Attendance and participation in class discussions are essential to succeed in this course. Participation, hands-on training with laboratory animals and computers, observation of your peers presenting in class, and evaluating scientific work will equip you to become independent researchers in your own right. To emphasize this point attendance is worth 15 percent of the total grade. You can be absent for 2 class periods without any excuse and loss of points. Otherwise, the same policies of late class assignments apply regarding missed classes. **Use of electronic devices, personal web browsing, and texting in class will result in losing your attendance points.**

**Grade Inquiries:** Grades will be posted to the course site on Carmen. You will have 14 days from the date the grade is posted to challenge any grade or inquire about a missing grade; after that time the grade becomes final, no exceptions.

**Miscellaneous items**:

Food and drink: Food and drink are strictly prohibited in the laboratory

Cell phones: All electronic devices must be turned off during class. No calls, no texts, no earpieces are allowed, and if you use your laptop for notes, it should be strictly for this class. See class participation policy above.

**University Policies**

**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://studentlife.osu.edu/csc/>.

**Accessibility**:

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://slds.osu.edu/>

**Errors & Omissions:** This syllabus may be altered in the event that student and local school schedules change, and animal deliveries are not made on time by the vendor. Corrected versions will be posted on CARMEN.

**Weekly Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Date** | **Lecture** | **Assignments\*** |
| 1 | **T** Jan 9 | Introduction to Research Methods |  |
|  | **R** Jan 11 | Discovery Time, Signature Animals, Introduction to Outreach Programs  |  |
| 2 | **T** Jan 16 | Research Methods Cont'd, Validity , Confounds, Reliability, Sampling |  |
|  | **R** Jan 18 | Experimental, Quasi-Experimental Designs, Randomization, Hypothesis Testing, Independent and Dependent Variables | ***Signature Animal Factsheet due (outreach engagement will be announced later)*** |
| 3 | **T** Jan 23 | Controlling the Confounds |  |
|  | **R** Jan 25 | Non-experimental Designs |  |
| 4 | **T** Jan 30 | Deductive and Inductive Reasoning: Termite Behavior |  |
|  | **R** Feb 1 | Research Databases, Literature Review | ***Required database worksheet distributed and collected in class today*** |
| 5 | **T** Feb 6 | Green House Visit |  |
|  | **R** Feb 8 | Research Ethics |  |
| 6 | **T** Feb 13 | Design an Experiment |  |
|  | **R** Feb 15 | Oral Presentation Tools/Quiz | ***Research methods quiz*** |
| 7 | **T** Feb 20 | Descriptive Statistics: Frequency Tables, Distributions, Central Tendency |  |
|  | **R** Feb 22 | Intro to SAS | ***Design an experiment due*** |
| 8 | **T** Feb 27 |  ***Student Presentations***  | ***Please refer to your presentation schedule*** |
|  | **R** Mar 1 |  ***Student Presentations***  | “ |
| 9 | **T** Mar 6 |  ***Student Presentations***  | “ |
|  | **R** Mar 8 | Inferential Statistics, Review of Hypothesis Testing, Meaning of *p* |  |
| 10 | **T** Mar 13 | ***No Class – Spring Break*** |  |
|  | **R** Mar 15 | ***No Class – Spring Break*** |  |
| 11 | **T** Mar 20 | T-tests, One-Way ANOVA, Non-parametric Statistics with SAS |  |
|  | **R** Mar 22 | Correlation and Regression with SAS |  |
| 12 | **T** Mar 27 | **Midterm** | ***Statistics Midterm*** |
|  | **R** Mar 29 | Abstract Writing, Budget Preparation |  |
| 13 | **T** Apr 3 | Two-way Within/Between Subject ANOVA |  |
|  | **R** Apr 5 | Multiple Regression with SAS |  |
| 14 | **T** Apr 10 | Grant Writing |  |
|  | **R** Apr 12 | Factorial Designs | ***Budget Proposal Due*** |
| 15 | **T** Apr 17 | Finding the Right Lab/Funding Opportunities |  |
|  | **R** Apr 19 | Logistic Regression-Count Data | ***Project Proposal Due*** |
| 16 | **R Apr 26** |  **Comprehensive Statistics** | ***Final Exam @ 2-3:45 pm DB 029*** |

\*Weekly reading assignments will be posted on Carmen