

Syllabus Stats 535: Regression Analysis

Spring Semester 2017, 3 Credits

Time & Place: 1:25 – 2:40 pm

Vancouver: VECS 125

Pullman: CUE 114

Puyallup: Research and Extension Center

Instructor: Dr. Leslie New

Undergraduate Building 341

(360) 546-9309, leslie.new@wsu.edu

Office Hours: Thursdays 3-5 pm, or by appointment

Via Skype: WSUVSTAT

Textbook: Mixed Effects Models and Extensions in Ecology with R, by Alain Zuur and Elena N. Ieno

Available in bookstore and online.

Alternate texts: Applied Regression Analysis and Generalized Linear models by John Fox
Generalized Linear Models and Extensions by James W. Hardin and Joseph M. Hilbe

Suggested prerequisites: Stats 423/523 or equivalent or permission of the instructor

Course description: There are many common issues in data that force complexity into the statistical analysis. These issues include repeated measurements, nested data, zero-inflated data and many others. The goal of this course is to help students develop the statistical skills to deal with these issues correctly, while avoiding the technical details outside the interest of most non-mathematically inclined individuals. As a result, this course will build upon students' basic knowledge of regression to introduce topics such as generalized least squares and generalized linear, additive and mixed effects models, while focusing on how and why these tools are applied. The course will aim to teach these tools through their application, allowing students to see how data collection and scientific inquiry are used to help define the appropriate statistical analysis.

Learning outcomes: Students will be able to perform statistical analyses that involve the critical assessment of data and model outcomes to ensure that they are applying the most appropriate statistical methods. Furthermore, students will demonstrate their ability to disseminate the results of their analyses to the wider community through published literature. Students' achievement of these outcomes will be determined through the course evaluation.

Evaluation: Course evaluation will be done through continuous assessment. Students will be provided with a data set that they will analyse throughout the semester. The work will be

submitted in stages, each of which is relevant to the regression tools being learned in class.

Discussion, collaboration and assistance between students is allowed and encouraged, but all submissions must be written and submitted by a single individual.

Grades will be broken down into 4 components: Participation (10%), Assignments (40%), Mid-term (20%) and Final (30%). Assignments will be a mix of online questions and short submissions. Due dates are as follows:

Assignments: 20 Jan., 27 Jan., 10 Feb., 24 Feb., 10 Mar., 24 Mar., 7 Apr., 21 Apr.

Mid-term: 1 March 2017

Final: 3 May 2017

Tentative lecture outline

The schedule of topics is not fixed. Enough time will be spent on each to ensure students have a solid grounding in one topic until we move to another. I will be keeping an eye on our overall progress and we will cover at least through GLMMs. Time permitting we may also cover GAMs and GAMMs.

Week	Date	Subject
1	9-13 Jan 2017	Introduction
2	16-20 Jan 2017	Regression refresher
3	23-27 Jan 2017	Model selection
4	30 Jan - 3 Feb 2017	Generalized least squares
5	6-10 Feb 2017	Introduction to generalized linear models
6	13-17 Feb 2017	GLM for binomial data
7	20-24 Feb 2017	GLM for Bernoulli data
8	27 Feb - 3 Mar 2017	GLM for count data
9	6-10 Mar 2017	Zero-inflated models
10	13-17 Mar 2017	Spring Break
11	20-24 Mar 2017	GLM model selection and model averaging
12	27-31 Mar 2017	Introduction to mixed models
13	3-7 Apr 2017	Linear mixed models
14	10-14 Apr 2017	GLMMs in practice
15	17-21 Apr 2017	Analysis of fit for GLMMs
16	24-28 Apr 2017	Introduction to generalized additive models

Other Considerations

Attendance: Lecture attendance is highly recommended. While it does not form part of a student's final grade, failure to attend lecture without prior notice to the instructor may be taken into account when considering students with borderline marks or requests for special circumstances.

Academic Integrity: Plagiarism or cheating of any kind is not tolerated in this course or any other at WSU. Students caught plagiarising or cheating will receive an F as a final grade and may be subject to additional disciplinary action by the University. The Academic Integrity Policy can be found at: <http://conduct.wsu.edu/forstudents/> and cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). Please see me if there are any questions regarding what may constitute a violation of Academic Integrity.

Submission of assignments: All assignments must be submitted by 5 pm on the day they are due. If a student will have difficulty meeting the assigned deadline, it is their responsibility to inform the instructor at least 24 hours in advance of the assignment's due date. Any extension will be at the instructor's discretion.

Electronic devices: Cell phone use is not permitted during class. Other electronic devices, such as laptops and tablets are permitted provided that they are being used for learning purposes. If the instructor determines that an electronic device is causing a distraction or being used for purposes other than learning, the student may be asked to leave the lecture. Repeated infractions of these rules may impact a student's final grade for the course. If a student is unsure as to the use of an electronic device in lecture, please check with the instructor prior to the start of class.

Students with disabilities: Reasonable accommodations will be made for students with a documented disability. If a student has a disability and needs accommodations to fully participate in this class, please get in touch with the Access Center (360-546-9138, <http://studentaffairs.vancouver.wsu.edu/access-center>). To schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Safety and Emergency: "WSU has made an emergency notification system available for faculty, students, and staff. Please register at zzusis with emergency contact information (cell, email, text, etc.). You may have been prompted to complete emergency contact information when registering for classes at ROnet. In the event of a building evacuation, a map at each classroom entrance shows the evacuation point for each building. Please refer to it. Finally, in case of class cancellation campus-wide, please check local media, the WSU Vancouver web page and/or <http://www.flashalert.net/>. Individual class cancellations may be made at the discretion of the instructor. Each individual is expected to make the best decision for their personal circumstances, taking safety into account.

Weather policy: For emergency weather closure policy, see: <http://alert.wsu.edu/>

All WSU employees who have information regarding an incident or situation involving sexual harassment or sexual misconduct are required to promptly report the incident to the Office for Equal Opportunity (OEO) or to one of the designated Title IX Co- Coordinators. Students who are the victim of and/or witness sexual harassment or sexual misconduct should also report to OEO or their Title IX Coordinator.