EDF 9770 Spring 2026: Multiple Regression / General Linear Model in Educational Research

Instructor Information:	**Professor Lesa Hoffman (she/her—you can call me Lesa)** Department of Education and Human Development Email: LesaH@clemson.edu *(preferred mode of contact)* Office: 213D Tillman Hall (*forthcoming*)
Course Location and Time:	324 Tillman Hall or via zoom Mondays 4:40–7:25 PM Eastern
Zoom-Only Office Hours:	Tuesdays and Thursdays 2:30–4:00 PM Eastern in a group format (first-come, first-served, no appointments) or individually by appointment
Zoom Link for Class and Office Hours:	https://clemson.zoom.us/j/8236434097 Meeting ID: 823 643 4097; Mobile Access: +19292056099 *(please use your real name as your account name to be admitted)*

Course Description (from the Graduate Catalog):

Intermediate inferential statistical methods course for educational research. Emphasis is on understanding the theory and application of univariate statistics and developing the ability to conduct independent empirical research in education. Prerequisite: EDF 9270 or equivalent.

Course Communication and Office Hours:

The planned schedule of topics and events given here may need to be adjusted during the course. The **course's external website** will always have the **most current schedule of events and due dates**. The instructor will provide announcements and reminders via email; larger changes will also be announced through Canvas. Emails will be answered within 1 business day barring unforeseen circumstances.

Instructor **office hours will be held on zoom** in a group format (first-come, first-served), in which multiple participants can receive assistance in succession (or simultaneously) without an appointment. Individual zoom meetings with the instructor are also available upon request.

Course Modality and Attendance:

This HyFlex course will meet synchronously in person in 324 Tillman Hall and in the instructor's zoom room Mondays from 4:40–7:25 PM. Participants may change the modality—in person as a "roomer" or online as a "zoomer"—in which they attend each week as desired. Attendance is expected and strongly encouraged but is not formally required. Auditors and visitors are always welcome to attend class, and participants may bring food or drink to consume during class. No required sessions will be held outside the regular class time (i.e., no additional midterm or final exam sessions).

Course Learning Objectives and Structure:

This quantitative methods course will focus on the prediction of numeric outcomes using the **general linear model** (**GLM**; i.e., regression, analysis of variance, analysis of covariance). **The course objective is for participants to be able to complete all necessary steps in conducting a GLM analysis:** describing variables and their associations; creating predictor variables and building models to evaluate their unique effects; and

interpreting and presenting empirical findings. Participants should already be familiar with univariate descriptive statistics, measures of bivariate association, and null hypothesis significance testing.

Class time will be devoted primarily to lectures, examples, and reviews, the materials for which will be available for download at the course's external website. Readings and other resources have been suggested for each unit and may be updated later. Video recordings of each class will be made available on a YouTube playlist so that searchable closed captioning will be provided, and supplemental videos (e.g., additional lectures, examples, or software demonstrations) may be posted to YouTube as well. Only the screen share and classroom audio will be captured on the video recordings.

Course Requirements:

Participants can earn **up to 100 total points** by completing out-of-class coursework as follows:

- Up to **21 points** may be earned from submitting **formative assessments** (FAs; 7 planned initially) administered using Canvas. In each of these review activities, 2 points will be given automatically for completion, and up to 1 additional point will be given based on accuracy. Feedback will be made available on the day of each class, and the responses will be discussed during class.
- Up to **59 points** can be earned from submitting **homework assignments** (HWs; 5 planned initially) through a custom online system created by the instructor—these will be graded for accuracy. In these data analysis activities, the computational questions allow infinite attempts at accuracy, whereas the results questions allow one attempt. Complete feedback will be available after the due date passes.
- Up to **20 points** may be earned from completing an individual project (including a plan document and a report document). Project reports must be at least ¾ complete to be accepted and may be revised once to earn additional points. Further requirements and a rubric will be made available separately.
- Up to **1 point of extra credit** for completing HW 0; there may be other opportunities to earn extra credit at the instructor's discretion.
- Revisions to the planned course schedule and/or content may result in fewer requirements (and thus fewer total points) at the instructor's discretion. If that happens, this syllabus will be updated to reflect the new point totals.

Course Grading Policies:

Participants may submit work at any point during the semester to be counted towards their grade. However:

- **Late HW will incur a 3-point penalty, late FAs and project plans will incur a 1-point penalty, and late project reports will incur a 5-point penalty (overall, not per day).**
- Extensions will be granted as needed for extenuating circumstances (e.g., conferences, comprehensive exams, family obligations) if requested at least **two weeks in advance** of the due date.
- A final grade of "incomplete" will only be given in unforeseen dire circumstances and entirely at the instructor's discretion. **All work must be submitted by 11:59 PM on Friday, May 1, 2026, to be included in the course grade.**
- Final grades will be determined by the ***percentage*** **earned** out of the total possible points:

  ≥93 = A, 90–92% = A−, 87–89% = B+, 83–86% = B, 80–82% = B−, 77–79% = C+, 73–76% = C, 70–72% = C− **(PASS)**, 67–69% = D+, 63–66% = D, 60–62% = D−, <60% = F

Required Software and Textbook:

This course will use **R software** for statistical analysis, which is free online. Participants will need to first install R software (currently version 4.5.2) and then install RStudio software (currently version 2026.01.0 build 392).

(**D & H**): Darlington, R. B., & Hayes, A. F. (2016). *Regression analysis and linear models: Concepts, applications, and implementation*. Guilford. Available electronically from the Clemson library.

Recommended Readings (in "Files" in Canvas):

Anderson, S. F. (2020). Misinterpreting *p*: The discrepancy between *p* values and the probability the null hypothesis is true, the influence of multiple testing, and implications for the replication crisis. *Psychological Methods, 25*(5), 596–609. https://psycnet.apa.org/doi/10.1037/met0000248

Belzak, W. C. M., & Bauer, D. J. (2019). Interaction effects may actually be nonlinear effects in disguise: A review of the problem and potential solutions. *Addictive Behaviors, 94*, 99–108. https://doi.org/10.1016/j.addbeh.2018.09.018

Certo, S. T., Busenbark, J. R., Kalm, M., & LePine, J. A. (2020). Divided we fall: How ratios undermine research in strategic management. *Organizational Research Methods, 23*(2), 211–237. https://doi.org/10.1177/1094428118773455

Cohen, J. (1994). The earth is round ($p < .05$). *American Psychologist, 49*(12), 997–1003. https://psycnet.apa.org/doi/10.1037/0003-066X.49.12.997

Correll, J., Mellinger, C., McClelland, G. H., & Judd, C. M. (2020). Avoid Cohen's 'small', 'medium', and 'large' for power analysis. *Trends in Cognitive Sciences, 24*(3), 200–207. https://doi.org/10.1016/j.tics.2019.12.009

Finsaas, M. G., & Goldstein, B. L. (2021). Do simple slopes follow-up tests lead us astray? Advancements in the visualization and reporting of interactions. *Psychological Methods, 26*(1), 38–60. https://doi.org/10.1037/met0000266

Hoffman, L. (2015 chapter 2). *Longitudinal analysis: Modeling within-person fluctuation and change*. Routledge / Taylor & Francis. https://psycnet.apa.org/record/2015-01073-000.

Hoffman, L., & Walters, R. W. (2022). Catching up on multilevel modeling. *Annual Review of Psychology, 73*, 629-658. https://doi.org/10.1146/annurev-psych-020821-103525

Johfre, S. S., & Freese, J. (2021). Reconsidering the reference category. *Sociological Methodology, 51*(2), 235–269. https://doi.org/10.1177/0081175020982632

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for *t*-tests and ANOVAs. *Frontiers in Psychology*, article 863. https://doi.org/10.3389/fpsyg.2013.00863

Rodgers, J. L. (2019). Degrees of freedom at the start of the second 100 years: A pedagogical treatise. *Advances in Methods and Practices in Psychological Science, 2*(4), 396–405. https://psycnet.apa.org/record/2019-78567-005

Westfall, J., & Yarkoni, T. (2016). Statistically controlling for confounding constructs is harder than you think. *PLOS ONE 11*(3), e0152719. https://doi.org/10.1371/journal.pone.0152719

Williams, M. N., Grajales, C. A. G., & Kurkiewicz, D. (2013). Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research, and Evaluation, 18*, Article 11. https://files.eric.ed.gov/fulltext/EJ1015680.pdf

Planned Schedule of Events for Weeks 1–8:

Week	Class	Due Date	Materials	Resources
1	**1/12**	11:59 PM Sunday	**Qualtrics intake survey**	
		During class	Introductions Lecture 0: Introduction to this Course Lecture 1: Univariate Data Description	D & H ch. 1
2	**1/19**	11:59 PM Sunday	**HW0 (online, based on the syllabus for 1 point of extra credit)**	Video: Intro to Online HW
		During class	**NO CLASS (MLK DAY)**	
3	**1/26**	11:59 PM Sunday	**Watch Video Part 2: Lecture 1 slides 18-40 (out of class)** **Install R and then RStudio** **Watch R Demo Video based on Lecture 1**	
		During class	**NO CLASS (DUE TO WEATHER)**	
4	**2/2**	11:59 PM Sunday	**FA1 (in Canvas)** **HW1 (online, based on Lecture 1 Files)**	Handout: Steps for HW
		During class	Discussion of FA1 Lecture 2: GLMs with Single-Slope Predictors	D & H ch. 2, ch. 5.1 Power Tables Cohen (1994) Correll et al. (2020)
5	**2/9**	11:59 PM Sunday	**FA2 and FA3 (in Canvas)**	
		During class	Discussion of FA2 and FA3 Lecture 2, continued Example 2: GLMs with Single-Slope Predictors	
6	**2/16**	11:59 PM Sunday	**HW2 (online, based on Example 2)** ***Video catchup and questions (if needed)***	
		During class	Lecture 3 and Example 3: GLMs with Multiple-Slope Predictors	D & H ch. 4, ch. 9–12 Johfre & Freese (2021) Rodgers (2019)
7	**2/23**	11:59 PM Sunday	**FA4 (in Canvas)** ***Video catchup and questions (if needed)***	
		During class	Discussion of FA4 Lecture 3 and Example 3, continued	
8	**3/2**	11:59 PM Sunday	**HW3 (online, based on Example 3)** ***Video catchup and questions (if needed)***	
		During class	Lecture 4 and Example 4a: GLMs with Multiple Predictors	D & H ch. 3, ch. 5.3, ch. 8 Lakens (2013) Williams et al. (2013)

Planned Schedule of Events for Weeks 9–16:

Week	Class	Due Date	Materials	Resources
9	**3/9**	11:59 PM Sunday	**FA5 (in Canvas)** ***Video catchup and questions (if needed)***	
		During class	Discussion of FA5 Lecture 4 and Example 4a, continued Example 4b: Review and Multiple-Predictor GLMs	
10	**3/16**	11:59 PM Sunday	*Nothing due*	
		During class	**NO CLASS (SPRING BREAK)**	
11	**3/23**	11:59 PM Sunday	**HW4 (online, based on Example 4a and 4b)** ***Video catchup and questions (if needed)***	
		During class	Lecture 5 and Example 5: GLMs with Interactions Interaction example spreadsheet	D & H ch. 13–14 Hoffman (2015 ch. 2) Belzak & Bauer (2019) Finsaas & Goldstein (2021) Certo et al. (2020)
12	**3/30**	11:59 PM Sunday	**Project Plan (in Canvas)** ***Video catchup and questions (if needed)***	
		During class	Lecture 5 and Example 5, continued	
13	**4/6**	11:59 PM Sunday	**FA6 and FA7 (in Canvas)** **Project Plan Revisions (in Canvas if needed)** ***Video catchup and questions (if needed)***	
		During class	Discussion of FA6 and FA7 Lecture 5 and Example 5, continued	
14	**4/13**	11:59 PM Sunday	**HW5 (online, based on Example 5)** ***Video catchup and questions (if needed)***	
		During class	Lecture 6: Caveats	D & H ch. 16–17 Anderson (2020) Westfall & Yarkoni (2016)
15	**4/20**	11:59 PM Sunday	**Project Report (in Canvas)**	
		During class	Lecture 7: Next Steps	Hoffman & Walters (2022) TBD
16	**4/27**	11:59 PM Sunday	*Nothing due*	
		During class	**NO CLASS (FINALS WEEK)**	
	5/1	11:59 PM Friday	**Project Report Revisions (in Canvas, if needed) and all outstanding coursework**	