

# STAT 203-01: GENERALIZED LINEAR MODELS (3 cr.)

## SYLLABUS & COURSE POLICIES

### DORDT UNIVERSITY

FALL 2023

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<b>Instructor:</b>	Dr. Mike Janssen, Professor of Mathematics
<b>Email:</b>	Mike.Janssen@dordt.edu; I will endeavor to reply to every email within one school day.
<b>Classroom:</b>	CL 92
<b>Class time:</b>	9:00–9:50 AM MWF
<b>Office:</b>	SB 1612
<b>Office Phone:</b>	(712) 722-6398
<b>Student Hours:</b>	By appointment: <a href="https://fantastical.app/mkjanssen/student-hours">https://fantastical.app/mkjanssen/student-hours</a>

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**Catalog course description:** This course covers simple linear regression and associated special topics, multiple linear regression, indicator variables, influence diagnostics, assumption analysis, selection of ‘best subset’, nonstandard regression models, logistic regression, and nonlinear regression models. This course, along with Statistics 131 and 202, also serves as preparation for Actuarial Exam SRM. Additionally, this course, along with Statistics 131, 202, 320 and 352, serves as preparation for Actuarial Exam MAS I. Prerequisite: Statistics 201 or 202.

## REQUIRED RESOURCES

- *Generalized Linear Models with Examples in R*, by Dunn and Smyth
- Regular access to a working installation of R
- Regular access to Canvas

## RECOMMENDED RESOURCES

- **Actuarial science majors** are recommended to purchase *Regression Modeling with Actuarial and Financial Applications*, by Frees
- **Data science majors** are recommended to purchase *An Introduction to Statistical Learning, with Applications in R* (James, et al.). Available for download at <https://statlearning.com>.

## LEARNING OBJECTIVES

In this course, we will focus on becoming **communicators** of and **ambassadors** for mathematics. In particular, we will:

- explore (generalized) linear models as means of understanding God’s creation (CS).
- apply generalized linear models and related ideas to statistical learning (CD).
- reflect on the use, misuse, and limitations of modeling in building a just society (CR).

# COURSE LITURGIES

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This course will be driven primarily by direct instruction (i.e., lecture). Nevertheless, active participation by asking and answering questions is crucial to your success!

## ATTENDANCE

Active participation in class activities is crucial to success in this course. Answer questions and ask questions. Questions are a sign of learning. If you must miss a class you must email me prior to the start of the class period. You must send an email and receive confirmation in order for the absence to be considered excused. It is your responsibility to make up work missed due to absence. See the institution-wide attendance policy below for more.

## TECHNOLOGY

Make sure phones, etc. are not seen or heard in class. Also, it is expected that you use the computers as part of the class: not to check your email, InstaChat, SnapFace, do assignments for other classes, etc. Consistent distractions caused by technology will result in a drop of your final grade.

## HOMEWORK

Homework will be roughly due once/week, on Thursdays. Each assignment will be graded out of 10 points. Most problems will be assessed on good-faith effort, while one or two problems will be randomly selected to be graded for correctness.

Homework is due on Canvas on Sept. 8, 15, 22, 29; Oct. 13, 20, 27; Nov. 3, 10, 17; Dec. 1, 8.

## EXAMS

There will be two midterm exams and one final exam. Each exam *may* have a take-home component—any take-home components will be announced at least two weeks ahead of time, and due at the time of the in-class exam.

The in-class midterm exams will be on **October 4** and **November 10**. The final exam is scheduled for **Monday, December 18, 1:15–3:15pm**.

## PROJECT

There will be a student-led project using R to fit generalized linear models on real data that will occur at the end of the semester. Details forthcoming.

## GRADING POLICY

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Course assignments will be weighted as shown in Table ??.

Your final percentage, G, will be assigned a letter grade as shown in Table ??.

## OTHER POLICIES AND ADVICE

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I am generally fairly accepting of late work, with a built-in 24-hour grace period for any non-classroom activities. Additional time beyond the 24-hour grace period must be approved ahead of time.

Activity	Weight
Midterm Exams	40%
Homework	20%
Project	20%
Final Exam	20%

Table 1: Assignment weights.

Grade	Interval
A	$95\% \leq G \leq 100\%$
A-	$90\% \leq G < 95\%$
B+	$85\% \leq G < 90\%$
B	$80\% \leq G < 85\%$
B-	$75\% \leq G < 80\%$
C+	$70\% \leq G < 75\%$
C	$65\% \leq G < 70\%$
C-	$60\% \leq G < 65\%$
D+	$55\% \leq G < 60\%$
D	$50\% \leq G < 55\%$
D-	$45\% \leq G < 50\%$

Table 2: Final grade cutoffs.

**Student hours** are your time to ask questions about all aspects of the class and college life. Please check online for an appointment. If you can't find one, send me an email! I will do my very best to accommodate your you.

**Email Policy:** I check my email twice per school day: once in the morning, where I'll deal with any emergencies, and once in the afternoon, when I'll respond to other emails (including any that have come in since the morning). If you require a more immediate response, you're welcome to come find me in my office.

**Policy on Generative AI:** Unless specifically permitted by Dr. Janssen in advance of student submission of work, any use of AI will be considered a breach of academic integrity. Suspected cases of misuse of AI tools will be treated as plagiarism and submitted to the Student Life Committee.

## TENTATIVE SCHEDULE

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Because this is a fairly new course (and the first time it will be taught as a 3-credit course), our schedule is subject to change. See below for my best guess.

Chapter 1, Statistical Models: August 30–September 8

Chapter 2, Linear Regression Models: September 11–25

Chapter 3, Linear Regression Models: Diagnostics and Model-Building: September 27–October 18

Chapter 4, Beyond Linear Regression: The Method of Maximum Likelihood: October 20–November 1

Chapter 5, Generalized Linear Models: Structure: November 3–17

Chapter 6, Generalized Linear Models: Estimation: November 20–December 1

Chapter 7, Generalized Linear Models: Inference: December 4-8

Chapters 9–10, Models for Proportions and Counts: December 11–13

## **INSTITUTIONAL POLICIES**

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### **DORDT UNIVERSITY STUDENT’S RIGHT TO ACCOMODATIONS POLICY**

Dordt University is committed to providing reasonable accommodations for students with documented qualifying disabilities in accordance with federal laws and university policy. Any student who needs access to accommodations based on the impact of a documented disability should contact the Coordinator for Service for Students with Disabilities: Sharon Rosenboom, Academic Enrichment Center, 712 (722-6490), Email: Sharon.Rosenboom@dordt.edu.

### **DORDT UNIVERSITY ACADEMIC HONESTY POLICY**

Dordt University is committed to developing a community of Christian scholars where all members accept the responsibility of practicing personal and academic integrity in obedience to biblical teaching. For students, this means not lying, cheating, or stealing others’ work to gain academic advantage; it also means opposing academic dishonesty. Students found to be academically dishonest will receive academic sanctions from their professor (from a failing grade on the particular academic task to a failing grade in the course) and will be reported to the Student Life Committee for possible institutional sanctions (from a warning to dismissal from the college).

Dordt University continues to monitor developments in the use of AI. For the Fall 2023 semester, follow your instructor’s AI-related policies and procedures.

Appeals in such matters will be handled by the student disciplinary process. For more information, see the Student Handbook at <https://www.dordt.edu/student-life/residential-life/student-services/student-handbook>.

### **DORDT UNIVERSITY ATTENDANCE POLICY**

As we begin the 2023-2024 school year, class attendance policies and procedures as outlined in the Student Handbook are in place. To paraphrase the Student Handbook, Dordt University as an institution remains committed to in person instruction for face-to-face courses. As a result, you are expected to be present for every class period and laboratory period. Should you need to miss class for any reason, contact your instructor as soon as possible (either prior to the absence or immediately following). Absences for Dordt-sponsored curricular or co-curricular activities will be communicated by the activity sponsor and are considered excused.

You are responsible to contact your instructor to make arrangements for missed work. Your instructor is not required to provide real time (synchronous) learning for you should you be absent for class for any reason (ex. Zooming into your real time class). Your instructor is also not required to provide asynchronous virtual learning materials for you (ex. recordings of missed classes, powerpoints, other materials on Canvas). While some instructors might utilize some of the synchronous/asynchronous methods of making up work on occasion, you should not expect all instructors to provide these experiences automatically. Methods of making up missed work might include: contacting a fellow student to get notes from class, extensions on assignments or labs, or other methods as determined by your instructor. Making arrangements for missed class work is your responsibility!

Please see your instructor’s specific attendance policy.

**I reserve the right to make changes to this document as the need arises.**