

AMS 578 - Regression Theory

Spring 2022; 10:30 AM - 11:50 AM; Tue & Thu

Instructor Information

Instructor

Hyunwook Koh, Ph.D.

Email

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Office Location & Hours

B-521, 9:00 AM - 11:50 AM; Mon & Wed
(or by appointment)

Course Information

Course Description

Regression analysis is one of the most widely used techniques for analyzing multifactor data. Its broad appeal and usefulness result from the conceptually logical process of using an equation to express the relationship between a variable of interest (the response) and a set of related predictor variables. Regression analysis is also interesting theoretically because of elegant underlying mathematics and a well-developed statistical theory. Successful use of regression requires an appreciation of both the theory and the practical problems that typically arise when the technique is employed with real-world data.

This course blends both theory and application so that students will gain an understanding of the basic principles necessary to apply regression model-building techniques in a wide variety of application environments.

Teaching Method (In-person/Online)

TBA

Textbook

“Introduction to Linear Regression Analysis” by D.C. Montgomery, E.A. Peck, and G.G. Vining, 5th edition; Wiley & Sons; ISBN: 978-0-470-54281-1 (Required)

“An Introduction to Statistical Learning with Applications in R” by G. James, D. Witten, T. Hastie, R. Tibshirani; Springer(Optional)

“Mathematical Statistics and Data Analysis” by J.A. Rice, 3rd edition; Duxbury Advanced Series (Optional)

“Statistical Inference” by G. Casella and R.L. Berger, 2nd edition; Duxbury Advanced Series (Optional)

Pre-requisite

AMS 572 (Data Analysis 1)

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

School Policy on Attendance

1. If a student has over 20% unexcused absences, the student's final course grade will be an F.
2. Students should report the reason of absence to the professor in advance, or immediately after the absence.

3. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the professor.
4. The professor of the course reserves the right to excuse absences.
5. The professor may excuse the absence if the submitted documentation fulfills the following conditions: extreme emergencies, severe medical reasons with doctor's note, very important events.

Critical incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Course Evaluations

Stony Brook University values student feedback in maintaining the high-quality education it provides and is committed to the course evaluation process, which includes a mid-semester assessment as well as an end-of-the-semester assessment, giving students a chance to provide information and feedback to an instructor which allows for development and improvement of courses. Please click the following link to access the course evaluation system: <http://stonybrook.campuslabs.com/courseeval/>

Grading

Final grade = $f(\text{Attendance}[5\%] + \text{Homework}[5\%] + \text{Midterm} [40\%] + \text{Final} [50\%])$; ABCDF grading; 3 credits

Total score	Final grade
94 - 100	A
90 - 93	A-
87 - 89	B+
84 - 86	B
81 - 83	B-
78 - 80	C+
75 - 77	C
72 - 74	C-
69 - 71	D+
66 - 68	D
61 - 65	D-
≤ 60	F

Tentative Course Schedule

No.	Date	Topic	Homework
1	Feb 22	Introduction	TBA
2	Feb 24	Simple Linear Regression	TBA
3	Mar 1	No class (Independence Movement Day)	
4	Mar 3	Simple Linear Regression	TBA
5	Mar 8	Simple Linear Regression	TBA
6	Mar 10	Multiple Linear Regression	TBA
7	Mar 15	Multiple Linear Regression	TBA
8	Mar 17	Multiple Linear Regression	TBA
9	Mar 22	Model Adequacy Checking	TBA
10	Mar 24	Model Adequacy Checking	TBA
11	Mar 29	Model Adequacy Checking	TBA
12	Mar 31	Transformation and Weighting to Correct Model Inadequacies	TBA
13	Apr 5	Transformation and Weighting to Correct Model Inadequacies	
14	Apr 7	Review	TBA
15	Apr 12	Midterm	
16	Apr 14	Transformation and Weighting to Correct Model Inadequacies	TBA
17	Apr 19	Polynomial Regression Models	TBA
18	Apr 21	Polynomial Regression Models	TBA
19	Apr 26	Polynomial Regression Models	TBA
20	Apr 28	Multicollinearity	TBA
21	May 3	Multicollinearity	
22	May 5	No class (Children's Day)	
23	May 10	Multicollinearity	TBA
24	May 12	Multicollinearity	TBA
25	May 17	Other topics	TBA
26	May 19	Other topics	TBA
27	May 24	Other topics	TBA
28	May 26	Other topics	TBA
29	May 31	Other topics	TBA
30	Jun 2	Review	TBA
31	Jun 7	No class (Reading day)	

No.	Date	Topic	Homework
32	Jun 14	Final (9:00 AM - 11:30 AM)	

Exam Schedule

Date	Subject
Apr 12	Midterm
Jun 14	Final