

DATA 140



Spring 2026

WEEK 13 STUDY GUIDE

The Big Picture

One of the rare weeks when we just cover one chapter:

The least squares predictor of one variable given another, and the error in it

- If you have the scatter diagram of simulated (X, Y) pairs, then Data 8 ideas say that given X , the best predictor of Y is the “center of the vertical strip at X .”
- Formally, “best” means “least squares,” and the “center of the vertical strip at X ” is the conditional expectation of Y given X .
- The error in this estimate, given X , is the conditional SD of Y given X .
- This allows us to decompose the variance of Y into two easier pieces, by conditioning on X .

Week At a Glance

Mon 4/13	Tue 4/14	Wed 4/15	Thu 4/16	Fri 4/17
Regular OH 10AM - 3PM in Warren 101B	Lecture	Sections	Lecture	Mega Section
Lab 7B Due Lab 8 (Due 5PM Mon 4/20)			Lab 8 Party 3-5 PM in Warren 101B	
HW 10 Due HW 11 (Due 5PM Mon 4/20)				HW 11 Party 2-5 PM in Evans 330
Skim Sections 22.1-22.2	Work through Sections 22.1-22.2	Skim Sections 22.3-22.4	Work through Chapter 22	Work through Chapter 22

Reading, Practice, and Class Meetings

Book	Topic	Lectures: Prof. A.	Sections: TAs	Optional Additional Practice
Ch 22	<p>An approach to prediction</p> <ul style="list-style-type: none"> - 22.1 develops the main reason why conditional expectation is important for prediction - 22.2 shows that conditional expectation is a least squares predictor, and defines the error in the estimate - 22.3 decomposes variance into two pieces, by conditioning - 22.4 is a series of examples of varied uses of the method of 22.3 	<p>Tuesday 4/14</p> <ul style="list-style-type: none"> - The random variable equivalent of “dropping a perpendicular” - Least squares prediction, and a new variance 	<p>Wednesday 4/15</p> <ul style="list-style-type: none"> - Ch 22 Ex 6, 1, 7 	<p>Ch 22</p> <ul style="list-style-type: none"> - Ex 2
		<p>Thursday 4/16</p> <ul style="list-style-type: none"> - Variance by conditioning - Examples, including a look back at Section 9.2 	<p>Friday 4/17</p> <ul style="list-style-type: none"> - Ch 22 Ex 5, 3, 4 	