

DATA109

INTRODUCTION TO STATISTICS

Fall 2024

MA109 SYLLABUS

Instructor

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Prerequisite

- ▶ A C- or better from MA100 or Recommendation from NMU Math Placement

Office Hours

- ▶ Office hours will normally be in person or through Zoom if requested (link is on Educat). MWRF 11am – 11:50 am.

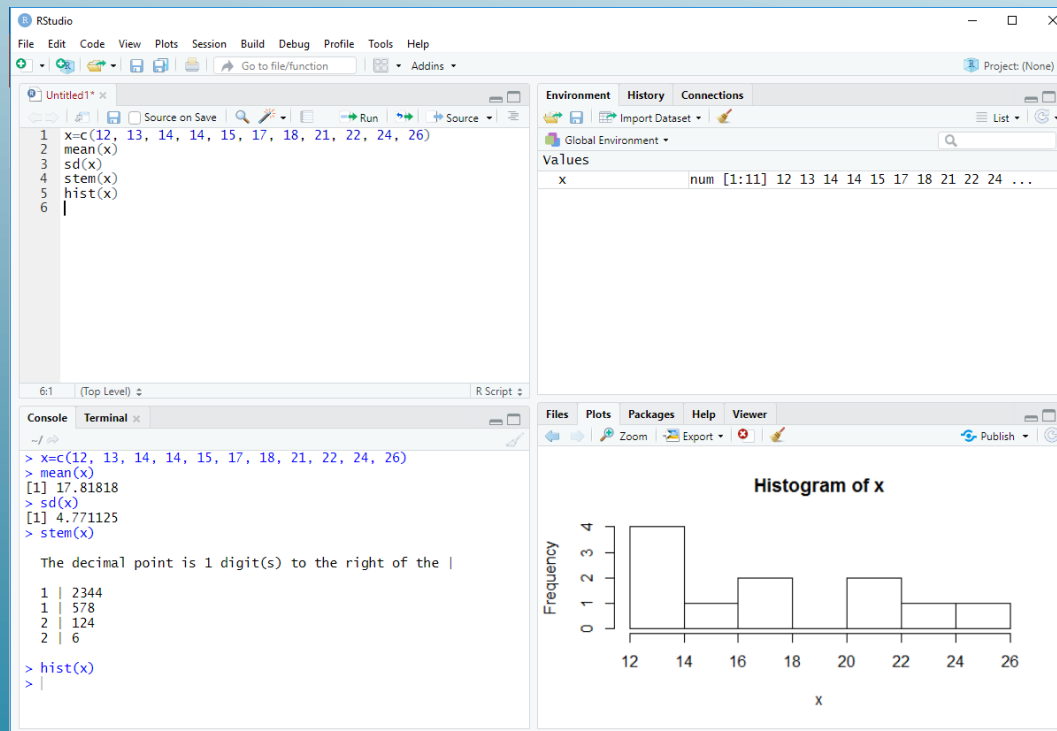
MA109 SYLLABUS

Computer and software Requirements

- ▶ A computer with Internet access to do homework and tests.
- ▶ Computer software: R and R-Studio (will be used in homework and tests throughout the semester, **mandatory**).
- ▶ R-Studio can be used as a calculator.

R and R Studio®

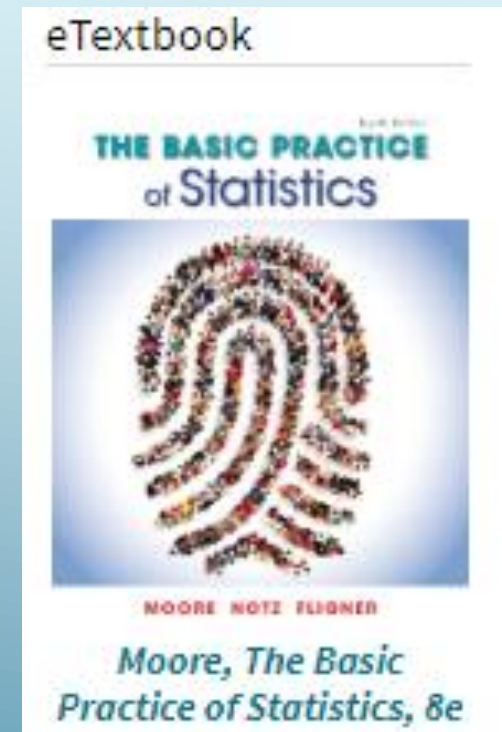
- ▶ We will be using R/R-Studio **on a daily basis**. Using R is not only as a tool replacing statistical tables, the basic use of R for statistical calculations is part of the curriculum.
- ▶ Learning of R is a progressive process throughout the semester.



We do not have a required hardcopy textbook. However the requirement of Achieve access is built into the class and is accessible through Educat.

The Achieve system contains:

- ▶ An interactive e-textbook
- ▶ All chapter online homework assignments





The homework assignments and e-text will be in the Macmillan Achieve system. You can access Achieve Tools, e-text and the homework through Educat.

A screenshot of a web interface showing three white rectangular buttons stacked vertically. The first button has a blue gear icon and the text "Macmillan Course Tools". The second button has a red book icon and the text "Achieve ebook". The third button is a solid blue square with the text "Click here to opt out of the inclusive access fee DATA109-W24 (You still need to buy it!)".

Macmillan Course Tools

Achieve ebook

Click here to opt out of the inclusive access fee DATA109-W24 (You still need to buy it!)

A screenshot of a mobile application interface. On the left is a dark blue sidebar menu with the Achieve logo at the top. The menu items are: "My Course", "Resources", "Gradebook", "Reports", "E-book", and "People". At the bottom of the sidebar are two buttons: "+ Create Content" and "⇌ Student Preview". The main content area on the right shows a course titled "Statistics -02" and a list of homework assignments: "Chapter 1 Homework" (10pts | 60/71 Students Completed), "Chapter 2 Homework" (12pts | 68/71 Students Completed), and "Chapter 3 Homework" (12pts | 65/71 Students Completed).

Achieve

My Course

Resources

Gradebook

Reports

E-book

People

+ Create Content

⇌ Student Preview

Statistics -02

Connect Achieve to your LMS course!

Homework Assignments

Chapter 1 Homework
10pts | 60/71 Students Completed

Chapter 2 Homework
12pts | 68/71 Students Completed

Chapter 3 Homework
12pts | 65/71 Students Completed

Homework, Tests and Quizzes

- ▶ Online Homework Assignments on Achieve are given for each chapter (each week). Completed homework assignments are graded and computed into grades.
- ▶ About 6 Biweekly Quizzes (drop one lowest quiz). (Makeups are allowed if notified on or prior to the test.)
- ▶ One final exam, check with the NMU websites for final exam schedules.

Online Homework Assignments

- ▶ Students can attempt homework assignment problems multiple times (with a slightly discounted credit each time).
- ▶ Homework assignments have due dates normally about a week after the assigned date. After the due dates, attempts are not allowed but still visible. Students can ask for due date extensions under special circumstances.
- ▶ Each chapter has a homework assignment consisting of usually no more than 15 problems.
- ▶ You can use R/R-Studio for all of the homework assignments and tests/quizzes.

Prepare for Quizzes and the Final Exam

- ▶ Completing and familiarizing with the homework problems and examples on slides are the best ways to prepare for quizzes.
- ▶ Quizzes are formulated to reflect on your understanding the concepts discussed in classes and you work in homework assignments.
- ▶ All tests and quizzes are open notes and are timed. R/R Studio will be needed for all quizzes.
- ▶ **Make sure you have your R/R Studio functional prior to the first quiz and homework assignment.**

▶ A Sample Online Homework Session

The screenshot shows the Sapling Learning interface for a homework session. The top navigation bar includes the Sapling Learning logo and the course information: Northern Michigan University - MA 109 (Sections 1, 2, 5) - Fall19 - ZHANG. The current assignment is Chapter 4 Homework, and the user's score is 0/2000. The interface displays a list of 20 questions on the left, with the current question (Question 20 of 20) selected. The main content area shows a table of data and a question asking for the correlation coefficient r .

Sapling Learning
macmillan learning

Sapling Learning > Northern Michigan University - MA 109 (Sections 1, 2, 5) - Fall19 - ZHANG > Activities and Due Dates > Chapter 4 Homework

20 of 20 Questions < Assignment Score: 0/2000

Question 20 of 20 >

Lake	1.8	12.9	Wayne	1.0
Licking	4.0	13.2	Wood	1.0

To access the complete data set, click the link for your preferred software for
[Excel](#) [Minitab](#) [JMP](#) [SPSS](#) [TI R](#) [Mac-TXT](#) [PC-TXT](#) [CSV](#) [CrunchIt!](#)

(a) Using the software of your choice make a scatterplot of the data. What is the correlation coefficient r (round to two decimal places.)

$r =$

(b) Using the software of your choice make a scatterplot of the data with an additional point A (county, suicide rate) = (30, 1.0). Find the new correlation for the original data plus Point A. (round to two decimal places.)

Classroom Attendance

The attendance for this class is required and will be calculated into the course grade.

The class attendance will be checked daily.

Grading (Weighted average)

- ▶ Online homework assignments 28%
- ▶ Biweekly Quizzes (≈ 6 , drop one lowest) 50%
- ▶ Final Exam 20%
- ▶ Attendance 2%

The grade is given based on the weighted average:

Percent Greater or Equal	95	90	85	80	75	70	65	60	55	50	45	-
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

► Liberal Studies Requirement

This course satisfies the Formal Communication Studies requirement.

This course is designed to introduce students to the ways in which information and ideas are expressed using a communication system other than English. Such courses should foster the student's ability to conceptualize and communicate in an orderly, rational manner.

Characteristics of a communication system include: 1) possession of a grammar; 2) operation from an established set of rules; 3) reasoning properties such as deduction, inference drawing and problem solving. This includes courses in languages and those in which the central focus of the course is on statistics, computers or formal logic.

DISABILITY SERVICES

- ▶ If you have a need for disability-related accommodations or services, please inform the Coordinators of Disability Services in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1737 or disability@nmu.edu). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

INSTALLATION OF AND Studio®

▶ To Install R:

- Open an Internet browser and go to www.r-project.org.
- Click the "download R" link in the middle of the page under "Getting Started."
- Select a CRAN location (a mirror site) and click the a link in USA such as <https://mirror.las.iastate.edu/CRAN/> or any other site.
- Click on the "Download R for Windows" or "Download R for (Mac) OS X" link.
- Click on the "install R for the first time" link at the top of the page (Mac users read message therein).
- Click "Download R 4.1.2 for Windows" and save the executable file somewhere on your computer. Run the .exe file and follow the installation instructions.
- Now that R is installed, you need to download and install RStudio.

▶ To Install R Studio

- Go to www.rstudio.com and move your mouse to Product, then choose RStudio
- Scroll down and click on RStudio Desktop, then "DOWNLOAD FREE DESKTOP IDE".
- Choose the free Windows 10 version (or MacOS 10.14 version if you use a Mac), and continue the download process

First Time use of R-Studio

- ▶ Click on R in a homework assignment.
- ▶ At “How do you want to open this file?” check the box Always use this app to open .rda file and click on Rstudio.

Sapling Learning
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Sapling Learning > Northern Michigan University - MA 109 (Sections 1, 2, 5) - Fall19 - ZHANG > Activities and Due Dates > Chapter 4 Homework

20 of 20 Questions < Assignment Score: 0/2000

8 Question 0 of 4 Attempts 0/100
9 Question 0 of 4 Attempts 0/100
10 Question 0 of 4 Attempts 0/100
11 Question 0 of 4 Attempts 0/100
12 Question 0 of 4 Attempts 0/100
13 Question 0 of 4 Attempts 0/100
14 Question 0 of 4 Attempts 0/100
15 Question 0 of 4 Attempts 0/100

Lake	1.8	12.9	Wayne	1.0
Licking	4.0	13.2	Wood	1.0

To access the complete data set, click the link for your preferred software for Excel Minitab JMP SPSS TI R Mac-TXT PC-TXT CSV CrunchIt!

(a) Using the software of your choice make a scatterplot of the data. What is the correlation coefficient r between the suicide rate from 2008-2011 for the 26 counties in Ohio in the table shown in places.)

$r =$

(b) Using the software of your choice make a scatterplot of the data with the suicide rate 30. Find the new correlation for the original data plus Point A. in places.)

How do you want to open this file?

RStudio
New

Look for an app in the Microsoft Store

[More apps](#) ↓

Always use this app to open .rda files

OK

STATISTICS

Statistics is a discipline which is concerned with:

- ▶ designing **experiments** and **data** collection.
- ▶ summarizing information to aid understanding.
- ▶ drawing **conclusions** (inference) from data.
- ▶ estimating unknown or future values the **futures**.

COURSE CONTENTS

- ▶ Part I Exploring Data
Chapter 1 - Chapter 6
- ▶ Part II Producing Data
Chapter 8 - Chapter 9
- ▶ Part III From Data Production to Inference
Chapter 12 – Chapter 18
- ▶ Part IV Inference About Variables
Chapter 20 – Chapter 21
- ▶ Part V Inference About Relationships
Chapter 25 – Chapter 27

LEARNING OBJECTIVES

The emphases of the course is on the concepts of statistics. Students are not required to memorize many formulas.

- ▶ Learn the fundamental set of concepts and vocabularies in probability and statistics
- ▶ Understand the nature of statistics and why the statistics as a mathematics subject can help with decision makings
- ▶ Learn the concepts of central tendencies and variations and their applications
- ▶ Gain a comprehensive knowledge about the definition and calculations of probabilities, odds, counting principles
- ▶ Learn the concepts of positions such as percentiles and their use in applications
- ▶ Learn the statistical methodologies for estimating population parameters such as confidence intervals and hypothesis tests.
- ▶ Learn the fundamental syntax of a statistical programming language such as R.

Note:

The course materials such as slides will be put on educat.nmu.edu normally during the first day of the coverage.

Online homework assignments will be on Achieve.com and due in about a week from the time assigned.