

MATH 121: Elementary Statistics

Spring 2022, Section 2

(Last updated April 15, 2022; syllabus is subject to change)

Instructor: Professor Eren Bilen

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Phone: 717-254-8162

Office Hours: Monday 7:00-8:00pm (Zoom)
Tuesday 1:45-2:45pm (in-person)
Friday 10:00-11:00am (in-person)
or by appointment

QRA: Trang Dang, dangtr@dickinson.edu

Office Hours: Thursday 7:00-8:00pm (in-person)
Thursday 8:00-9:00pm (in-person)

Location: Rector North 1311

Class: Tome 121

Tuesday and Friday
3:00-4:15pm

Class Notes and Other Required Materials

- MATH 121 Course Packet v3.1 by Professor Dick Forrester, available at the Dickinson College bookstore (required)
- Introductory Statistics: Exploring the World Through Data, by Gould, Wong, and Ryan, 3rd ed. (Not required, but encouraged; Earlier editions would work equally well.)
- Access to Minitab statistical software. Dickinson College has purchased a bulk subscription for Minitab's cloud-based option, so it will be available at no cost to you. More details to come on how to access Minitab using your personal computer. Alternatively, Minitab is available in Tome 121.
- Course webpage: [Moodle](#)

Course Goals

Math 121 (Elementary Statistics) is an algebra-based introduction to the science of collecting, organizing, analyzing, and interpreting data. The focus is on data presentation and statistical reasoning based upon the analysis of data sets. Topics include the study of sampling methods, observational and experimental studies, graphical and numerical summaries of data, probability, sampling distributions, significance testing, estimation, and simple linear regression. The learning objectives for this course can be succinctly stated as:

- Students should understand the basic concepts of descriptive statistics, including how to summarize data both graphically and numerically.
- Students should understand the concepts and techniques for computing basic point and interval estimates.
- Students should understand the concepts and techniques for performing basic statistical inference.

Course Policies

Attendance Policy: This course will be taught in person in Tome 121. Students are expected to attend all in-class meetings, which occur on Tuesdays and Fridays from 3:00-4:15pm ET. While I will not take formal attendance, it is important for you to attend in class meetings and take notes. If you will be unable to attend a class meeting for any health-related issues or other emergencies, please contact me beforehand so that arrangements can be made.

Use of Laptops, Tablets, and Phones: Phones or tablets are not permitted during this course as they can be highly distracting in the classroom. For Minitab applications, you are free to use any of the desktop computers in the room, or you may choose to use your own personal laptop. We will usually work in pairs. Phones should be put away in silent mode.

Grading: Your course grade is based on three closed-book midterms, one final (closed-book, comprehensive), and weekly homework.

Midterm 1 (20%):	February 22
Midterm 2 (20%):	March 29
Midterm 3 (20%):	April 29
Final (25%):	May 17 @9am
Homework (15%):	Due dates TBA

You will be given a formula sheet, statistical tables (if needed), and a calculator to use during the test.

Extra credit: You will have opportunities to earn bonus points throughout the course which will depend on your participation. Each student can earn at most 30 bonus points during the semester. (exchange rate: 10BP=1 point) Additionally, I will drop your lowest homework. I expect there to be 11 total assignments (depending on course pacing). Occasionally, an assignment may be weighted to count as two assignments (because of the complexity or length), but this will be clearly indicated when the assignment is given.

The following scale will be used to determine your final grade:

Score	Letter	GPA	Score	Letter	GPA
$93 \geq x$	A	4.0	$73 \leq x < 77$	C	2.0
$90 \leq x < 93$	A-	3.7	$70 \leq x < 73$	C-	1.7
$87 \leq x < 90$	B+	3.3	$67 \leq x < 70$	D+	1.3
$83 \leq x < 87$	B	3.0	$63 \leq x < 67$	D	1.0
$80 \leq x < 83$	B-	2.7	$60 \leq x < 63$	D-	0.7
$77 \leq x < 80$	C+	2.3	$x < 60$	F	0.0

Make-up Exams: There will be no make-up exams unless a student must be away from campus on university business or due to an emergency. The student must provide documentation and reach out to me as soon as possible.

Homework: Homework will be assigned in Moodle on a weekly basis. Due dates will be provided for all assignments. Solutions will be made available in Moodle after the deadline. You may discuss homework problems with others, but your solutions must be written up individually.

Homework assignments must be turned in person at the beginning of class as a stapled physical copy. All homework assignments must conform to the [attached guidelines](#). Assignments not conforming to these standards may be penalized. Late assignments will not be accepted without a signed medical excuse. If you are unable to submit an assignment because of a personal or health emergency that arises during the week, you must contact me prior to the submission time to discuss arrangements for completing the assignment. Your work will be scored and returned in class.

Getting Help

Office Hours: I will be holding office hours in-office and in Zoom—please see Moodle for the Zoom link that will be used throughout the semester. My office hours are Monday 7:00 – 8:00pm (Zoom), Tuesday 1:45-2:45 (in-person), and Friday 10:00 – 11:00am (in-person). I am also available by appointment.

Quantitative Reasoning Associate: This semester, we are fortunate to have a Quantitative Reasoning Associate (QRA) working with us. A QRA is a fellow student who completed this course in the past and will be helping us as a course facilitator and student mentor. This semester, the QRA for our course is Trang Dang. She will be holding office hours on Tuesdays 8:00–9:00pm and Thursdays 7:00–8:00pm, both in person. Location is Rector 1311.

If you need to attend office hours on Zoom, please contact Trang ahead of time to arrange this. Trang will host exam review sessions, which will be announced closer to each exam.

Quantitative Reasoning Center

Dickinson College provides additional support for students taking courses with quantitative content across the curriculum through the Quantitative Reasoning (QR) Center. For the fall 2021 semester, the QR Center will offer tutoring for MATH 121, in addition to general quantitative support. You are strongly encouraged to make an appointment with them. [Click here](#) to access the QR Center webpage.

Please visit dickinson.mywconline.com to make an appointment. Then, access the drop-down menu under “limit to” at the top of the scheduler and select MATH 121. This will restrict the tutor list and schedule to only those tutors approved for this course. When you make your appointment, please also paste or upload your assignment and any work that you have done.

Other Important Information

Referencing the Work of Others: When submitting your work, you must follow common-sense ground rules. External sources may only be used to improve your own understanding of the material. When you write your solutions, you should do it on your own without the direct help of any external sources, and certainly should not write down anything that you do not understand. If you do use external references, please be sure to cite them. Failure to cite references will be treated as academic dishonesty.

Respect for Intellectual Property: It is important that you be aware of and respect the intellectual property rights of others. Unless explicitly stated otherwise, all materials available on the Internet, in libraries, and elsewhere are considered intellectual property and can only be used with the permission of the owner. Specifically, with regards to this class, you should not share any of the course materials, including homework answer keys, with others, even after the completion of the course.

Statement on Disabilities: Dickinson values diverse types of learners and is committed to ensuring that each student is afforded equitable access to participate in all learning experiences. If you have (or think you may have) a learning difference or a disability – including a mental health, medical, or physical impairment that would hinder your access to learning or demonstrating knowledge in this class, please contact Access and Disability Services (ADS). They will confidentially explain the accommodation request process and the type of documentation that Dean and Director Marni Jones will need to determine your eligibility for reasonable accommodations. To learn more about available supports, go to www.dickinson.edu/ADS, email access@dickinson.edu, call (717) 245-1734, or go to the ADS office in Room 005 of Old West, Lower Level (aka “the OWLL”).

If you have already been granted accommodations at Dickinson, please follow the guidance at www.dickinson.edu/AccessPlan for disclosing the accommodations for which you are eligible and scheduling a meeting with me as soon as possible so

that we can discuss your accommodations and finalize your Access Plan. If test proctoring will be needed from ADS, remember that we will need to complete your Access Plan in time to give them at least one weeks advance notice.

SOAR: Academic Success Support: Students can find a wealth of strategic guidance by going to www.dickinson.edu/SOAR. This website for SOAR (Strategies, Organization, and Achievement Resources) includes apps, tips, and other resources related to time management, study skills, memory strategies, note-taking, test-taking, and more. You will also find information aimed to help students “SOAR Through Academic Challenges,” as well as a schedule of academic success workshops offered through Academic Advising. If you would like to request one-on-one assistance with developing a strategy for a manageable and academically successful semester, email SOAR@dickinson.edu.

Course Outline: Below is a list of topics to be covered in this course. There may be adjustments on the list during the semester depending on progress. This syllabus will be updated with any adjustments.

- Chapter 0: How to Make a Decision with Statistics
- Chapter 1: Introduction to Data
- Chapter 2: Picturing Variation with Graphs
- Chapter 3: Numerical Summaries of Center and Variation
- Chapter 4: Regression Analysis: Exploring Association Between Variables
- Chapter 5: Modeling Variation with Probability
- Chapter 6: Modeling Random Events: The Normal and Uniform Models
- Chapter 7: Survey Sampling and Inference
- Chapter 8: Hypothesis Testing for Population Proportions
- Chapter 9: Inferring Population Means

Important Dates for the Spring 2022 Semester

Last Day to Add/Drop or Change to/from Pass/Fail	Friday, January 28
Spring Vacation	5 pm, Friday, March 11 thru 8 am, Monday, March 21
Public lecture: Luis von Ahn, Co-founder of Duolingo	Tuesday@5pm, March 22 in ATS
Course Request Period for Fall 2022 Semester	Monday, March 28 thru Wednesday, March 30
Last Day to Withdraw from a Course with a "W" grade	Friday, April 22
Classes End	Friday, Friday, May 6
Reading Period Days	May 7, 8, 11, 14, 15

Homework Guidelines

The importance of homework cannot be overstated as it provides the main vehicle for truly understanding the material presented in this course. Therefore, you must give top priority to working on and understanding homework problems. The instructions below provide some basic guidelines for creating organized, legible, and professional looking homework.

Why Format Matters? There are a number of reasons why I require carefully formatted homework assignments:

- Learning statistics involves learning how to communicate your ideas effectively. As a student, much of this communication will be in the form of homework. How you present your work should enhance the ideas you are trying to communicate.
- Proper formatting allows me to provide meaningful feedback.
- Grading assignments is much more efficient when they are formatted well.

Requirements

1. Homework assignments should be typed or handwritten in pencil. All handwriting should be neat, organized, and legible.
2. Use 8.5×11 white paper. (“printer paper”, letter-size)
3. Homework assignments must be stapled. There is not a stapler in the classroom and therefore you should staple your homework before coming to class.
4. Do not cross out errors; erase them.
5. There should be no perforated edges. No twisted corners.
6. Avoid scratchwork on assignments: instead, first work out the solutions to homework problems on scratch paper, and then write them up neatly.
7. All Minitab (statistical software used in this course) output should be in a **fixed-width font**, in which all the characters have the same width. This ensures that all indentation and spacing is retained. Courier is an example of such a font.
8. If you are asked to include Minitab output, all comments related to the output should appear directly next to the output. Ideally, you should copy all Minitab output into Microsoft Word or Latex and then type your comments immediately following the output.

Semester Schedule

Date	Day	Chapter/Topic	Pages in Notes	in Textbook	Homework Due
Week 1					
Jan 25	T	Ch0: Introduction to Statistics	1-4	Not in textbook	
Jan 28	F	Ch0: Decision Rules	4-21	Not in textbook	
Week 2					
Feb 1	T	Ch1: Introduction to Data	22-43	2-20	
Feb 4	F	Ch1-2: Experiments	43-61	21-24, 36-46	#1
Week 3					
Feb 8	T	Ch2: Visualizing Data	61-83	47-60, 83-88	
Feb 11	F	Ch3: Measuring Spread	84-95	89-102	#2
Week 4					
Feb 15	T	Minitab application	96-108	102-115	
Feb 18	F	Ch4: Association + Review	109-121	142-156	#3
Week 5					
Feb 22	T	Midterm #1			
Feb 25	F	Ch4: Linear Regression	121-133, 142-145	142-173	#4
Week 6					
Mar 1	T	Ch4: Linear Regression	134-141, 146-150	173-176, 205-210	
Mar 4	F	Ch5: Probability	152-161	210-225	#5a,b
Week 7					
Mar 8	T	Ch6: Probability, RVs	162-173	226-230, 255-259	
Mar 11	F	Ch6: Discrete & Continuous RVs	174-187	259-267	#6
Week 8					
Mar 15	T	<i>Spring Break: No Class</i>			
Mar 18	F	<i>Spring Break: No Class</i>			
Week 9					
Mar 22	T	Ch6: Standardizing Normal RVs	187-191	268-272	
Mar 25	F	Ch6-7: Assessing Normality	192-203	273-274, 307-312	#7
Week 10					
Mar 29	T	Midterm #2			
Apr 1	F	Ch7: Random Sampling	204-213	312-325	
Week 11					
Apr 5	T	Ch7: Bias and Precision	214-222	326-332	
Apr 8	F	Ch8: Hypothesis Testing	223-230	333-335, 361-369	#8
Week 12					
Apr 12	T	Ch8: Hypothesis Testing	231-235	369-381	
Apr 15	F	Ch8: Confidence Intervals	236-255	381-385, 411-422	#9
Week 13					
Apr 19	T	The t-distribution	256-263	422-433	
Apr 22	F	The t-distribution	256-263	422-433	#10
Week 14					
Apr 26	T	Ch9: Hypothesis Test for μ	264-269	433-439	
Apr 29	F	Midterm #3			
Week 15					
May 3	T	Minitab application	270-279	433-439	
May 6	F	Review for Final			#11
May 17	T	Final Exam, 9:00-12:00am	Comprehensive		