

**INSTRUCTOR:** Dr. Atul Anurag  
**OFFICE:** G128H  
**OFFICE PHONE:** 201-684-7159  
**OFFICE HOURS:** In-person or virtual. By appointment: Mondays and Thursdays & Times: 12:00 PM to 1 PM or by appointment at other days/times.  
**CLASS TIME & ROOM:** 08:00 AM – 9:40 AM, Main Campus: A Building, Room 102  
**E-MAIL:** [aanurag@ramapo.edu](mailto:aanurag@ramapo.edu)  
**WebEx ADDRESS:** <https://ramapo.webex.com/meet/aanurag>  
**COURSE DELIVERY:** in-person

**Course description:** This introduction to statistics consists of both descriptive and inferential statistics, offering elementary probability as its background. Topics include: organization and description of data, introduction to probability, probability distributions, making inferences about population parameters using hypothesis testing, correlation and linear regression. The course offers a variety of exercises with real-life data sets.

The course is designed to introduce the student to the language, methodology, scope, and spirit of mathematics through an introduction to probability and statistics, two topics which are rich in applications and can genuinely be appreciated by students throughout the College.

**More detailed list of the course topics:** description of data by tables and graphs, measures of center and variation, introduction to probability, probability addition and multiplication rules, probability distributions of discrete variables, binomial distribution, normal distribution, normal approximation to the binomial, sampling distributions and the central limit theorem, inferences about the population mean and population proportion including confidence intervals and hypothesis testing, correlation coefficient and linear regression.

**Course goals:** The course consists of two components: Probability and Statistics. The student will gain a detailed insight into the three-step process of what Statistics is: (1) collecting data sample, (2) displaying the sample and analyzing it, and from the later part of the course, (3) making calculations regarding predictions/inferences about the entire population. The second component of the course is Probability. Students will be introduced to probability as a branch of mathematics in its own right, as well as they will be able to see its usage in or connection to statistics. Students will be exposed to a variety of real-life word problems, which will not only help them to make connections between the field of statistics and their field of study, but also, it will improve their problem-solving skills. Students will learn how to solve mathematics problems two ways: both algebraically (which will reinforce their basic mathematical skills) as well as by using the statistical features of their graphing calculators (which will enable them to learn and use relevant technology). Students will be required to treat mathematics as a language, in both written and oral way.

**Measurable Student Learning Outcomes with respect to the course:**

- (1) Students will gain a rigorous knowledge of the foundations of mathematics.
  - (2) Students will display a broad range of computational skills.
  - (3) Students will communicate mathematics with precision, clarity and organization.
- Assessment: Quizzes – Outcome (1),(3); Exams – Outcomes (2),(3); Final Exam – Outcomes (1),(2),(3).

**Credit Hours:** 4. For each one hour (60 minutes) of lecture time, college students are expected to spend approximately two hours (120 minutes) of coursework outside the classroom. Moreover, this is a General Education Program course in Quantitative Reasoning category.

**Prerequisites:** SAT Math score of at least 580, or ACT Composite score of at least 26, or a passing score on the ACCUPLACER Math Placement Test at the RCNJ Testing Center, or passing MATH 022: Transitional Mathematics, or passing MATH 021: PCMP.

**Text:** Required: *Statistics: Informed Decisions Using Data* by Michael Sullivan III. Pearson-Prentice Hall, 2024, 7<sup>th</sup> edition. Optional from the publisher: *Student Solutions Manual*, CD lecture videos. Visit [bkstr.com](http://bkstr.com) for textbook options.

**Required Technology:** Graphing Calculator TI-83 Plus or TI-84 Plus; Excel XP (“Microsoft Office Spreadsheet”) may be used for some of the exercises. Smart phones may be required to turn in certain assignments.

**Additional required technology if virtual instruction becomes necessary:** A computer with a webcam and a working audio connection (microphone and speakers); a smartphone; internet connection. A student should talk to the instructor if they don’t have some of the technology items listed above and the instructor will advise how to get those items without a purchase.

**Grading Policy:**

Quizzes and Assignments:	25 %
Exam I (Monday, 10/13/2025, proctored, during class time):	25 %
Exam II (Thursday, 11/06/2025, proctored, during class time):	25 %
Cumulative Final Exam (Monday, 12/15/2025, 08:00am – 11:20am, proctored):	25 %

Please refer to the Academic Calendar located on the Web For Students ( <http://www.ramapo.edu/web-resources/> ) (under “Related Resources”) for important deadlines such as add/drop, withdrawal from the course, and incomplete grade requests.

**Office hours:** Office hours will be held by appointment as in-person meetings, or as virtual meetings held at the WebEx address listed on the first page of the syllabus. First, the student needs to email the instructor for an appointment that will be held during office hours or outside the office hours. Shorter questions should be sent to the instructor via email.

**Tutoring:** Free tutoring for this course is available through the STEM Tutoring Center. Location: G131.

**STEM Tutoring Center schedule** can be found here: <https://tutoring.ramapo.edu/#/login> (log in using your RCNJ credentials, type the course name “Elementary Probability and Statistics” to the search box and select the date on which you wish to be tutored). You will see not only the tutoring schedule there, but also workshops schedule if there are workshops offered. You’re welcomed to attend both the tutoring and the workshops. STEM Tutoring Center offers two kinds of tutoring: large group and small group.

**Large group tutoring** are walk-in sessions and do not require an appointment - students show up during the times listed in the STEM Tutoring Center schedule during which their course is being tutored by “large group” tutors.

**Small group tutoring** - Here is link to a guide for students how to make an appointment on Connect for small group tutoring (1-on-3): [Instructions-for-student-STEM-Center-Appointments](#) . Connect button can be found on the RCNJ Intranet Page.

**Measurable Student Learning Outcomes with respect to General Education in Quantitative Reasoning and their assessment:**

Objective	Outcome	Midterm Exams I and II	Quizzes and Assignments	Final Exam
1. Apply mathematical concepts effectively.	1. Effectively communicate quantitative evidence in support of an argument.	X		
	2. Explain information in mathematical forms (e.g., equations, graphs, diagrams, tables, words).	X		
	3. Use appropriate computational method(s) to solve a problem.	X		
2. Demonstrate logic and reasoning skills.	1. Demonstrate logic and reasoning skills.			X
3. Use technology to communicate, manage, or solve problems.	1. Use technology to solve problems.		X	
4. Apply interdisciplinary knowledge and skills to address complex problems.	1. Apply interdisciplinary knowledge to address a problem			X
	2. Utilize interdisciplinary skills to solve problems appropriately			X

**Quizzes and Assignments:** There will be at least 6 quizzes and assignments total, each having an equal weight. The quizzes will be proctored in-class quizzes and will constitute at least 40% of the “Quizzes and Assignments” category of the course grade (counted before dropping the 3 lowest grades from “Quizzes and Assignments” category). Quizzes will be similar to the already covered lecture material and already assigned homework material not yet covered by the previous quiz. In addition to the quizzes, a number of assignments may be given throughout the semester and grades received from them will count towards the “Quizzes and Assignments” category (some of the assignments may be: collected homework, take home assignments, lecture notes, or group work).

**There will be no make up quizzes or assignments. Moreover, quizzes or assignments will not be accepted past the due date, but the lowest 3 grades from the “Quizzes and Assignments” category will be dropped at the end** (they could be from the days a student did not submit their work or didn’t perform their best). If a student is feeling sick or contagious, the student should not come to class and they should see a doctor or a school nurse. If a student misses more than 3 in-class quizzes and if each of them was missed due to a contagious illness documented by a doctor’s note or a school nurse’s note that the student experienced on the dates those quizzes were administered, the student may contact the course instructor for additional accommodations. Students with chronic medical conditions are advised to seek accommodations from the Office of Specialized Services.

Whether collected or not, it is essential that homework is completed by each next class meeting.

Any files (documents, lecture videos, quiz solutions, exam solutions, etc.) that the course instructor posts on Canvas, sends via email, or hands out on paper, are the intellectual property of the course instructor. Students may not post them on the web for anyone from outside of this class to see nor share with others in any format, whether it’s electronic, paper, etc., whether it’s this year or in the future years.

When a student works on their quizzes/assignments/exams that are take home assignments or ones that may need to be submitted online, for the student’s long term benefit, it is expected that the student does their work on their own without using any help from other persons, textbooks, notebooks or the internet. If a student’s answers look too close to the answers of another student, points may be deducted and all students involved may be reported to the Office of the Provost as outlined in the Academic Integrity Policy of Ramapo College.

In this course, students should take lecture notes in their paper notebooks, and not on computers, not on tablets, not on smartphones. During in-person lectures electronic devices such as computers, tablets, and smartphones need to be stored away into student bags. Disciplinary actions will be taken against students who do not adhere to this policy.

**Exams:** Exam I, Exam II and the Final Exam will be proctored exams (closed book/notes). In extraordinary circumstances a student might be permitted by the instructor to reschedule their Exam I or Exam II to a different date/time that will be determined by the instructor and scheduled for a time preceding the lecture in which the graded exam is returned to the whole class. Such student needs to notify the instructor about rescheduling their Exam I or Exam II the earliest possible, before the date of the class exam (or if it is not possible, at most 24 hours after the actual class exam). The student will need to provide the instructor a proper documentation justifying their absence from the original exam. Students may not retake any of the exams they already took. The final exam will be administered by the instructor of this section to all students of this section at the date and time specific to this section’s class meeting day and time and is designated by the table called Final Exam Schedule that can be found on the Web for Students at <https://www.ramapo.edu/web-resources/>. Permission for an alternate time/day of the Final Exam will be granted to a student only in extraordinary circumstances and it requires the instructor to obtain the permission of the course director, Dr. Kowal. If during an exam or during a proctored quiz a student uses a smart phone or other

electronic device during the time in which such electronic device is not permitted, the student's score on that exam or quiz will automatically turn into a 0, and the student may be reported to the Office of the Provost as outlined in the Academic Integrity Policy of Ramapo College. Students are not permitted to leave the exam desk during a proctored quiz or an exam (so there are no bathroom breaks during quizzes or exams) unless a related doctor's note or a related note from the Office of Specialized Services is presented to the instructor at least a week prior to the start of the quiz or exam. The electronic devices that are not permitted on quizzes and exams must be stored by students to their bags during quizzes and exams, unless instructed otherwise by the instructor.

[Fall semesters only: In case of a college closing due to inclement weather during one of the days of the final exam week, the college designated for this semester December 17 to be the final exam make up day.]

**Attendance Policy:** Students are expected to attend all classes, including possible virtual classes. Attendance will be taken. A student who accumulates more than 4 unexcused absences will not pass the course. All other absences (besides the 4 unexcused ones) in order to be excused, must be documented with a doctor's note or a school nurse's note, but a student may wait with submitting the first two doctor/nurse notes to the professor until they accumulate 7 absences. That is, a student who has at most 6 absences total of any kind, does not need to provide any documentation to the professor yet, but once the student accumulates more than 6 absences total, the student needs to begin submitting to the professor the doctor/nurse notes for the excused absences that accumulated. For instance, once someone has 4 unexcused absences and 3 absences excused with doctor's notes, at that point they need to submit the 3 doctor/nurse notes.

A student who misses a lecture for more than 30 minutes will be marked absent for the whole lecture. Students who are absent or late are still responsible for obtaining any missed lecture notes, announcements, hand-outs, etc. from a classmate.

College policy states that: "A student who plans to miss one or more class sessions for religious observance, whether the religious holiday is recognized by the State of New Jersey or not, must notify the course instructor as soon as possible but no later than prior to the date of the religious holiday or the 50% refund date of the term in which the student is enrolled in the course (whichever comes first). The course instructor will not penalize the student for the absence and will allow the student to make up any work missed while absent for religious observance. Ultimately, it is the student's responsibility to complete the work by the date agreed upon by the instructor and the student." This semester, September 9 is the college's 50% tuition refund date.

**E-mail Account and Electronic Communication:** In accordance to the College policy, students are responsible for keeping their Ramapo College e-mail accounts active. There will be both college and class announcements sent out to these accounts. The instructor may also use Canvas website (available through RCNJ Intranet page) for electronic communication, such as emailing the class, posting course files, etc. Contact [helpdesk@ramapo.edu](mailto:helpdesk@ramapo.edu) or 201-684-7777 for technology-related issues.

**Policy on Academic Integrity:** Students are expected to read and understand Ramapo College's academic integrity policy, which can be found online in the *College Catalog* or at <https://www.ramapo.edu/provost/policy/academic-integrity/>. Members of the Ramapo College community are expected to be honest. Students who are suspected of violating this policy will be required to meet with the faculty member and/or will be referred to the Office of the Provost.

**Students with Disabilities:** If a student needs course adaptation or accommodations because of a disability that has been documented with the Office of Specialized Services (OSS), the student should contact their professor.

**Tentative Course Schedule:**

Lecture #	Sections Covered	Lecture #	Sections Covered
1	1.1	15	6.2
2	1.3, 1.4, 2.1, 2.2	16	6.2, 7.1
3	2.2, 3.1	17	7.1, 7.2
4	3.1, 3.2	18	7.2, 8.1
5	3.2, 3.3	19	8.1, 9.2
6	3.3, 3.4, 5.1	20	9.2
7	5.1	21	9.2, 10.1 / Review
8	5.1, 5.2	22	Exam II
9	5.4, 5.3	23	10.3
10	5.3, 5.5	24	10.3
11	5.5 / Review	25	4.1, 4.2
12	Exam I	26	3.5, 7.4
13	5.5, 6.1	27	8.2, 9.1, 10.2 / Catch up / Review
14	6.1	28	8.2, 9.1, 10.2 / Catch up / Review
		Final Exam	Cumulative final exam

**College Closings:** For college closings and special announcements call (201) 236-2902 or sign up for "Alert Me Now". Labor Day: no classes Monday, September 1<sup>st</sup>. Thanksgiving Break: no classes from Wednesday November 26<sup>th</sup> to Sunday November 30<sup>th</sup>.

**School of Theoretical and Applied Science Office:** Location ASB 422, Tel. (201) 684-7734.

**Course grading scale:** 100%-93% A, 92%-90% A-, 89%-87% B+, 86%-83% B, 82%-80% B-, 79%-77% C+, 76%-73% C, 72%-70% C-, 69%-67% D+, 66%-60% D, 59%-0% F.

**Homework (with Course Outline):**

Note: Problems numbered H0 through H10 will be provided by the instructor on the Homework Handouts.

Chapter 1: Data Collection

- 1.1 Introduction to Statistics # 1abcfgh,2,11,13,15,17,19,21,23,25,35,37,58, H0 part a) on handout
- 1.3 Simple Random Sampling # 2,3,4,5,9b,13
- 1.4 Other Effective Sampling Methods # 11,15,21

## Chapter 2: Organizing and Summarizing Data

- 2.1 Organizing Qualitative Data # 13
- 2.2 Organizing Quantitative Data # 21bfh,22,23abcde,25abc,31

## Chapter 3: Numerically Summarizing Data

- 1.1 Introduction to Statistics # 1de,3,4,5,H0 part b)
- 3.1 Measures of Center # 1,2,3,4,7,9,13 (mean & median only),15,17,19,21a,24, 27(use class width 5), 50acde
- 3.2 Measures of Dispersion # 1,3,5,7,9,11,15,16,21a,23,31,32,33,45,54
- 3.3 Weighted Mean # 9,10,11
- 3.4 Measures of Position # 7,8,10,16,17a,21a,37, H1

## Chapter 5: Probability

- 5.1 Probability Rules #1,3,5,6,7,11,12, H0 parts c)d)e)f),14,15,16,20,21,23a (in the sample), 25a (in the sample), 25b,27,39, 40,41,46,59
- 5.2 The Addition Rule and Complements # 1,2,3,5,7 (hint for part 3: classical method),9,11 (hint for part 2: classical method) ,13,15,17,19,21,23,25,31,33,34,35
- 5.3 Independence and the Multiplic. Rule # 1,2,3,4,5,6,9,11,15,17,18
- 5.4 Conditional Prob. & Gen. Multiplic. # 1,2,3,5,7,9,11,13,15,17,19,21,29 (no trees),31,32,41,42
- 5.5 Counting #5,7,9,19,21,23,25,29,31,33,41,43,44,51,53,59,61,62

## Chapter 6: Discrete Probability Distributions

- 6.1 Discrete Random Variables # 1,3,7ab,9,11,13,18, H2a),19,H2b),21,H2c),25,30,31a (hint: if the ball lands on 17, the player also gets the \$5 bet back), H2d),34
- 6.2 Binomial Distr. #1,2,3,5,7,9 (use  $p=0.90$ ),11,12,13,17,19,23,24,25,26,29,H2e),31,H2f)g)h),35,36,37,38,43ab,44ab,58,59

## Chapter 7: The Normal Probability Distribution (and other Continuous Probability Distributions)

- 7.1 Properties of the Normal Distr. #1,4,5,6,7,8,11a,12a,16,21,22,23,25,27,29,31,H3,H4,H5,H6,H7
- 7.2 Applications of the Normal Distr. # 1,2,4,5ac,7ac,9a,13,14,15,16,17,18,19,21,35,37,38,39abcd,43ab,47,49ab,50,51,57,H8

## Chapter 8: Sampling Distributions

- 8.1 Distribution of the Sample Mean # 1,2,3,7,8,9,15,17,19abcd,21ab,25,29abc,31abcde,37,38,40

## Chapter 9: Estimating the Value of a Parameter Using Confidence Intervals

- 9.2 Confidence Intervals for Population Mean # 1,2,17,25,27abc,28ac(use Z-distribution),30(use Z-distrib.),31,H9

## Chapter 10: Hypothesis Testing Regarding a Parameter

- 10.1 The Language of Hypothesis Testing # 1bc,3,5,7,8,9,13bcd,17bcd,19bcd
- 10.3 Hypothesis Testing for a Population Mean # 3,4,10abcde,14,15,17,25

## Chapter 4: Describing The Relation Between Two Variables

- 4.1 Scatter Diagrams and Correlation # 1,4,9,10,11,13,14,17,18,21,29abcd,38abcd,51,52,56  
 4.2 Least-Squares Regression # 2,5,18ac,19aceg (skip residuals in e),23adf  
 3.5 Boxplots #1,2,3,4,5,6,9,11

### ----- If time permits: -----

#### Normal Approximation to the Binomial:

- 7.4 Normal Approximation to the Binomial # H2 g)h),1,H10,21,22,24

#### Estimating Population Proportion:

- 8.2 Distribution of the Sample Proportion # 1,2,5,7,11,15cde,17  
 9.1 Confidence Intervals about a Population Proportion # 17,25,27abcd  
 10.2 Hypothesis Testing for a Population Proportion # 7,8,11,15,20,21

### Suggested examples to read from the text:

Sec.#	Objectives/Subsections	Suggested examples to read from the text:
1.1	1,2,3,4	1,2,3,4,5
1.3	1	2,3
1.4	1,2	1,2
2.1	1,2,3	1,2,3,6
2.2	1,2,3,4,5,6	1,2,3,4,6,7
1.1	2	1
3.1	1,2,3,4	1,2,3,4,5,6,7
3.2	1,2,3,4	1,2,3,4,5,7,8
3.3	2	2
3.4	1,2,3	1,2, "Computing Percentiles & Quartiles" and H1 on HW Handout
5.1	1,2,3	1,2,3,5,6,7
5.2	1,2,3	2,3,5
5.3	1,2,3	2,3,4
5.4	1,2	1,2,3,4,5,6
5.5	1,3,5	1,2,3,4,7,8,9,12,13
6.1	1,2,3,4,5,6	1,2,3,4,5,6,7,8
6.2	1,2,3,4	1,2,3,5,6, Problem H2 e) on HW Handout
7.1	1,2,3,4	1,2,3,4, Problem H7 on HW Handout
7.2	1,2	1,2,3,4,5 *
8.1	1,2	1,2,3,4,5
9.2	1,2,3,4	1,2,3,4, also pages 421-425 **
10.1	1,2	2,3
10.3	1,2	1,2,3 **
4.1	1,2,3	1,2,3
4.2	1	2,3
3.5	1,2	1,2,3
7.4	1	1,2, Problem H10 on HW Handout
8.2	1,2	1,2,3,4
9.1	1,2	1,2,3,4
10.2	1,2	1,2
		* In this course, any exercises in sections 7.2 - 10.3 requiring normal distribution calculations should be done using a graphing calculator and not Table V. **In sections 9.2 and 10.3, we'll only cover examples where population is known to be normally distributed or where $n$ is large. So normality verification (first introduced in section 7.3) should be omitted.