



## Science and Mathematics Department

**Course Title, Number and Section:** Statistics, Math 220-3

**Catalog Description, Credit Hours:**

Using technology and real-world data, this course explores descriptive and inferential statistics in preparation for research in various fields of study. A TI-83 graphing calculator or equivalent may be required. This course partially fulfills the knowledge (natural science) outcome or partially fulfills the thinking outcome, and fulfills the university mathematics proficiency requirement. 3 credits.

**Prerequisite/s:** Math 090 or equivalent or appropriate placement

**Semester:** Spring 2022  
**Time/Place:** Mondays and Wednesdays. 11:00 – 12:15 PM. Lower Level Library – LTC 1.  
**Instructor:** Dr. O'Neill Kingston (Ph.D.)  
**Office:** EKH 215  
**Contact:** MS 1725, Teams @O'Neill Kingston, 563-588-6395  
**Email:** oneill.kingston@clarke.edu  
**Student Hours:** MW 1:30-2:20, TTh 11:00-11:50

Giving your brain permission to grow sometimes can give you headaches. Student hours are there to help material make sense and help headaches go away. (MARC coaches can help with this also.) Quick caveat, we are all good at twisting questions around. Trust us, this process is designed with brain growth in mind. Knowing 42 is the answer, does not actually help you if that is all you know. Your grade in this class will be determined by successfully claiming “stones” that will be defined later. For now, know there is a weekly limit to the number of stones you can claim outside of student hours. As an incentive to come to student hours, any stones demonstrated sufficiently during student hours will be credited toward a student’s grade but not count against the weekly stone claiming limit.

**Required Text:** OpenStax Introductory Statistics (S. Dean, B. Illowsky, ISBN-10 1938168208)  
(Free web version: <https://openstax.org/books/introductory-statistics/pages/1-introduction>)

Textbooks can be ordered through Clarke University’s Online Bookstore. You can select from new, used, eBook, and rental options. It is recommended that you order your textbooks 2-3 weeks before the term begins. For more information about ordering textbooks, digital textbooks, or the Bookstore Charge Program, please visit the [Online Bookstore](#). The Customer Experience Team works year-round with 24/7 support at the beginning of every spring and fall term. Visit [Clarke.TextbookX.com/help](https://Clarke.TextbookX.com/help) to use the dynamic help tool, send an email, or call the help line at 1-855-790-6381.

**Required Materials/Equipment:**

- A laptop/tablet
- A personal Google account you can use from any computer.

**Access to Online Materials**

Course content, assignments, and activities are available online through Moodle, Clarke's course management system. The following steps will help you access your course:

1. Access the [Moodle login page](#).
2. Enter your Clarke username and password. (e.g., username = jane\_doe@clarke.edu).
3. Click on the **Log in** button. After logging in, you will see a list of your current courses. To access a particular class, simply click on the course title.

You will also need access to MS Teams.

**Clarke University Mission**

Clarke University is a Catholic academic community that believes learning is lifelong and life changing. We inspire intellectual curiosity, cultural engagement, professional preparedness, spiritual exploration, and a commitment to contributing to the common good in a global society.

**Course Goals and Statement connecting goals to the Clarke University Mission:**

If you actively participate in all aspects of this course, then we promise you will grow in your ability to think and reason using data as evidence. You will learn how to

- collect, organize, and explore data
- use data to learn about large populations
- read, interpret, and understand what others do with statistics
- use a statistical approach to answer your own questions.

We will encounter a broad and rich collection of fields that use statistical thinking. Health and wellness, sports performance, sports strategy, advertising, marketing, scientific experiments, credit ratings and risk, discrimination in housing or the workplace, and social media use are just a few examples where data sciences provide valuable understanding. To be effective citizens in today's world, we need to be shrewd consumers of statistics and statistical information.

This course is designed to partially fulfill the thinking outcome of the Clarke Compass.

**Clarke Compass Outcomes**

Clarke's Compass helps students navigate their own personal and professional growth, leading toward success in the contemporary world. The student learning outcomes are grounded in a Catholic vision of education, particularly as we express it in the BVM Core Values of freedom, education, charity, and justice. The common good serves as an important unifying theme.

The Compass outcomes integrate the liberal arts, essential academic and professional skills, experiential learning, and major courses of study in order to prepare students for whatever awaits them.

To view the Compass outcomes, please see the Clarke Academic Catalog that aligns with your program evaluation <https://www.clarke.edu/academics/academic-resources/> .

### **Course Outcomes and Assessments:**

Your grade in this class will be determined by what you have demonstrated you can do. We call these accomplishments stepping stones. Claim a stepping stone by 1) demonstrating you can do the task and 2) determining which outcome it goes with.

You are permitted to claim no more than five stepping stones per week for yourself. You are encouraged to advocate for your peers and may claim one stepping stone per week for a peer. You can support the common good by distributing these advocate claims among everyone in the class. Every fourth module is a comprehensive claim event where you can claim past stepping stones for a second outcome in addition to the originally claimed outcome.

These are the eleven course outcomes. All of these outcomes support the Compass *Thinking* outcome. As passing this class requires fulfilling the course outcomes, passing this class also will pursue the Compass *Thinking* outcome.

Students will:

- CG .....Relate statistical ideas to the common good.
- PB.....Demonstrate professional behavior.
- LT .....Use the language and terminology of statistics correctly, in speaking and writing.
- CT.....Demonstrate critical thinking in a statistical context.
- TECH . Utilize software to organize, present, interpret, and test data.
- FIS ..... Demonstrate understanding of the fundamental ideas of sampling from large populations.
- NGE ... Explore data numerically and graphically using appropriate tools.
- OES ... Explain the difference between observational and experimental studies, and the connection to causality.
- PND ... Interpret probability models for normal distributions.
- CI ..... Construct and interpret confidence intervals.
- ST ..... Interpret results of significance tests for one- and two-sample hypotheses.

This course is designed to partially fulfill the *Thinking* outcome of Compass. As a result, in order to receive credit for the *Thinking* outcome, students must complete a majority of the required coursework associated with the *Thinking* outcome.

### **Any other general remarks, narrative about this course**

Be prepared to think outside of the box. This class will require you to maintain active communication with me and with your peers. Working together in support of the common good, everyone will succeed. My contact information is at the front of the syllabus for the express purpose of making it easier for you to contact me. If you are brave enough to tell me what you know, your brain will thank you by growing.

### **Campus Climate for Diversity, Equity, and Inclusion**

Clarke University is committed to fostering a welcoming campus community that celebrates the unique contributions of each person and promotes an inclusive learning environment. To promote our core value of justice for the common good, we strive to respect diversity, practice inclusion, and seek equity. We all benefit from a diverse learning environment and the sharing of differences in ideas, experiences, and beliefs. Dimensions of diversity can include sex, race, age, national origin, ethnicity, gender identity and expression, intellectual and physical ability, sexual orientation, income, socio-economic class, faith and non-faith beliefs, religion, political affiliation, ideology, educational background, linguistic background, family or marital status, military experience, and geographic identity. Clarke University expects students, faculty, and staff to respect the individual intersection of these experiences and characteristics in our community and our classrooms.

Clarke University is in the Bee Branch Watershed. Our waters drain to the Bee Branch Creek and then to the Mississippi River. As our interactions with the watershed combine to affect the river, our interactions with each other combine to affect the Clarke community. **As we make efforts to not pollute the land in which we live, let us also make efforts to not pollute each other.** Be kind. Be respectful. Be open-minded. We come from a variety of places and mindsets. Communication and respect are key to our mutual success. Speak up in whatever way makes sense to you if you see or experience pollution in our community. ***If I have unwittingly done harm, please find a way to let me know. I would rather learn than continue to cause someone pain.***

If you witness or experience an act that undermines these commitments to diversity, equity, and inclusion at Clarke University, you should submit a bias incident report online <https://www.clarke.edu/campus-life/culture-inclusion/bias-incident-report/>.

### **CLASS ATTENDANCE POLICY**

As our class meetings will be centered around team activities, attendance is mandatory. This is your primary opportunity to demonstrate to me that you are learning and hence earn your grade. Any student who is healthy is expected to be in class. Any student in quarantine who is able to participate online is expected to do so. With an eye toward the common good, your peers (myself included) are expected to support you in your time of need as you would support us.

Clarke University's class attendance policy is consistent with the institution's focus on students as key contributors to the learning that takes place in each class. Students are expected to attend all classes and must be present during finals week. However, Clarke University recognizes that students may sometimes need to miss class.

Clarke University recognizes four types of absences – Officially Excused Absences, Instructor-Excused Absences, Approved Absences, and Unexcused Absences.

#### ***Instructor-Excused Absences***

##### **Definition**

Instructor-excused absences are handled between the student and the instructor. Each course syllabus outlines the expectations for attendance, which may vary among different instructors and classes.

Examples of absences that may be excused by an instructor include missed classes due to a family commitment, severe weather conditions, or a death in the student's extended family.

Vacations, late arrivals, or early departures before summer, winter, or other breaks do not constitute excused absences.

#### Policy

Students who need this type of excuse are expected to personally inform the instructor in advance of the absence when possible. Instructors may ask for documentation and will use their judgement as to whether to excuse the absence or not. Instructors may allow students to makeup the missed material; they may assign appropriate substitute material, disregard the missed assignment, or make a similar arrangement. Instructors may require students to submit scheduled assignments or complete quizzes or exams before the missed class.

### ***Officially Excused Absences***

#### Definition

Officially excused absences occur when an unexpected event or a situation beyond the student's control prevents a student from attending class. In these situations, the Academic Affairs Office assists students by directly notifying their instructors of the excused nature of the absence.

Examples of officially excused absences include significant illness or injury that requires hospitalization, or a death in the immediate family.

#### Policy

Officially excused absences require the student to provide appropriate documentation to the Academic Affairs Office in advance of the absence, when possible, or as soon as the student returns to the university. The Academic Affairs Office then contacts the student's instructors. Instructors will accommodate these students by allowing them to submit late work or make up missed assignments or exams.

### ***Approved Absences***

#### Definition

Approved absences are scheduled, university-sponsored events in which students serve as representatives of the university.

Examples of approved absences include musical performances, academic conferences, and athletic competitions. Approved absences do not include practices or rehearsals.

#### Policy

Approved absences require the student to personally inform the instructor in advance of the planned absence. This notice must be given no later than one week before the anticipated absence. When unforeseen circumstances prevent this advance notification, the student must make every effort to communicate with the instructor as soon as possible. Instructors will use their discretion in making reasonable accommodations to minimize the disruption to the student's educational experience. These accommodations may include requiring that the student complete substitute assignments for experiences that happen in class. When possible, instructors may require that scheduled assignments, quizzes or exams be completed prior to the absence. Students bear the responsibility for all missed class material.

## ***Unexcused Absences***

### Definition

Absences which are not approved or excused will be considered unexcused.

### Policy

Faculty members are under no obligation to allow students to complete work missed from unexcused absences. Course syllabi may outline attendance policies that result in a penalty that may affect course grades.

### **Policies on missed opportunities (late work, etc.):**

There is a weekly deadline for stone claims. Any attempts to claim stones after these deadline will not be accepted for that week.

### **Grading Scale and Standards**

Your grade in this class will be determined by what you have demonstrated you can do. We call these accomplishments stepping stones. Claim a stepping stone by 1) demonstrating you can do the task and 2) determining which outcome it goes with. There are 55 possible stepping stones you can earn in this class. A sheet with default outcomes for each stepping stone is available on Moodle. Each grade level requires a certain number of stepping stones earned paired with certain conditions on stepping stone distributions across course outcomes.

As you earn stones and confirm them as earned in the Moodle gradebook, you can track your progress in a chart like this. To pass the class, you need 27 stepping stones with at least one stepping stone in each outcome. With the 27 stone minimum requirement, it makes most sense to start by shooting for a C. This entails filling both the D- level and C- level columns with stones (any stones will do – just distribute them across the outcomes) and putting the remaining five stones required to get to 27 stones total in the B- level column. (Sales pitch: At that point, you may as well earn three more stones and upgrade the 27 stone C to a 30 stone C+.)

	D- level	C- level	B- level	A- level	Summit level
CG					
PB					
LT					
CT					
TECH					
FIS					
NGE					
OES					
PND					
CI					
ST					

HINT: Don't write the stones in pen until you've confirmed they are credited in Moodle.

Level of Ascent (Your final grade)	Minimum Stepping Stones Needed	Minimum number of stepping stones per outcome	Number of outcomes requiring at least one more than the minimum.
Base Camp	0	0	0
D-	27	1	0
D	27	1	4
D+	27	1	8
C-	27	2	0
C	27	2	4
C+	30	2	8
B-	33	3	0
B	37	3	4
B+	41	3	8
A-	44	4	0
A	48	4	4
Summit	55	4	4

### Reading the Table

When you have earned **27** stepping stones **AND** you have distributed them such that each of the eleven course outcomes has **at least two** stepping stones, then you have earned a **C-**.  
 When you have earned **27** stepping stones **AND** you have distributed them such that each of the eleven course outcomes has **at least two** stepping stones **AND** at least *four* of those eleven have **at least three** stepping stones, then you've earned a **C**.  
 When you have earned **30** stepping stones **AND** you have distributed them such that each of the eleven course outcomes has **at least two** stepping stones **AND** at least *eight* of those eleven have **at least three** stepping stones, then you've earned a **C+**.

### Stepping Stone Progress

Everyone starts at base camp with a clean slate for learning and claiming. Students have access to submitting 5 stone claims each week. At an average claim rate of 3 stones per week, a student can finish the semester with an A. Claiming stones at a 3 one week, 2 the next week pattern, a student can finish the semester with a B and be very close to a B+. In addition to claiming stones for yourself, you are encouraged to advocate for your peers and may claim five stepping stone per week for your peers. You can support the common good by distributing these advocate claims among everyone in the class.

The limit to the number of weekly claims is driven by time required to process the claims. There may occasionally be weeks where my schedule is light enough that I could go over the limit and will let you know that extra claims are possible. Typically, you may not go over the five per week limit. As an incentive to come to student hours, any stones demonstrated sufficiently during student hours will be credited toward a student's grade but not count against the weekly stone claiming limit.

### MARC COACHES

In the 2019-2020 academic year, the MARC served almost 70% of Clarke's student population through roughly 5000 online meetings. In other words, it's cool to seek assistance at the MARC! Coaches for Statistics are students who have taken the class before and have succeeded. They can help with all aspects of the course, from understanding the statistical concepts and getting

your Colab to do what you want to understanding what stepping stones are and how you can claim them strategically. When in doubt, supplement your student hours visits with MARC coach meetings as a first resort.

### Planning for Midterm Grades

When midterm approaches, you will be asked to submit your proposal for finishing the semester and earning your desired grade. If your proposal seems plausible, your midterm grade will be entered as your proposed final grade. Your grade proposal will be assessed using Clarke's Thinking Rubric.

### **Academic Support Services**

Academic support is available in the library for all students by appointment or drop in. Providers include:

- Reference Librarians available for research consultation and assistance. [library@clarke.edu](mailto:library@clarke.edu), (563)588-6320
- the MARC (Margaret Mann Academic Resource Center), 2<sup>nd</sup> floor, Room 228, (563)588-8133
  - Professional staff who support writing across the curriculum, time-management, learning and study strategies, note-taking, college reading strategies, and ELL assistance.
  - One-on-one work with trained peer coaches for writing, skills, and course content
  - Course specific study groups and SWAG (Study With a Guide) sessions
  - Assistance for students with disabilities requesting accommodations

### **Accommodation Services**

Any student with a ADHD, mental or physical health, mobility, or learning disability may be eligible for reasonable accommodations. To determine eligibility, discuss options, and arrange services, students should contact the Disability Services Coordinator (DSC) at their first opportunity. The DSC is located in the MARC on the second floor of the Library. Contact (563)588-8107 or [marianne.mauss@clarke.edu](mailto:marianne.mauss@clarke.edu).

### **Statement on Academic Integrity Policy**

#### **Academic Federal Government Policy**

Academic credit is awarded based on student achievement resulting from instruction and out-of-class student work. For every credit received in a semester (fifteen weeks or the equivalent), the undergraduate student should expect to participate in at least one hour of direct instruction (face-to-face or online) and to complete a minimum of two additional hours of student work per week. The Federal government requires this minimum standard for instruction and corresponding student work be used in awarding Federal financial aid (34 CFR 600.2). For every graduate credit received in a semester (fifteen weeks or the equivalent), the student should expect to participate in at least one hour of direct instruction (face-to-face or online) and to complete a minimum of three additional hours of student work per week.

Example:

- A three-credit hour undergraduate course would require a minimum of 9 hours of student work (instruction and homework) weekly.



**Disclaimer -Dates May Change:**

Due to class accommodation scheduled dates for assignments, tests, projects and products may change. Assignments are subject to revision dependent upon the progress of the class.

**Sample Course Schedule**

Schedule and assignments are subject to the pace and quality of student learning.

Any changes in schedule or assignments will be announced in class.

<b>Weeks</b>	<b>Module</b>	<b>TOPICS</b>	<b>THEMES</b>
1-4	1	Sampling and Data	Implicit and Explicit Bias
	2	Descriptive Statistics	Adulting and Hard Conversations
	3	Data Science, Regression, and Correlation	Black History Month
5	4	Comprehensive Claim	Apply What You Know
7-10	5	Normal Distributions	Wealth Inequality
	6	Confidence Intervals I	Writing History
	7	Confidence Intervals II	Cultural Appropriation
11	8	Comprehensive Claim	Apply What You Know
12-15	9	Significance Testing I	Climate History
	10	Significance Testing II	Climate Present
	11	Chi Squared Testing	Climate Future
16	12	Comprehensive Claim	Apply What You Know