Moravian College
Math 107B – Elementary Statistics
Fall 2015

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Course Materials – *Introduction to Statistics and Data Analysis, Fifth Edition* by Peck, Olsen, and Devore, 2016.
Calculator: The TI 83+ or TI 84+ calculator is recommended and will be used for presentations, but any comparable graphing calculator with which the student is familiar with is acceptable. Please refrain from using your cell phone or smartphone during class. NOTE: for all tests and quizzes electronic devices (cell phones, smartphones, laptops, iPads, etc.) must be away and are NOT permitted to be used.

Course Goals – Each student will

- have an understanding of how data is collected and gain experience collecting their own data sets.
- be able to effectively summarize data using graphical displays and interpret data as well as draw conclusions based on graphical displays of data.
- understand that the purpose of collecting and analyzing data is to answer questions and make informed decisions.
- understand the role of probability and uncertainty in data analysis.
- be able to explain clearly, both orally and in writing, how the results of statistical analyses relate to the context from which they were obtained.
- learn to think critically about data and the results of data analyses that occur in their everyday lives.

Class Participation and Attendance – Regular and active class attendance and participation is expected of all students and necessary in order to be most successful. You are responsible for all material assigned or covered in class. If you do miss a class for any reason, it is your responsibility to keep on track and up to date with class topics. You should see a classmate or the instructor for notes, homework assignments, and any announcements from class. Attendance will be taken during each class meeting.

Behaviors that will negatively affect your class participation grade:

- poor attendance (including absences, lates, and leaving during class)
- using cell phones or other devices during instructional time

Behaviors that will positively affect your class participation grade:

- coming to class, and being on time!
- asking questions
- answering questions
- actively working on any in-class assignments

Student Expectations – Students should be spending approximately ten hours per week outside of scheduled class times on assigned reading and exercises, completing graded problem sets and studying for quizzes and tests.

Evaluation and Grading – Practice is vital for developing the required Calculus skills. All given assignments are designed to give students opportunities to practice using all of the concepts presented in class.

Final grades will be computed based on the weights below*.

- Class Participation (5%)
- Culture Points (5%)
- Activities/Projects (15%)
- Graded Homework (5%)
- Quizzes (5%)
- Tests (45%)
- Cumulative final exam (20%)

Final grades will be based on the following rubric.

Average	Grade
$x \geq 92$	A
$90 \leq x < 92$	A-
$88 \leq x < 90$	B+
$82 \leq x < 88$	B
$80 \leq x < 82$	B-
$78 \leq x < 80$	C+
$72 \leq x < 78$	C
$70 \leq x < 72$	C-
$68 \leq x < 70$	D+
$62 \leq x < 68$	D
$60 \leq x < 62$	D-
$x < 60$	F

Homework – Working together: When faced with difficulty in mathematics, it helps to work through problem with a colleague. I welcome and encourage you to work with friends, tutors and myself in working through completing homework assignments. When you work through the problems connected with each reading, you are welcome and encouraged to work with your friends and classmates. Feel free to exchange ideas as your work through the problems. HOWEVER: when writing your homework response, you must work on your own. The final response you write on your homework should be yours and yours alone. I recommend that while you may complete the scratch work for all of your homework with a classmate, you should write the final copy of your homework when you are alone. Ultimately, YOU are responsible for understanding how to find a solution to each assigned problem.

It is necessary that students do all homework exercises assigned. In addition to the daily assignments (not graded) there will be graded homework assignments approximately every two weeks. **These assignments will be graded with a 10% penalty for each day that they are late and will only be accepted up to one week late.**

Activities/Projects – Often group activities and projects will be completed in class. If you are absent, you will not get credit for that group activity or project.

Quizzes – Approximately one quiz will be given per week. Each quiz will be announced. **There will be absolutely NO makeups.** The lowest quiz score will be dropped.

Tests – We will have three in class tests. If you will miss an test (with an approved excuse), you must notify me **PRIOR TO** the test. You will then be given a suitable (corresponding to the time beyond the test date) but more difficult test. Extenuating circumstances will be taken into account (with appropriate documentation).

Final Exams – The final exam will be cumulative. Please mark when your final exam is on your calendar and plan accordingly. The final exam is scheduled for Wednesday, December 16 at 8:30am.

Disclaimers – This syllabus is subject to change through the semester. Any updates to the syllabus will be announced in class. The instructor reserves the right to apply qualitative judgment in determining final grades for the course.

Learning Disability Accommodations – Students who wish to request accommodations in this class for a disability must contact Ms. Elaine Mara, assistant director of academic support services for academic and disability support, at the lower level of Monocacy Hall, or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Mathematics Department Academic Honesty Policy – The Mathematics Department supports and is governed by the Academic Honesty Policy of Moravian College as stated in the Moravian College Student Handbook. The following statements will help clarify the policies of members of the Mathematics Department faculty.

In all at-home assignments which are to be graded, you may use your class notes and any books or library sources. **When you use the ideas or thoughts of others, however, you must acknowledge the source. You also may not use a solution manual** or the help (orally or in written form) of any individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources, you will be violating the Academic Honesty Policy of Moravian College. **You may work with your fellow students on homework which is not to be graded. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and un-graded.**

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by your instructor for a particular test

Culture Points

> The mathematician's patterns, like the painter's or the poet's must be beautiful; the ideas, like the colours or the words must fit together in a harmonious way. Beauty is the first test: there is no permanent place in this world for ugly mathematics.
>
> *G. H. Hardy*

> To those who do not know mathematics it is difficult to get across a real feeling as to the beauty, the deepest beauty, of nature ... If you want to learn about nature, to appreciate nature, it is necessary to understand the language that she speaks in.
>
> *Richard Feynman*

One goal for this class is to provide some perspective of mathematics, and the role it plays in our modern world. Whether you plan to be a mathematician, a scientist, or simply a well-rounded liberal arts graduate, it is important to be aware of the role and nature of mathematics today. To help meet this goal, I am asking you to participate in "mathematical cultural awareness." There are no specific assignments for this portion of the course. Rather, there are many opportunities for you to explore mathematics in our culture. Activities that foster cultural awareness include (but are not limited to): attending talks, discussing a mathematical topic with a fellow student or professor, giving a talk, reading a paper, or solving a problem.

Basic overview of culture points

Culture points activities will account for 5% of your final course grade. **To get full credit for this activity, you must accrue 15 points by the end of the semester**. You gain points by attending seminars, colloquia or other talks; discussing mathematics outside class; reading articles; giving presentations; solving problems.

To get credit for an event, you will need to submit a short write-up for the event. This write-up will have two portions: (1) a short description of the event and (2) a reflection on the impact of that event on your own understanding of mathematics.

Points will be given based both on the quality of the event and the quality of the submission. The following sections provide details on this activity.

Culture point activities

This list below is not comprehensive – it is meant to illustrate some possible activities and to provide a calibration for how many culture points different activities might provide. Note that the actual number of culture points you get will vary depending on the quality of your particular write-up.

- Attend an ϵ-talk (3 points). These short (10 to 15 minute) talks are given weekly as part of the Math Society's regular meetings.
- Attend a Math/CS colloquium (4 points).
- Attend a colloquium or conference off-campus (5 to 10 points). There are many opportunities to attend conferences throughout the valley, such as at Lafayette or Lehigh.
- Review an article on mathematics (3 to 5 points). I have attached a listing of places to look for articles, as well how many points you might get for different articles. Also look to sources such as the *New York Times*, the *Washington Post*, or PBS for mathematics in the news.
- Discuss a mathematical topic with someone outside the class (2 to 4 points) – this could be with roommates, teammates, family members, other professors. You can discuss a mathematical topic from the course or some other mathematical topic.
- Find mathematics in popular culture (2 to 4 points) – movies such as `A Beautiful Mind`, or references in *The Simpsons*. One source is *mathgoespop.com*. Also look for mathematics in the creation of movies by Pixar, LucasFilms or Dreamworks.
- Work on a problem outside the scope of the classroom (4 to 10 points). You might solve an interesting exercise or simply work on an interesting problem without quite reaching a solution.

Rules for submission

Your culture point write-up must be neat and well-written (complete sentences, paragraph structure, etc.). I prefer your submissions to be typed, but I will accept hand-written submissions – particularly if there is a great deal of mathematical notation. For each submission, keep in mind that there are two portions:

1. **Summary of the event:** This section of the write-up should constitute no more than 50% of your submission. Summarize the talk, conversation, article, or event. If you were working on a problem, discuss *how* you approached the problem and whether you were able to arrive at a satisfactory answer (provide the actual solution or work on the problem on an attached page).
2. **Reflection on the event:** How does the event affect your understanding of mathematics and mathematicians? Do you have a greater appreciation of the role of mathematics in society or the nature of mathematical research? Does the event connect with the mathematics you've learned in this course (or any of your other mathematics courses)? If you worked on a problem, explain how your work on that problem has influenced the way you solve problems or your understanding of the mathematics involved.

Be sure to clearly state what the involved event was. If you watched an episode of a series, be sure to include the name of the episode as well as the name of the series. If you read an article, include a full citation of the article (do NOT include a copy of the article itself). If you attended a talk or seminar, include the name of the talk and of the speaker.

Miscellaneous rules

- You may make at most one culture point submission per week.
- At least one culture point submission needs to based on a talk, colloquium or seminar. At least one culture point submission needs to be based on an article or reading.
- Culture point submissions that do not follow the above rules (particularly regarding neatness and making full citations) will be penalized or rejected.
- Culture points above the required number will be used as "extra credit" – how extra culture points translate to bonus points on the final grade will be determined at the end of the semester.

Places to go for articles and other writings

Books and Journals

- (3 to 5 points) – mathematical articles from popular journals such as *Popular Science*, *Scientific American*, or *National Geographic*
- (3 to 5 points) – teaching-oriented journals such as *Mathematics Teacher* or *Mathematics Teaching*
- (4 to 5 points) – articles from journals such as *American Mathematical Monthly*, *The College Mathematics Journal*, *Mathematics Magazine*, or *PME Monthly*. Many of these journals can be found in JSTOR and are available both in Reeves and the Mathematics library.
- (3 to 5 points) – many books provide terrific insight to the nature of mathematics. Pick a chapter of almost any of the general mathematics books by Martin Gardner, Ian Stewart, Sherman Stein, or Keith Devlin.

There are many other interesting articles out there – look through some of the search engines available through Reeves to discover articles on your own. You can also search `http://scholar.google.com` or `http://www.scholarpedia.org` for articles.

Math in the news

Look through the newspapers, especially the *New York Times*, the *Chicago Tribune* and other major newspapers for articles on mathematics in modern culture.

You can also find mathematics on the History Channel, the Discovery Channel, or PBS.

Consider almost any topic: the war in Iraq, football, jazz music, security at the airports, global warming, sinkholes, overpopulation, Windows Vista, poker. If you search through the web facilities available in Reeves, you can find an article connecting your favorite activity to mathematics.

Web Resources

Below are just a few links to mathematical articles (and a rough indication of their point value)

- `http://www.maa.org` (2 to 6 points)

  There is a host of columns here – all quite readable. Be sure to look through the archives to find articles of particular interest.

- `http://www.americanscientist.org` (2 to 4 points)

  While most articles are more for the sciences, there are a few mathematics articles that get thrown in. Two of the more recent articles are *Unwed Numbers: The Mathematics of Sudoku, a puzzle that boasts "No math required!"* and *Group Theory in the Bedroom: An insomniac's guide to the curious mathematics of mattress flipping.*

- `http://www.cut-the-knot.org` (4 points)

  Lots of interesting mathematical tid-bits, most of which include an interactive applet for you to experiment with.

- `http://plus.maths.org/` (4 to 5 points)

  An on-line magazine devoted almost exclusively to questions in the mathematical sciences.

Below are a few links to blogs hosted by professional mathematicians where interesting mathematical musings can be found (2 to 4 points)

- *What's New* by Terence Tao, `http://terrytao.wordpress.com/`
- *Not Even Wrong* by Peter Woit, `http://www.math.columbia.edu/ woit/wordpress/`