

# MTH203 (3 units) Introduction to Statistics

|                  |                  |                    |                  |                 |
|------------------|------------------|--------------------|------------------|-----------------|
| <b>Sec 1: W</b>  | <b>1:00-2:15</b> | <b>Help Lab: M</b> | <b>1:00-2:15</b> | <b>LBRT 201</b> |
| <b>Sec 2: F</b>  | <b>1:00-2:15</b> | <b>Help Lab: M</b> | <b>1:00-2:15</b> | <b>LBRT 201</b> |
| <b>Sec 3: Th</b> | <b>1:00-2:15</b> | <b>Help Lab: T</b> | <b>1:45-2:15</b> | <b>LBRT 201</b> |
| <b>Sec 4: Th</b> | <b>2:30-3:45</b> | <b>Help Lab: T</b> | <b>2:30-3:00</b> | <b>LBRT 201</b> |

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| Instructors:      | Ryan Botts, Ph.D.  | Greg Crow  |
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| Phone:            | 619.849.2968   | 619.849.2604   |
| Office:           | RS228  | RS220  |
| Office Hours:     | Posted in Canvas   | Posted in Canvas   |
| Online Materials: | Statistical Reasoning<br>from Acrobatiq,<br>(Through Canvas, \$50) | Statistical Software:<br>SPSS, Excel, or R                   |

## Catalog Description

MTH 203 (3 Units) Introduction to Statistics

A first course in statistics for the general student. Description of sample data, probability theory, theoretical frequency distributions, sampling, estimation, and hypothesis testing. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 099 (or equivalent).

## Learning Outcomes

- Students will be able to apply their technical knowledge to solve problems.
- Students will be able to compute measures of central tendency for data.
- Students will be able to compute measures of dispersion for data.
- Students will be able to use statistical methods to test hypotheses.
- Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

## Required Materials

- A cheap calculator (with at least a square root key) that is not your phone, tablet, pad, or computer
- Laptop or access to a computer with Java enabled in the web browser
- Statistical Software (there are many options for purchase locations):
  - SPSS
    - There are many websites selling many flavors of SPSS. For instance you could search Google for “Buy SPSS Base Grad pack” and click the Shopping bar near the top of the page.
  - Excel
    - There are many websites selling many flavors of Excel. For instance you could search Google for “Buy Excel Home” and click the Shopping bar near the top of the page.
  - R
    - <http://cran.r-project.org/bin/windows/base/> (free)
    - <http://cran.r-project.org/bin/macosx/> (free)

**Course Format**

Mathematics is learned by doing. This course has intentionally been designed in a hybrid format so that more class time can be spent doing Statistics. A significant portion of the course (~50%) will be completed online either in the open working sessions or on your own. This allows for more self-paced work. You are encouraged to work with each other, however, you are responsible for the material and simply copying answers will be to your detriment. This course also aims to introduce a statistical computing package (SPSS, R, or Excel) as a problem solving tool. Thus you will be required to install the software on your own computer and bring it to class during the assigned sessions.

**Grade Components**

- **Online Checkpoints and Modules:** You will be working in the online course materials provided by Acrobatiq®. Prior to our in class activities you will be required to complete the assigned checkpoints. You will have two attempts on the checkpoints and the best score will be recorded. A checkpoint will not count if it is not completed by the due date.
- **Labs:** The labs will be submitted in Canvas and are due at the scheduled times, usually the end of the week of the lab.
- **Homework:** Written problems are assigned in Canvas and due the first day of class following the in class activity on the Module. There may also be other activities that are completed as homework.

Collected assignments must be prepared in a style suitable for grading. The following guidelines are used to determine credit:

- the organization must be easy to follow
  - the work must be legible
  - complete solutions must be written for problems (not just answers); answers must be clearly marked
  - use complete sentences to answer questions
- **Examinations and the Final Examination.** Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent or a well documented emergency beyond your control. A score of zero will be assigned for an examination that is missed without prior consent or a well documented emergency beyond your control. The Final Lab Project will be included as 1/6<sup>th</sup> of the Final Examination score.

The examination schedule is included in the daily schedule. This instructor does not intend to accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents.

| Grade Components             | Percent |
|------------------------------|---------|
| Two Examinations at 20% each | 40      |
| Final Exam                   | 30      |
| Labs                         | 10      |
| Written Homework             | 10      |
| Online Assignments           | 10      |
| Total                        | 100     |

**Grading scale**

Grades are based on the number of points accumulated throughout the course with the following exception. A student must pass at least one of Exam 1, Exam 2, or the Final Exam in order to pass the class. That is, a score of 60% must be achieved on one of the Exams, or else the final grade will be an F regardless of all other point totals. Approximate minimal percentages required to obtain a given grade are:

| Grading Scale in percentages | A            | B            | C            | D            |
|------------------------------|--------------|--------------|--------------|--------------|
| +                            |              | (87.5, 90.0) | (77.5, 80.0) | (67.5, 70.0) |
|                              | [92.5, 100]  | [82.5, 87.5] | [72.5, 77.5] | [62.5, 67.5] |
| -                            | [90.0, 92.5) | [80.0, 82.5) | [70.0, 72.5) | [60.0, 62.5) |

**Attendance Policy**

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class (whether face-to-face or online) and the assignments given that day. Here is the university's stated policy on attendance:

Regular and punctual attendance at all classes in which a student is registered is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements to be met. There are no allowed or excused absences except as approved in writing by the Provost for specific students participating in certain university-sanctioned activities. Excused absences still count toward the 10%-20% limits, but allow students to make up work, quizzes, or tests missed as a result of a university-sanctioned activity. Activities of a unique nature, such as labs or other activities identified clearly on the syllabus, cannot be made up except in rare instances when instructors have given advanced, written approval for doing so. Whenever the number of accumulated absences in a class, for any cause, exceeds ten (10) percent of the total number of class meetings, the faculty member should send an e-mail to the student and the Vice Provost for Academic Administration (VPAA) warning of attendance jeopardy. If more than twenty (20) percent of the total number of class meetings is reported as missed, the faculty member or VPAA may initiate the student's de-enrollment from the course without further advanced notice to the student. If the date of de-enrollment is past the last date to withdraw from a class, the student will be assigned a grade of W or WF consistent with university policy in the Grading section of the catalog. There are no refunds for courses where a de-enrollment was processed. For more details see the PLNU catalog:

[http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Class\\_Attendance](http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Class_Attendance)

Because this course is a hybrid course, here is how attendance will be calculated:

Face-to-face portion of the class: You must be present on time for the full class for you to be considered present in the face to face meeting.

Online portion of the class: You are expected to work on material online every week. In order to earn credit for being "present" in the online portion of the class each week you must complete at least one online homework assignment or exam review assignment (for test weeks) before the due date/time for that week.

If you miss 10% of the class, you will receive a warning. If you miss 20% of the class, you will be automatically de-enrolled.

**Class Enrollment:**

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

**Academic Accommodations:**

While all students are expected to meet the minimum academic standards for completion of their courses as established by the instructors, students with special needs may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center contacts the student's instructors and provides written recommendations for reasonable and

appropriate accommodations to meet the individual needs of the student. This policy assists the university in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with special needs and guarantees all qualified students equal access to the benefits of PLNU programs and activities.

For more details see the PLNU catalog:

[http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic\\_Accommodations](http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Accommodations)

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

#### **Academic Honesty:**

The Point Loma Nazarene University community holds the highest standards of honesty and integrity in all aspects of university life. Any violation of the university's commitment is a serious affront to the very nature of Point Loma's mission and purpose. Violations of academic honesty include cheating, plagiarism, falsification, aiding academic dishonesty, and malicious interference. The details of PLNU's meaning of each of these words can be found in the PLNU catalog at:

[http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Honesty)

A student remains responsible for the academic honesty of work submitted in PLNU courses and the consequences of academic dishonesty beyond receipt of the final grade in the class and beyond the awarding of the diploma. Ignorance of these catalog policies will not be considered a valid excuse or defense. Students may not withdraw from a course as a response to a consequence.

A student who is caught cheating on any item of work will receive a zero on that item and may receive an "F" for the semester. See the PLNU Catalog for a further explanation of the PLNU procedures for academic dishonesty ([http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278#Academic_Honesty)).

#### **Copyright Protected Materials**

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

#### **Credit Hour:**

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for an 3 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

#### **Point Loma Nazarene University Mission:**

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

#### **Department Mission:**

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

#### **Final Exam: 7:30-10:00 am Monday May 2<sup>nd</sup>, 2016**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. Only in the case that a student is required to take three exams during the same day of finals week is an instructor authorized to change the exam date and time for that particular student.

#### **The Final Exam is a Comprehensive Examination.**

| Week<br>Start Date | Prior to Class  |                    | In class  | After Class                              |
|--------------------|---|--------------------|---|--|
|                    | Online Modules  | Online Checkpoints | Activities By Module  | Written Homework                         |
| 1<br>1/10/2016     | None  | None               | Introduction<br>1, 2, 3: Read   | Load Statistical Software on Your Laptop |
| 2<br>1/17/2016     | 4: Examining Distributions  | 26, 40             | 4: Activities<br>5: Introduction  | HW 1                                     |
| 3<br>1/24/2016     | 5, 7: Examining Relationships, Sampling   | 54, 71             | 5, 7: Activities  | HW 2<br>Regression Activity              |
| 4<br>1/31/2016     | 8, 10: Designing Studies, Probabilities   | 79, 89, 94         | 8, 10: Activities Introduction to Random Variables and z<br><i>Lab: Summarizing Data*</i> | HW 3                                     |
| 5<br>2/7/2016      | 11: Random Variables  | 123                | 11: Activities  | HW 4                                     |
| 6<br>2/14/2016     | <b>Exam 1</b>   |                    |   |  |
| 7<br>2/21/2016     | 12: Sampling Distributions  | 128, 132           | 12: Activity<br>14, 15,<br>& 16: Introduction   | HW 5                                     |
| 8<br>2/28/2016     | 14, 15,<br>& 16: Introduction to Inference, C.I.'s                              | 155                | 14, 15,<br>& 16: Activities<br>17: Introduction   | HW 6                                     |
| 9<br>3/13/2016     | 17: Hypothesis Testing  | 161, 175           | 17: Activity  | HW 7                                     |
| 10<br>3/20/2016    |   |                    | <i>Lab: Regression and Scatterplots*</i>  |  |
| 11<br>3/27/2016    | 17: Hypothesis Testing  | 184, 185,<br>187   | 17: Inference Practice<br><i>Lab: Hypothesis Tests and Confidence Intervals*</i>          | HW 8                                     |
| 12<br>4/3/2016     | 18: Inference for Relationships (C-Q)   | 200, 209,          | 18: Activity  | HW 9                                     |
| 13<br>4/10/2016    |   | 217, 218           | <i>Lab: Hypothesis Tests for C-Q*</i><br>Exam Review                                      |  |
| 14<br>4/17/2016    | <b>Exam 2</b>   |                    |   |  |
| 15<br>4/24/2016    | 19: Inference for Relationships (C-C)   | 228                | 19: Chi-squared   | Lab Final Project Assigned               |
| 16<br>Final        | Sections 1-4 Common Final<br><b>7:30 AM Monday 2-May-2016</b><br>LSCC Main Room |                    |   |  |

\* Laptops with statistics software required