D.S. 300 Applied Statistics

Fall 2022, Section 01

**Important**: This syllabus and its components are subject to change based on modifications to applicable guidelines. Your instructor will attempt to communicate all changes to you in a timely manner.

Instructor Information

* Dr. Fenton
* Pasteur 006 – D, MF 2:00-2:50, TTh 1:00-1:30
* Telephone: 272-8427
* Email: wfenton@bellarmine.edu

Course Information

This course is a continuation of MATH 205 Elementary Statistics. The focus is on statistical inference, using data from samples to learn about populations. There are many statistical methods to pick from, depending on the situation, but the basic structure of data analysis and inference stays the same. We will create visual representations of sample data, look for patterns and relationships, conduct statistical tests, and interpret the results of these tests in context. The software packages R and RStudio will be valuable tools for these analyses.

I plan to teach this course using cooperative learning. There are many benefits to working as a team. Working together on homework and during class keeps everyone actively involved, which improves learning. Having a group gives you a great resource when you have questions. And even if you feel you understand a topic, explaining it to the others in your group will improve your understanding.

In this course, you will work in groups for the homework, for work in class, and for portions of the two tests. For the first few assignments you should work with as many other students in the class as possible and try to determine who you would like to work with for the semester. You must choose your group no later than Thursday September 8.

Here are some things to think about while you decide who you want in your group:

1. Is there someone in the group who is good with computers?
2. Is everyone comfortable with all the other people in the group? Will you be able to work together productively?
3. Are there definite times when the entire group can meet outside of class?   
   (This is very important!)
4. There must be three or four people in a group.

We will discuss this further in the first couple weeks of the semester.

While I will attempt to follow this syllabus in every detail, circumstances may require changes to the course as the semester progresses.

Course Description

"This course builds on the Elementary Statistics course enabling students to do more complex data analysis and interpretation of results using tools that are common in Data Science. Topics may include: Simple Regression, Multiple Regression, Logistic Regression, One-Way and Two-Way Analysis of Variance, and Bootstrap Methods. A software package such as R will be used extensively.”

**Modality**: Traditional/face-to-face course

**Meeting location:** Pasteur 106

**Meeting day and time:** Tuesdays and Thursdays 1:40-2:55

**Prerequisite**: C.S.150 and MATH 205.

**Credit hours**: 3 credits

Learning Outcomes

By the end of the semester, a successful student should be able to

* Create an appropriate visual representation of a data set;
* Choose an appropriate statistical analysis to answer questions about a situation;
* Carry out each statistical analysis and explain generally why it works; and
* Interpret the results of the analysis in the original problem setting.

Course Outcomes

| Objective/Outcome | Associated Course(s) or Assessment(s) |
| --- | --- |
| Data Science Program Goal 5: Interpret the results of data analysis. | This will be demonstrated on homework and on exams. |
| Data Science Program Goal 6:  Present the results of data analysis orally, visually, or in written format. | Class discussions will require informal oral communication. Homework and exams will require more formal written and visual presentations. |

Course Methodology

Class meetings will be a mixture of lecture and group activities. Please ask questions and offer suggestions. You are welcome to use a calculator or a computer during class.

In this course, you will work in groups for the homework, for work in class, and for portions of the two tests. You must choose your group no later than Thursday September 8. For this course, groups may have three or four members.

Course Materials

Required Materials

You will need access to the online Achieve system from Macmillan Learning. This system includes the e-book *Introduction to the Practice of Statistics, 10th edition* by McCabe, Moore, and Craig. There are additional resources in Achieve as well, such as videos on how to use the RStudio software.

Course Activities

Use this table as a checklist of all activities that require a submission or product.

| Activity | Value | Due Date | Description/Notes |
| --- | --- | --- | --- |
| Homework | 200 | Various dates | Eight assignments at 25 points each. These will be posted on the course Moodle page. |
| Test 1 | 150 | September 27 | This will be in two portions, a 50 point group portion and a 100 point individual portion. |
| Test 2 | 150 | November 1 | This also will be in two portions, a 50 point group portion and a 100 point individual portion. |
| Final Exam | 150 | December 15 | The final exam will be comprehensive, covering the entire semester but with extra emphasis on the material since the second test. It is solely an individual test. |

The tentative schedule above may change at the discretion of the instructor. Also, remember that there are many important dates and deadlines published annually in the University’s Master Calendar at <https://www.bellarmine.edu/registrar/academic-calendars/>, including the final exam schedule (<https://www.bellarmine.edu/registrar/final-exam-information/>). It is your responsibility to be aware of all academic calendar dates and to meet the published deadlines

Grading Information

There are several components to your grade. You must take all the exams to pass the course.

* Homework is to be done with your group. Everyone who works on an assignment should sign the first page, certifying that s/he participated fully in the work. The homework will be collected and graded, 25 points per assignment. The assignments will be posted on the course Moodle page. Test questions will be similar to the homework problems.   
   Homework assignments are due at by 5:00 on the specified date, unless you are told otherwise. Turn in a hard copy of each assignment. You may NOT work on these during class. Late homework usually will not be accepted. If your group has some difficulty, please talk to me ***before*** the assignment is due.
* Each test will be in two sections, a group portion to be done as a take-home exam prior to the in-class portion and an individual portion to be done in class. Make-up tests will be given only in extreme circumstances and only if I am contacted on or before the day of the test.  
  TEST 1: Chapters 9, 10, and 11. This test will be in two portions, a 50 point group portion and a 100 point individual portion. This is tentatively scheduled for Tuesday September 27.  
  TEST 2: Chapters 12, 13, and 14. This also will be in two portions, a 50 point group portion and a 100 point individual portion. This is tentatively scheduled for Tuesday November 1.
* The discussions in class will be primarily responses to questions that I will ask. I will call on a group at random and a reasonable answer earns that group one point. You must be present to earn these points! (30 possible) Also, each group is expected to meet with me twice during the semester. Each meeting is worth 5 points, but again you must be present to earn the points. In addition, I will ask you a question about once a week via email. Your response is worth 1 point each time. (10 possible)
* The Final Exam will be **THURSDAY DECEMBER 15** at 11:30-2:30. It will be comprehensive, covering the entire semester but with extra emphasis on the material since the second test. It is solely an individual test.

Homework: 8 assignments at 25 points each 200 points

Test 1 150 points

Test 2 150 points

Class Participation 50 points

Final Exam 150 points

Your course grade will be your point total as a percentage of the 700 possible points.

Grading Scale

| Letter Grade | G.P.A. Equivalent | Lower Limit (%) | Upper Limit (%) |
| --- | --- | --- | --- |
| A+ | 4.00 | 100.00 | 100.00 |
| A | 4.00 | 92.00 | 99.99 |
| A- | 3.67 | 88.00 | 91.99 |
| B+ | 3.33 | 84.00 | 87.99 |
| B | 3.00 | 79.00 | 83.99 |
| B- | 2.67 | 75.00 | 78.99 |
| C+ | 2.33 | 70.00 | 74.99 |
| C | 2.00 | 63.00 | 69.99 |
| C- | 1.67 | 60.00 | 62.99 |
| D+ | 1.33 | 58.00 | 59.99 |
| D | 1.00 | 52.00 | 57.99 |
| D- | 0.67 | 50.00 | 51.99 |
| F | 0.00 | 0.00 | 49.99 |

Course Policies

Attendance

This is entirely up to you. However, you are responsible for all material discussed in class. In my experience, people who come to class regularly have a better understanding of the material than those who miss classes.

Communication

I expect to be in my office a lot so feel free to stop by. Messages or homework may be left in my mailbox in Pasteur Hall 006. You can contact me by email at *wfenton@bellarmine.edu*. I usually respond to email within one or two days. Feel free to phone me at home at 454-7855 (but not after 9:00 p.m. please).

Technology

**Required applications/software**

We will use free software packages called **R** and **RStudio**. This software should be available in Pasteur 104 and Pasteur 106, and you can download copies for yourself.

**Library access off campus**

To access the W.L. Lyons Brown Library and pertinent contact information, visit the library website at <https://www.bellarmine.edu/library>. Through the library, Bellarmine students have access to resources for research, including academic journals, print and eBooks, films, and more. Some of these services require special steps to access off-campus; you can find necessary instructions at <https://libguides.bellarmine.edu/off_campus>.

**Technical support**

The Technology Support Center (TSC) provides technology services for the Bellarmine community for Moodle, Office 365, email, and other technology needs. The TSC is open Monday through Saturday. You may stop by the TSC on the “A” Level of the Library, call 502.272.8301, or email [tsc@bellarmine.edu](mailto:tsc@bellarmine.edu).

Important Information for Your Success

As a Bellarmine University student, you are expected to be engaged in the learning process throughout the semester. We also understand circumstances may arise that may impact your success as a student. Note the following resources that may be helpful to you based on certain circumstances.

Academic Honesty

Bellarmine University exists for the sake of the advancement of knowledge; the pursuit of truth; the intellectual, ethical, and social development of students; and the general well-being of society. All members of our community have an obligation to themselves, to their peers, and to the institution to uphold the integrity of Bellarmine University. In the area of academic honesty, this means that one’s work should be one’s own and that the instructor’s evaluation should be based on the student’s own efforts and understanding. When the standards of academic honesty are breached, mutual trust is undermined, the ideals of personal responsibility and autonomy are violated, teaching and learning are severely compromised, and other goals of the academic community cannot be realized. For a thorough description of the University’s policy, including penalties for acts of academic dishonesty and breaches of integrity, refer to the Undergraduate Academic Policies’ Academic Honesty and Integrity Policy in the current Bellarmine Course Catalog, found at <https://www.bellarmine.edu/one-bellarmine/>.

Bellarmine’s post-baccalaureate programs, including professional programs, may have established policies addressing violations of academic honesty and integrity which may not mirror the penalties noted for the institution’s baccalaureate/undergraduate programs. Students enrolled in the programs are responsible for familiarizing themselves with these policies and are subject to the penalties noted in the program should they be charged with a violation of academic honesty and/or integrity, and the Dean and/or Department Chairperson will enforce the program’s policies.

University-sponsored Travel Notification / Extended Absence

While students are expected to attend scheduled classes, Bellarmine University faculty will make every effort to accommodate students who are absent from class due to university-sponsored activity. This policy protects students from being penalized for missed class time due to university-sponsored activity. Faculty will provide reasonable opportunities to make-up missed work that would normally occur in class (e.g., quizzes, tests, presentations, performances) and may include a selection of comparable coursework as agreed upon by the faculty and student. This make-up process will apply even if the instructor has a policy to drop a low test/quiz/presentation score. If a student has a test or quiz they miss, the points for the make-up work cannot be incorporated into the final exam. This is intended to have exams made up within a reasonable time frame. It is the student’s responsibility to make prior arrangements with the instructor to turn in written materials (e.g., assignments, papers, projects) on or before the assigned due date.

It is the responsibility of each student to inform their instructors of a class absence for such events by doing the following:

* meet with each instructor in the first two weeks of the semester to discuss the days they will miss class and determine plans to make up missed work.
* one week prior to each absence, notify the instructor of the class day they will miss. Exception: a person who joins a team or club after the first two weeks would provide the initial notification upon joining the group.

The student will initiate this process by providing the Student Absentee Notification Form (<https://www.bellarmine.edu/registrar/forms/>). The student and instructor will work through the form, which details expectations for successful completion of missed coursework. See the University-Sponsored Activity Absence Policy (<https://catalog.bellarmine.edu/2022-2023/undergraduate-academic-policies#Class_Attendance>) in the current Bellarmine University Course Catalog for specific details.

Should you need to miss class due to a death in the family, hospitalization, or extreme illness, you may contact the Dean of Students, Leslie Maxie, at [lmaxie@bellarmine.edu](mailto:lmaxie@bellarmine.edu) or 502.272.8051 for assistance in notifying your professors and specific information about your responsibility in making up work.

Military- and Veteran-Related Absence Policy

Bellarmine University acknowledges and appreciates the important contributions of our students who are serving or have served in our armed forces. To support these students, Bellarmine faculty pledge to provide reasonable allowances as described in the Military and Veteran Related Absence Policy (<https://www.bellarmine.edu/office-of-veteran-and-military-services/student-policies/>) to students who must be absent from class due to military obligations or required medical treatment for service-related conditions. See the Academic Policies in the University Catalog for specific details.

Student Success Center

The Student Success Center provides programs and services available to all students at the University and is committed to supporting every student. Students are encouraged to access services early and often, as the most successful students are those who utilize the resources available to them. The Student Success Center is located on the B-Level of the W. L. Lyons Brown Library and is home to Academic Advising, Tutoring Center, Writing Center, Testing Center, Pioneer Scholars Program, Learning Communities, and a variety of other programs and services. For more information, visit the SSC website (<https://www.bellarmine.edu/studentsuccess>), email [studentsuccess@bellarmine.edu](mailto:studentsuccess@bellarmine.edu), call 502.272.7400, or find the SSC on social media.

Accessibility Resource Center

Students with disabilities who require accommodations such as academic adjustments and/or auxiliary aids or services for this course may apply for services by filling out the online application found on the ARC website (<https://www.bellarmine.edu/studentaffairs/disabilityservices/>) under the Apply for Services link (<https://www.bellarmine.edu/studentaffairs/disabilityservices/acc/>). Contact the Accessibility Resource Center at 502.272.8490 or email [arc@bellarmine.edu](mailto:arc@bellarmine.edu) for more information about the accommodation process. The Accessibility Resource Center occupies CNMH 074 and CNMH 076. Students are encouraged to make these arrangements as early in the semester as possible so that the student and their course instructor can collaborate for a successful course experience.

Counseling Center and Health Services

Recognizing the impact that mental and physical health can have on academic performance, the Bellarmine University Counseling Center and Health Services provide free and confidential services to all currently enrolled students.

The Counseling Center provides a range of mental health services including short-term individual, couples, and group counseling; crisis intervention; consultation; and referral. The Counseling Center is located on the 4th floor of Nolen C. Allen Hall. For more information or to schedule an appointment, call 502.272.8480, email [counselingcenter@bellarmine.edu](mailto:counselingcenter@bellarmine.edu) or visit the Counseling Center website (<https://www.bellarmine.edu/studentaffairs/counselingcenter/>).

Health Services provides a range of services, including, but not limited to assessment; referral; over-the-counter medications; education on wellness, diet, exercise, and health; vaccinations; allergy antigen shots; and emergency response on campus. Health Services is located on the 1st floor of Newman Hall, room 121. All appointments, check-in, and questions must be completed via phone at 502.272.8048. You may also visit the Health Services website (<https://www.bellarmine.edu/studentaffairs/healthservices>) or email [healthservices@bellarmine.edu](mailto:healthservices@bellarmine.edu).

In the event of a mental health or medical emergency after hours, contact the Office of Public Safety at 502.272.7777.

Student Concern Reporting

Students are encouraged to report instances of concern that they experience or witness. As Bellarmine strives to be an educational environment that allows all students to thrive, it is helpful to sometimes involve university officials who may be able to provide resources, support, or options for additional action.

The Student Concern & Comment Form (<https://bellarmine.wufoo.com/forms/k15jgt3a1o0dgae/>) allows students to report incidents and/or student well-being concerns. Anonymous reporting is available, however the ability for administrators to follow up on an anonymous report may be limited. Once submitted, the report is reviewed by the Dean of Students Office and the Title IX Office for appropriate follow-up.

Examples of reportable concerns include mental health, inappropriate or concerning behavior, harassment, bias related to identity, sexual misconduct, student well-being, and family concerns. If you experience or witness one of these incidents, you are encouraged to report it to university officials. In addition to the Report Form, reports may also be made to the Office of Public Safety (502.272.7777), the Dean of Students Office (502.272.8051) or the Title IX Office (502.272.7337).

***Title IX and Sexual Misconduct Notification***

Sexual misconduct (including sexual harassment, sexual assault, stalking, dating violence, domestic violence) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the Counseling Center (502.272.8480) and Campus Health Services (502.272.8313). To report sexual misconduct or sex discrimination, email Natasha Begin, Chief Title IX Officer, at [nbegin@bellarmine.edu](mailto:nbegin@bellarmine.edu) or call the Office of Public Safety (502.272.7777). Disclosure to University faculty or instructors of sexual misconduct, occurring on campus, in a university-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under University policy. Faculty and instructors must forward such reports, including names and circumstances, to the Title IX Officer. For more information, see the Sexual Misconduct Advocacy and Resource Guide at <https://www.bellarmine.edu/title-ix>.

Chosen Name

To encourage a more inclusive and welcoming campus, Bellarmine has established the policy whereby a community member has the option to use a chosen name on campus whenever possible. The chosen name must be reasonable and may not be used to misrepresent the individual. This name will appear wherever a legal name is not necessary. A student wishing to use a chosen name may do so by visiting the self-service page on one.bellarmine. After clicking on self-service, click the displayed username in the upper right-hand corner of the page. A drop-down menu will appear, click on user profile, and under personal identity details click the pencil to edit. Be sure to click save after entering information. Use of the legal name will continue to be required for certain documents, including but not limited to, payroll records, billing records, financial aid documents, transcripts, medical records and federal immigrations documents. Students will need to visit the help desk to get a new ID that reflects the chosen name. Students may contact the Registrar’s office at [registrar@bellarmine.edu](mailto:registrar@bellarmine.edu) or 502-272-8133 for questions about updating chosen name in self-service.

Pronouns and Gender Identity

Students may select pronouns to be displayed on class rosters. Pronouns are viewable to faculty and staff members of the Bellarmine community. If no pronoun has been selected, pronouns will not be displayed. Gender identity is not displayed on class rosters. A student wishing to select pronouns may do so by visiting the self-service page on one.bellarmine. After clicking on self-service, click the displayed username in the upper right-hand corner of the page. A drop-down menu will appear, click on user profile, and under personal identity details click the pencil to edit. Be sure to click save after entering information. Students may contact the Registrar’s office at [registrar@bellarmine.edu](mailto:registrar@bellarmine.edu) or 502-272-8133 for questions about updating pronouns and/or gender identity in self-service. For support or additional resources regarding gender identity contact the Office of Identity and Inclusion at [edixon@bellarmine.edu](mailto:edixon@bellarmine.edu) or 502-272-8303.

COVID-19 Policies and Procedures

Subject to the fluid nature of the pandemic and federal and state guidance, updates on campus COVID-19 policies and procedures can be found at the University’s COVID-19 site at <https://www.bellarmine.edu/coronavirus>.