LIBERTY UNIVERSITY

Online · College of Arts & Sciences · General Math & Sciences

Introduction to Probability and Statistics

MATH-201

CG   Section 8WK   11/08/2019 to 04/16/2020   Modified 04/08/2022

💻 Course Description

Introduction to descriptive statistics and probability, probability distributions, estimation, tests of hypotheses, chi-square tests, regression analysis, and correlation with applications in business and science.

Requisites

For information regarding prerequisites for this course, please refer to the Academic Course Catalog (https://catalog.liberty.edu/).

◎ Rationale

As members of a society increasingly devoted to the use and misuse of numbers, students must learn to correctly interpret and construct statistical presentations in all areas of public discourse, especially in their major fields. This course emphasizes the major applications of statistical knowledge rather than its theory. The course seeks to educate men and women who will make important contributions to their workplaces and communities, follow their chosen vocations as callings to glorify God, and fulfill the Great Commission.

📊 Course Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Construct and interpret appropriate graphical representations of data.
2. Compute statistical measures which describe the location, dispersion, and placement of data values.
3. Compute probabilities associated with multiple events and common distributions.
4. Create confidence intervals for unknown parameters.
5. Perform hypothesis tests.
6. Determine the correlation between two variables and develop linear regression models which predict the value of one variable as a function of the other.

General Education Foundational Skill Learning Outcomes: Technological Solutions and Quantitative Reasoning (TSQR)

1. TSQR 1: Analyze data and inform action through a structured method.
2. TSQR 2: Predict the output based on an input in practical scenarios using technological solutions and/or quantitative reasoning.
3. TSQR 4: Relate technology and quantitative reasoning to participation in God's redemptive work.

📘 Course Resources

Click on the following link to view the required resource(s) for the term in which you are registered: Liberty University Online Bookstore (https://bncvirtual.com/liberty)

Additional Materials for Learning

A. Computer with basic audio/video output equipment
B. TI-84 Calculator and/or Excel

C. Canvas [recommended browsers (https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66)](https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66)

D. Please note, technical skills for this course include:
   1. Basic Blackboard navigation skills

E. CutePDF software. Available for free at [cutepdf.com (http://www.cutepdf.com/)](http://www.cutepdf.com/).

☰ Course Assignments

Textbook readings and lecture presentations

Course Requirements Checklist

After reading the Course Syllabus and [Student Expectations (https://www.liberty.edu/institutional-effectiveness/student-expectations/)](https://www.liberty.edu/institutional-effectiveness/student-expectations/), the student will complete the related checklist found in the Course Overview.

Homework (HW) Assignments (31)

Each module, the student will complete several sets of exercises which will correlate with the assigned Learn material. These exercises will be completed using ALEKS. (CLO: A, B, C, D, E, F; TSQR 1, 2).

Project Assignments (5)

This real-world project has 5 parts and utilizes course-specific information to apply statistics to real-life data collection and analysis. The students will gather class data and utilize this data in the first 4 parts of the project. The students will receive feedback on the first 4 parts of the project before submitting the final report as the final 5th part of the project (CLO: A, B, E; TSQR 1, 2, 4).

Review Assignments (4)

The purpose of the review assignments are to ensure the students are adequately prepared for each exam assignment. The review assignment for each exam assignment must be completed with a grade of at least 70% before the exam can be taken. Each question on all the Review Assignments can be worked as many times as needed to get full credit. All the Review Assignments can be found in ALEKS. (CLO: A, B, C, D, E, F; TSQR 1, 2).

Exams Assignments (4)

The student will complete 4 exams throughout the course. Each exam will be timed, open-book/open-notes, and will cover 2 modules of material. The exams will be taken in ALEKS (CLO: A, B, C, D, E, F; TSQR 1, 2).

Note: Students must submit all written work for each exam question on the Written Work Submission Assignment that correlates with that specific Exam Assignment. Written Work Submission Assignments must be submitted in Canvas. Exams submitted without the accompanying Written Work Submission Assignment will not be accepted.

Written Work Submission Assignments (4)

Written work for each exam question must be submitted in Canvas. Exams submitted without the accompanying work will not be accepted.

✔ Course Grading

Course Requirements Checklist		10
Homework (HW) Assignments	(31 at 10 pts ea)	310

Project Assignments	(3 at 25 pts ea, 1 at 20 pts, and 1 at 75 pts)	170
Review Assignments	(4 at 5 pts ea)	20
Exam Assignments	(4 at 125 pts ea)	500
Written Work Submission Assignments	(4 at 0 pts ea)	0
Total		1010

🏛 Policies

Mathematical Late Assignment Policy

Mathematical assignments that are submitted after the due date without prior approval from the instructor will receive the following deductions

1. Late *mathematical* assignments submitted within one week after the due date will receive a 10% deduction.
2. *Mathematical* assignments submitted more than one week late or after the final date of the course will not be accepted.
3. Discussion board assignments submitted within one week after the due date will receive a 10% deduction.
4. Discussion board submitted more than one week and less than 2 weeks late will receive a 20% deduction.
5. Discussion board submitted more than 2 weeks late will not be accepted.
6. Group projects, including group discussion board threads and/or replies, and assignments will not be accepted after the due date.

Special circumstances (e.g. death in the family, personal health issues) will be reviewed by the instructor on a case-by-case basis.

For other assignments, please refer to the standard Late Assignment Policy, below.

Late Assignment Policy

Course Assignments, including discussions, exams, and other graded assignments, should be submitted on time.

If the student is unable to complete an assignment on time, then he or she must contact the instructor immediately by email.

Assignments that are submitted after the due date without prior approval from the instructor will receive the following deductions:

1. Late assignments submitted within one week after the due date will receive up to a 10% deduction.
2. Assignments submitted more than one week and less than 2 weeks late will receive up to a 20% deduction.
3. Assignments submitted two weeks late or after the final date of the course will not be accepted outside of special circumstances (e.g. death in the family, significant personal health issues), which will be reviewed on a case-by-case basis by the instructor.
4. Group projects, including group discussion threads and/or replies, and assignments will not be accepted after the due date outside of special circumstances (e.g. death in the family, significant personal health issues), which will be reviewed on a case-by-case basis by the instructor.

Disability Assistance

Students with a disability and those with medical conditions associated with pregnancy may contact Liberty University's Online Office of Disability Accommodation Support (ODAS) at LUOODAS@liberty.edu for accommodations. Such accommodations require appropriate documentation of your condition.   For more information about ODAS and the accommodations process,

including how to request an accommodation, please visit https://www.liberty.edu/online/online-disability-accommodation-support/ (https://www.liberty.edu/online/online-disability-accommodation-support/). Requests for accommodations not related to disabilities or pregnancy must be directed to the Registrar's Office, which generally handles medical needs support.

If you have a complaint related to disability discrimination or an accommodation that was not provided, you may contact ODAS or the Office of Equity and Compliance by phone at (434) 592-4999 or by email at equityandcompliance@liberty.edu. Click to see a full copy of Liberty's Discrimination, Harassment, and Sexual Misconduct Policy (https://www.liberty.edu/media/1226/Liberty_University_Discrimination_Harassment_and_Sexual_Misconduct_Policy.pdf) or the Student Disability Grievance Policy and Procedures (http://www.liberty.edu/media/8021/Disability_Grievance_Procedures.pdf).

Course Attendance

In an effort to comply with U.S. Department of Education policies, attendance is measured by physical class attendance or any submission of a required assignment within the enrollment dates of the course (such as examinations, written papers or projects, any discussion posts, etc.) or initiating any communication with one's professor regarding an academic subject. More information regarding the attendance policy (https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwiki.os.liberty.edu%2Fdisplay%2FIE%2FOnline%2BAttendance%2Band%2BNon-Attendance&data=02%7C01%7Caccollins2%40liberty.edu%7Cd91431fa6ac547056b5408d833029e1a%7Cbaf8218eb3024465a9934a39c97251b2%7C0%7C0%7C637315433613719138&sdata=%2BNBTsPOoXuHAPLflSQRugK7cRSuV6UyC7qD3agf3l2k%3D&reserved=0) can be found in the Academic Course Catalogs (https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.liberty.edu%2Findex.cfm%3FPID%3D791&data=02%7C01%7Caccollins2%40liberty.edu%7Cd91431fa6ac547056b5408d833029e1a%7Cbaf8218eb3024465a9934a39c97251b2%7C0%7C0%7C637315433613729132&sdata=DjjhMiRBhnF%2B2ZJUC8eBd1OdNb26S9ADukODYsilXlA%3D&reserved=0). Regular attendance in online courses is expected throughout the length of the term. Students who do not attend within the first week of a sub-term by submitting a required academic assignment (such as the Course Requirements Checklist, an examination, written paper or project, discussion post, or other academic activity) will be dropped from the course. Students who wish to re-engage in the course are encouraged to contact Academic Advising to discuss their enrollment options. Students who begin an online course, but at some point in the semester cease attending, and do not provide official notification to withdraw, will be assigned a grade of "FN" (Failure for Non-Attendance (https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwiki.os.liberty.edu%2Fdisplay%2FIE%2FUnofficial%2BWithdrawals&data=02%7C01%7Caccollins2%40liberty.edu%7Cd91431fa6ac547056b5408d833029e1a%7Cbaf8218eb3024465a9934a39c97251b2%7C0%7C0%7C637315433613729132&sdata=MoMvZdPfza69InuhVHMHAVgu59ZP0Fw45xJTu9PIBrU%3D&reserved=0)). Students wishing to withdraw from courses after the official start date should familiarize themselves with the withdrawal policy.

Grading Scale

A	B	C	D	F
900-1010	800-899	700-799	600-699	0-599

For courses with a Pass/NP final grade, please refer to the Course Grading section of this syllabus for the assignment requirements and/or point value required to earn a Passing final grade.

Add/Drop Policy

The full policy statement and procedures are published in the Policy Directory (https://wiki.os.liberty.edu/display/IE/Dropping+and+Adding+Online+Classes).

Honor Code

Liberty University comprises a network of students, Alumni, faculty, staff and supporters that together form a Christian community based upon the truth of the Bible. This truth defines our foundational principles, from our Doctrinal Statement to the Code of Honor. These principles irrevocably align Liberty University's operational procedures with the long tradition of university culture, which remains distinctively Christian, designed to preserve and advance truth. Our desire is to create a safe, comfortable environment within our community of learning, and we extend our academic and spiritual resources to all of our students with the goal of fostering academic maturity, spiritual growth and character development.

Communities are predicated on shared values and goals. The Code of Honor, an expression of the values from which our Doctrinal Statement was born, defines the fundamental principles by which our community exists. At the core of this code lie two essential concepts: a belief in the significance of all individuals, and a reliance on the existence of objective truth.

While we acknowledge that some may disagree with various elements of the Code of Honor, we maintain the expectation that our students will commit to respect and uphold the Code while enrolled at Liberty University.

Adherence to the principles and concepts established within facilitates the success of our students and strengthens the Liberty community.

The Code of Honor can be viewed in its entirety at http://www.liberty.edu/index.cfm?PID=19155 (http://www.liberty.edu/index.cfm?PID=19155).

📅 Schedule

When	Topic	Notes
Course Overview	Student Acknowledgements	Course Requirements Checklist
	Technology Integration Set-Up	Prepare: Register for ALEKS
Module 1: Week 1	Learn	Read: 3 items Watch: 4 items
	Apply	HW: 1.1 Sampling Assignment HW: 1.2 Types of Data Assignment HW: 2.1 Graphical Summaries for Qualitative Data Assignment HW: 2.2 Frequency Distributions and Their Graphs Assignment HW: 2.3 More Graphs for Quantitative Data Assignment Project: Part 1 – Data Collection Assignment
Module 2: Week 2	Learn	Read: 3 items Watch: 4 items
	Apply	HW: 3.1 Measures of Center Assignment HW: 3.2 Measures of Spread Assignment HW: 3.3 Measures of Position Assignment Review: Introduction and Descriptive Statistics Assignment Exam: Introduction and Descriptive Statistics Assignment Written Work Submission: Introduction and Descriptive Statistics Assignment
Module 3: Week 3	Learn	Read: 2 item Watch: 2 items

When	Topic	Notes
	Apply	HW: 5.1 Basic Concepts of Probability Assignment
		HW: 5.2 The Addition Rule and the Rule of Complements Assignment
		HW: 5.3 Conditional Probability and the Multiplication Rule Assignment
		HW: 5.4 Counting Assignment
		Project: Part 2 – Descriptive Statistics Assignment
Module 4: Week 4	Learn	Read: 3 items
		Watch: 5 items
	Apply	HW: 6.1 Random Variables Assignment
		HW: 6.2 The Binomial Distribution Assignment
		HW: 7.1 The Standard Normal Curve Assignment
		HW: 7.2 Applications of the Normal Distribution Assignment
		Review: Probability Assignment
		Exam: Probability Assignment
		Written Work Submission: Probability Assignment
Module 5: Week 5	Learn	Read: 2 item
		Watch: 6 items
	Apply	HW: 7.3 Sampling Distributions and the Central Limit Theorem Assignment
		HW: 7.4 The Central Limit Theorem for Proportions Assignment
		HW: 8.1 Confidence Intervals for a Population Mean, Standard Deviation Known Assignment
		HW: 8.2 Confidence Intervals for a Population Mean, Standard Deviation Unknown Assignment
		HW: 8.3 Confidence Intervals for a Population Proportion Assignment
		Project: Part 3 – Confidence Intervals Assignment
Module 6: Week 6	Learn	Read: 3 items
		Watch: 4 items
	Apply	HW: 9.1 Basic Principles of Hypothesis Testing Assignment
		HW: 9.2 Hypothesis Tests for a Population Mean, Standard Deviation Known Assignment
		HW: 9.3 Hypothesis Tests for a Population Mean, Standard Deviation Unknown Assignment
		HW: 9.4 Hypothesis Tests for Proportions Assignment
		Review: Inferential Statistics Assignment
		Exam: Inferential Statistics Assignment
		Written Work Submission: Inferential Statistics Assignment
		Project: Part 4 – Hypothesis Tests Assignment

When	Topic	Notes
Module 7: Week 7	Learn	Read: 3 items Watch: 6 items
	Apply	HW: 9.5 Hypothesis Tests for a Standard Deviation Assignment HW: 11.4 Hypothesis Tests for Two Population Standard Deviations Assignment HW: 12.1 Testing Goodness of Fit Assignment HW: 12.2 Test for Independence Assignment Project: Part 5 – Final Report Assignment
Module 8: Week 8	Learn	Read: 3 items Watch: 3 items
	Apply	HW: 4.1 Correlation Assignment HW: 4.2 The Least-Squares Regression Line Assignment Review: More Hypothesis Tests Assignment Exam: More Hypothesis Tests Assignment Written Work Submission: More Hypothesis Tests Assignment