North Carolina Agricultural and Technical State University

Spring 2022 Course Syllabus
College of Science and Technology
Department of Mathematics and Statistics

NOTE: Students are responsible for reading, understanding and following the syllabus.

Undergraduate Course Information

Course Name: Introduction to Probability and Statistics
Course Number/Section: MATH224.007
Credit Hours: 3.00
Days and Times: MWRF 12:00-12:50pm
Class Location: MWF → Marteena Hall 312 and R → Virtual Computing Lab (Zoom*)
*You can attend the virtual lab on Zoom from Room 201 in Marteena Hall or any quite place.

Instructor Contact Information

Instructor: Dr. Sayed Mostafa
Office Location: 3005 Smith Hall
Email Address: sabdelmegeed@ncat.edu
Office Phone: 336-2853104

Communication

Students can expect to receive an answer to all communications (e.g., email, phone, course messages) within 48 hours, i.e., within two business days.
If you do not hear from me in 48 hours, please forward the email to me again.

Graduate teaching assistant: Arbaaz Mohideen (amohidee@aggies.ncat.edu)
TA Office Hours: TBA

Student Hours (Virtual via Zoom Link in Blackboard)

These are times students may visit the professor without an appointment to request the assistance they need.

10:00 AM ☒ / PM ☐ – 11:00 AM ☒ / PM ☐

Monday ☒ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☒

Course Prerequisites

List the course Prerequisites here.
   Minimum C Grade in MATH104 or MATH110 or MATH111 or MATH131

Course Description

This is a general introductory statistics course covering graphical and numerical summaries of data, basic rules of probability, introduction to discrete and continuous random variables, sampling variability, and the fundamentals of estimation and hypothesis testing for means and proportions.

General Education Student Learning Objectives/Outcomes (SLO)

By the end of this course, students will be able to do the following:
- Summarize data using graphical techniques such as histograms, barcharts, stemplots, boxplots, and scatterplots.
- Compute summary statistics for measures of central tendency (e.g., means, medians) and measures of spread and variability (e.g., standard deviation, interquartile range).
- Use the laws of probability to compute the probability of events (and their unions intersections and complements).
- Use discrete and continuous random variables, such as the binomial and normal distributions to estimate probabilities.
- Use the normal distribution and the Central Limit Theorem to approximate probabilities for sample proportions and means
- Estimate population means and proportions by confidence intervals.
- Perform and interpret tests of significance on population parameters.

Required Textbooks and Materials

Any course-level subscriptions and tools linked in Blackboard Learn learning management system (LMS) should be listed here. The Blackboard LMS must have links to their student data privacy statement.

Required Texts: OpenIntro Statistics (4th Ed) by Christopher D. Barr, David M. Diez, and Mine Çetinkaya-Rundel. Free pdf available here: https://www.openintro.org/book/os/

Required Materials:

- You need to create free RStudio Cloud account here: https://rstudio.cloud
- Access to Blackboard. Course syllabus, lecture notes, quizzes, homework assignments, and scores will be accessible in Blackboard.
- **All tests will be taken through Blackboard using Respondus Lockdown browser**.
- **A computer with webcam and microphone.**
- **You need to have Respondus Lockdown browser installed to take tests in the course**. For more details and downloading instructions, follow this link:
  http://www.respondus.com/lockdown/download.php?id=922833142
- **NCAT email account**: Students use their same email login credentials to access the course in Blackboard, which is the platform for this online course. Course syllabus, course materials and updates are posted on Blackboard.
- Students are expected to **actively participate in Discussion Board** to discuss the course contents and to post and/or answer questions.
- You are allowed to use any calculator for the course. Basic calculator that takes square root should be sufficient.

Grading Policy

Course Grade Scale *[Undergraduate level courses]*

92-100	A	80-81.99	B-	66-67.99	D+
90-91.99	A-	78-79.99	C+	60-65.99	D
88-89.99	B+	70-77.99	C	00-59.99	F
82-87.99	B	68-69.99	C-		

Grading Allocation

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows:

Work	Percentage	Notes
Homework	15%	Weekly HW assignments completed in Blackboard
Reading Assignments	10%	Weekly reading assignments in the form of interactive R Shiny tutorials with embedded knowledge check questions
Lab Reports	10%	Weekly lab attendance and submission of lab report due by the end of the day of each lab session
Data Analysis Project	10%	Work on a semester-long data analysis project in a group of 3 students.
Participation	5%	Discussion board assignments, in-class participations, pre- and post-diagnostic tests and the intro stats survey
Midterm Exams	30%	Best 2 scores out of 3 midterm exams **(each worth 15%)**
Final Exam	20%	**Comprehensive**

Homework (HW)
- These assessments will be completed in MyOpenMath by clicking the assignment link in Blackboard. You do **NOT** need to create an accounton MyOpenMath. Just access the weekly HW assignment from the unit folder under "Learning Units" in Blackboard.
- HW is due **by 11:59pm on Sundays**.
- You can try up to **2 versions** of each HW question and you have **3 attempts** on each version. If you get the question or part of it wrong, you can try the same question two more times. If you still want to improve, you can try a different version of the question.
- **Late submission penalty**: If you submit your homework late but by 11:59pm on the day before the next major exam opens, you will receive 80% of points earned.
- Your lowest HW score will be dropped.

Reading Assignments
- You will need to complete a weekly reading assignment in the form of interactive R Shiny tutorials with embedded knowledge check questions.
- The reading assignments will prepare you for the computing lab session on Thursdays and therefore are due before the lab session (**by 12:00noon on Thursday**).
- To complete the reading assignment for the week, click the reading assignment link in the week's unit folder under "Learning Units" in Blackboard.
- Each reading assignment is worth 20 points.
- You have unlimited time before the due date to complete the reading assignment.
- Follow instructions under the reading assignment to submit your work in Blackboard.
- Your lowest reading assignment score will be dropped.

Computing Lap Reports
- You will attend a weekly virtual lab on Thursday via Zoom (Starting in Week 2).
- During the lab session, you will follow the instructor's demo to complete some coding tasks on the lab template and prepare and submit your lab report for the session.
- Lab reports must be submitted in Blackboard **by 11:59pm on Thursday** (the day of the lab session).

Data Analysis project
- You will work on a semester-long data analysis project in a group of **3** students.

- Your group will be assigned a dataset to analyze throughout the semester with support and guidance from instructor and TAs.
- Your group will prepare and submit two progress reports and a final report.
- More details about the project will be given in class.

Participation
- Complete discussion board assignments by making and responding to posts in the Blackboard "Discussion Board".
- You will also receive participation points for completing the pre- and post- intro stats survey which will be announced in class and email invitations will be emailed to each student.
- You will also receive participation points for completing the pre- and post-diagnostics tests in Blackboard during First Week and Last Week of semester, respectively.
- Other participation points will be assigned for in-class participations.

Exams
- There will be **three midterm exams** (see course schedule) and a **comprehensive final exam**.
- Exams are closed book, closed notes. A formula sheet will be provided for each exam.
- **All exams will take place online through Blackboard Respondus Lockdown Browser.**
- **For exam dates, see course schedule.**

Course Policies

Use Of Blackboard as The Learning Management System
Blackboard is the primary online instructional and course communications platform. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Blackboard orientation and log in daily to course.

[Other Course Polices]

Describe all policies specific to your course, e.g. Make-Up Exams, Late Work, Extra Credit, Special Assignments, Homework, Quizzes, Exams, Academic Dishonesty, Attendance/Participation, or Classroom Citizenship, etc. Utilize any headings as needed. Here you could include any common policies that you feel require special mention.

Make-Up Exams Only university-recognized excuses (e.g. Immediate Family Loss, Illness, etc.) are accepted. The student should notify the instructor at least 72 hours prior to missing quiz or exam and official documentation should be presented, e.g., Doctor's note. The student missing a quiz or exam with valid documented excuse is responsible to contact the instructor to reschedule for making-up missed quiz or exam.

Extra Credit Any extra credit opportunities will be announced in class and/or via Blackboard.

Late Work Late work shall not be accepted except due to a university-excused absence on due date.

Special Assignments There shall be no special assignments.

Class Schedule [or Course Plan]

Week	Date	Module Title	Sections	Assignments Due
Week 1	01/10-01/16	Ch1: Introduction to Data	1.1 Case study: using stents to prevent strokes 1.2 Data basics 1.3 Sampling principles and strategies 1.4 Experiments	**Sunday, 01/16** - RA1, HW1, DB1
Week 2	01/17-01/23	**Monday,** 01/17	**Martin Luther King Day (no class)**	**Wednesday, 01/19 – Pre-Intro Stats Survey** **Wednesday, 01/19 – Pre-diagnostic Test** **Thursday, 01/20 -** RA2, CL1 **Friday, 01/21 -** DB2 **Sunday, 01/23 -** HW2, DB2
		Ch2: Summarizing Numerical Data	2.1 Examining Numerical Data Lab 1: Intro to R	
Week 3	01/24-01/30	Ch2: Summarizing Categorical Data	2.2 Considering Categorical Data 2.3 Case Study: Malaria Vaccine Lab 2: Exploratory Data Analysis Part 1	**Thursday, 01/27 -** RA3, CL2 **Sunday, 01/30 -** HW3
Week 4	01/31-02/06	**Exam 1**		Monday, 01/31
		Ch3: Probability I	3.1 Defining Probability 3.2 Conditional Probability Lab 3: Exploratory Data Analysis Part 2	**Thursday, 02/03 -** RA4, CL3 **Sunday, 02/06 -** HW4
Week 5	02/07-02/13	Ch3: Probability II	3.3 Sampling from a small population 3.4 Random Variables Lab 4: Introducing DAP Part I	**Thursday, 02/10 -** RA5, CL4 **Sunday, 02/13 -** HW5
Week 6	02/14-02/20	Ch4: Distributions of Random Variables	4.3 Binomial distribution 3.5 Continues distributions 4.1 Normal distribution Lab 5: Probability	**Thursday, 02/17-** RA6, CL5 **Friday, 02/18 –** DB3 **Sunday, 02/20 -** HW6, DB3
Week 7	02/21-02/27	Ch4: Distributions of Random Variables	4.1 Normal distribution (Cont'd) Lab 6: Normal Distribution	**Thursday, 02/24 –** RA7, CL6 **Sunday, 02/27 -** HW7
		Exam 2		Friday, 02/25
Week 8	02/28-03/06	Ch5: Foundations for Inference I	5.1 Point Estimates and Sampling Variability Lab 7: Sampling distributions	**Thursday, 03/03 –** RA8, CL7 **Sunday, 03/06 –** Submit DAP Part I
		Friday 03/04	**Wellness Day (no class)**	
Week 9	03/07-03/13		**Spring Break**	
Week 10	03/14-03/20	Ch5: Foundations for Inference II	5.2 Confidence Intervals for a proportion 5.3 Hypothesis Testing for a Proportion Lab 8: Confidence Intervals for proportions	**Thursday, 03/17 -** CL8 **Sunday, 03/20 –** HW8
Week 11	03/21-03/27	**Tuesday,** 03/22	**College of S. &T. Wellness Day**	**Thursday, 03/24 -** RA9, CL9
		Ch5: Foundations for Inference III	5.3 Hypothesis Testing for a Proportion Lab 9: Inference for categorical data	
Week 12	03/28-04/03	**Tuesday,** 03/29	**University Mental Health Day (no class)**	**Thursday, 03/31 -** RA10, CL10 **Sunday, 04/03 –** HW9
		Ch6: Inference for Categorical Data	6.1 Inference for a Single Proportion 6.2 Difference of Two Proportions Lab 10: Introducing DAP Part II	
Week 13	04/04-04/10	Ch7: Inference for Numerical Data I	7.1 One-sample Means with the t-distribution 7.2 Paired Data Lab 11: Inference for Numerical data	**Thursday, 04/07 -** RA11, CL11 **Sunday, 04/10 -** HW10
Week 14	04/11-04/17	**Friday,** 04/15	**University Holiday (no class)**	
		Ch7: Inference for Numerical Data II	7.3 Difference of Two Means Review for Exam 3	**Friday, 04/15 –** DAP Part II Due
		Exam 3		**Wednesday, 04/13 – Thursday, 04/14**
Week 15	04/18-04/24	**Monday,** 04/18	**University Mental Health Day (no class)**	
		Ch8: Introduction to linear regression I	8.1 Fitting a line, residuals, and correlation 8.2 Lease squares regression Lab 12: Introducing DAP Part III	**Thursday, 04/21 -** CL12

Week 16	04/25-05/01	Ch8: Introduction to linear regression II	8.4 Inference for linear regression 9.1 Introduction to multiple regression Lab 13: Correlation and Linear Regression	**Thursday, 04/28 -** RA12, CL13 **Friday, 04/29 – Post-Intro Stats Survey** **Friday, 04/29 – Post-diagnostic Test** **Sunday, 05/01 -** HW11
Week 17	05/02-05/06	Ch9: Multiple and logistic regression I	9.2 Model Selection 9.3 Checking model conditions using graphs Lab 14: Multiple linear regression	**Thursday, 05/05 -** RA13, CL14 **Sunday, 05/08 -** HW12 **Sunday, 05/08 –** DAP Part III Due
	05/09-05/13	**Final Exam**		**Wednesday, 05/11 – Thursday, 05/12**

* These descriptions and timelines are subject to change at the discretion of the instructor.

Please refer to the Common Policies file for all other University policies. The Common Policies should also be provided to all students or available in the course Blackboard shell.