# University of Oklahoma University of Oklahoma Polytechnic Institute CYBS 3223: Applied Statistics for Computing Fall 2024

Gregory G. MacDonald, Ph.D

## Course Format/Meeting Time: 06:00PM-7:20PM and Location: OU Tulsa Campus, Learning Center, Room 220.

### Student/Office Hours: Tuesdays and Thursday from 2:00PM-4:00PM. Other times by appointment only.

### Learning Management System/website: All Materials will be available on Canvas.

## Course Prerequisite: MATH 2423

## Course Description: This course is an introduction to basic statistical concepts and techniques with an emphasis on application to applied computing. Topics include basic properties of probability, a review of descriptive statistics, common discrete and continuous distributions of data, visualization of real data, hypothesis testing, parametric versus nonparametric tests, supervised and unsupervised learning methods, the bias-variance tradeoff, use of statistical packages.

**Course Goals:**

* Students will gain knowledge of common problems encountered in applied computing and how to evaluate real data.
* Students will become fluent in statistics with the assistance of a statistical computing program.
* Students will learn to interpret and communicate statistical results both in written and oral communication.

**Learning Outcomes:** Upon successful completion of the course, the student will be able to:

* Have an appreciation of probability theory being at the forefront of statistics, model selection and data science as a whole
* Recognize and test for appropriate distributions of data
* Apply descriptive statistics
* Analyze real data using appropriate hypothesis tests
* Use technology to perform statistical analyses.
* Explain why bias and variance are critical to assessing model performance
* Formulate a statistical question, plan how to address that question using data, collect and analyze the data, interpret the results.

**ABET:**

Students will increase their ability to meet the following ABET outcomes (which are outcomes tied to the accreditation of the Bachelor of Science degree in cybersecurity):

* Outcome 1: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.
* Outcome 3: Communicate effectively in a variety of professional contexts.

## Texts and Materials:

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Description automatically generated

1. Sign in or create an account at learn.zybooks.com

2. Enter zyBook code:

UniversityofOklahoma-PolytechnicInstituteCYBS3223MacDonaldFall2024

3. Subscribe

OR purchase thru the University Bookstore

## Expectations: Students are expected

* to be present in all class meetings and inform the instructor of a brief e-mail to explain their absence in advance
* to participate actively in class discussions
* to spend an adequate amount of time on homework each week, solving and understanding each problem
* to seek help from the instructor when needed

## Learning Activities, Assignments, and Assessments

## Assessments:

Homework: 40%

Quizzes: 40%

Final Exam: 20%

* **Twelve Homework Assignments** (40% total of course grade):
* **Three Quizzes** (40% total of course grade):
* **Final Exam** (20% of course grade):

## Assigning Grades:

## The final letter grades will be assigned as follows: 90-100% A; 80-89% B; 70-79% C; 60-69% D; and below 60, F.

## Course Policies

### Academic Integrity and Plagiarism:

Academic integrity is a fundamental principle of scholarship and education. As a student in this course, you are expected to uphold the highest standards of honesty and integrity in your academic work.

**Plagiarism** is the presentation of someone else’s work, ideas, or words as your own without proper acknowledgment. This includes, but is not limited to:

* Copying and pasting text from a source without quotation marks and/or appropriate citation.
* Paraphrasing or summarizing someone else's ideas without proper attribution.
* Submitting a paper or assignment that has been written in whole or in part by another person.

**Consequences of Plagiarism:**  
Plagiarism is a serious academic offense and will not be tolerated. Any student found to have plagiarized will face disciplinary action, which may include, but is not limited to:

* Receiving a zero or failing grade on the assignment.
* A reduction in the final course grade.

**Avoiding Plagiarism:**  
To avoid plagiarism, you should:

* Always cite your sources properly.
* Use quotation marks when directly quoting another’s work.
* Paraphrase correctly by rewriting the original text in your own words and still providing a citation.

## Land Acknowledgement Statement Provided by OU’s Tribal Liaison office

Long before the University of Oklahoma was established, the land on which the University now resides was the traditional home of the “Hasinais” Caddo Nation and “[Kirikirʔi:s](http://www.wichitatribe.com/media/18910/wichita.mp3)” (audio available when opened in Chrome) Wichita & Affiliated Tribes. We acknowledge that this territory once also served as a hunting ground, trade exchange point, and migration route for the Apache, Comanche, Kiowa, and Osage nations.  Today, 39 tribal nations dwell in the state of Oklahoma due to settler and colonial policies designed to assimilate Native people. The University of Oklahoma recognizes our university's historical connection with its indigenous community. We acknowledge, honor and respect the diverse Indigenous peoples connected to this land. We fully recognize, support, and advocate for the sovereign rights of all of Oklahoma’s 39 tribal nations. This acknowledgment is aligned with our university’s core value of creating a diverse and inclusive community. It is an institutional responsibility to recognize and acknowledge the people, culture, and history that make up our entire OU Community.

## University Policies

### Mental Health Support Services

Support is available for any student experiencing mental health issues that are impacting their academic success. Students can either been seen at the University Counseling Center (UCC) located on the second floor of Goddard Health Center or receive 24/7/365 crisis support from a licensed mental health provider through [TELUS](https://www.ou.edu/ucc/online-therapy) Health. To schedule an appointment or receive more information about mental health resources at OU please call the UCC at 405-325-2911 or visit [University Counseling Center](https://www.ou.edu/ucc). The UCC is located at 620 Elm Ave., Room 201, Norman, OK 73019.

### Title IX Resources and Reporting Requirement

The University of Oklahoma faculty are committed to creating a safe learning environment for all members of our community, free from gender and sex-based discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking, in accordance with Title IX. There are resources available to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you have (or someone you know has) experienced any form of sex or gender-based discrimination or violence and wish to speak with someone confidentially, please contact [OU Advocates](https://www.ou.edu/gec/gender-based-violence/advocates)(available 24/7 at 405-615-0013) or [University Counseling Center](http://ou.edu/ucc) (M-F 8 a.m. to 5 p.m. at 405-325-2911).

Because the University of Oklahoma is committed to the safety of you and other students, and because of our Title IX obligations, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. You may also choose to report directly to the Institutional Equity Office. After a report is filed, the Title IX Coordinator will reach out to provide resources, support, and information and the reported information will remain private. For more information regarding the University’s Title IX Grievance procedures, reporting, or support measures, please visit [Institutional Equity Office](https://www.ou.edu/eoo)at 405-325-3546.

### Reasonable Accommodation Policy

The University of Oklahoma (OU) is committed to the goal of achieving equal educational opportunity and full educational participation for students with disabilities. If you have already established reasonable accommodations with the Accessibility and Disability Resource Center (ADRC), please [submit your semester accommodation request through the ADRC](https://www.ou.edu/adrc/students/adrc-registered-students/accommodation-request) as soon as possible and contact me privately, so that we have adequate time to arrange your approved academic accommodations.

If you have not yet established services through ADRC, but have a documented disability and require accommodations, please complete [ADRC’s pre-registration form](https://forms.office.com/pages/responsepage.aspx?id=neB9nDSQwUS0YsRk_s4gSiXtB4DC5XxJhwAGd7Un1f5UNFU2WDE3UEVENTFIMkgyWFkzV0lGM1NPVCQlQCN0PWcu) to begin the registration process.  ADRC facilitates the interactive process that establishes reasonable accommodations for students at OU.  For more information on ADRC registration procedures, please review their [Register with the ADRC](https://www.ou.edu/adrc/about/registering-with-the-adrc) web page.  You may also contact them at (405)325-3852 or [adrc@ou.edu](mailto:adrc@ou.edu), or visit [www.ou.edu/adrc](http://www.ou.edu/adrc) for more information.

Note: disabilities may include, but are not limited to, mental health, chronic health, physical, vision, hearing, learning and attention disabilities, pregnancy-related. ADRC can also support students experiencing temporary medical conditions.

### Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty. [[See Faculty Handbook 3.15.2]](https://apps.hr.ou.edu/FacultyHandbook/#3.15.2)

### Adjustments for Pregnancy/Childbirth Related Issues

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact the Accessibility and Disability Resource Center at 405/325-3852 and/or the Institutional Equity Office at 405/325-3546 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students’ Rights](https://www.ou.edu/content/dam/eoo/documents/faqs/faqs-pregnant-and-parenting-students.pdf) for answers to commonly asked questions.

### Final Exam Preparation Period

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU’s [Final Exam Preparation Period policy](https://www.ou.edu/registrar/academic-records/academic-calendars/final-exam-schedule/final-exam-policies).

### Emergency Protocol

During an emergency, there are official university [procedures](https://www.ou.edu/campussafety/policy-and-procedures) that will maximize your safety.

**Severe Weather:**If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

1. Look for severe weather refuge location maps located inside most OU buildings near the entrances.
2. Seek refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
3. Goto the building’s severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
4. Get in, Get Down, Cover Up
5. Waitfor official notice to resume normal activities.

Additional [Weather Safety Information](https://www.ou.edu/campussafety/divisions#management) is available through the Department of Campus Safety.

### The University of Oklahoma Active Threat Guidance

The University of Oklahoma embraces a Run, Hide, Fight strategy for active threats on campus. This strategy is well known, widely accepted, and proven to save lives. To receive emergency campus alerts, be sure to update your contact information and preferences in the account settings section at [one.ou.edu](http://one.ou.edu/).

**RUN**: Running away from the threat is usually the best option. If it is safe to run, run as far away from the threat as possible. Call 911 when you are in a safe location and let them know from which OU campus you’re calling from and location of active threat.

**HIDE:** If running is not practical, the next best option is to hide. Lock and barricade all doors; turn of all lights; turn down your phone’s volume; search for improvised weapons; hide behind solid objects and walls; and hide yourself completely and stay quiet. Remain in place until law enforcement arrives. Be patient and remain hidden.

**FIGHT:** If you are unable to run or hide, the last best option is to fight. Have one or more improvised weapons with you and be prepared to attack. Attack them when they are least expecting it and hit them where it hurts most: the face (specifically eyes, nose, and ears), the throat, the diaphragm (solar plexus), and the groin.

Please save OUPD’s contact information in your phone.

**NORMAN** campus:  For non-emergencies call (405) 325-1717. For emergencies call (405) 325-1911 or dial 911.

**TULSA** campus:  For non-emergencies call (918) 660-3900. For emergencies call (918) 660-3333 or dial 911.

### Fire Alarm/General Emergency

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates:

1. LEAVEthe building. Do not use the elevators.
2. KNOWat least two building exits
3. ASSIST those that may need help
4. PROCEEDto the emergency assembly area
5. ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues.
6. WAITfor official notice before attempting to re-enter the building.

[OU Fire Safety on Campus](https://vimeo.com/125093634)

## Tentative Schedule (Subject to Change)

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| --- | --- | --- | --- |
| Week | Topic | Readings | Assignments |
| 1 | Data and Sampling / Data Visualization | Chapters 1 and 2 | Assignments #1 and #2 |
| 2 | Descriptive Statistics | Chapter 3 | Assignment #3 |
| 3 | **Review + Quiz #1** |  |  |
| 4 | Probability and Counting | Chapter 4 | Assignment #4 |
| 5 | Probability Distributions | Chapter 5 | Assignment #5 |
| 6 | Inferential Statistics | Chapter 6 | Assignment #6 |
| 7 | **Review + Quiz #2** |  |  |
| 8 | Linear Regression | Chapter 8 | Assignment #8 |
| 9 | Logistic Regression **(NOV 21)** | Chapter 11 | Assignment #11 |
| 10 | Transformations **(NOV 14)** | Chapter 12 | Assignment #12 |
| 11 | **Review + Quiz #3 (NOV 19)** | **Due NOV 26** | **Chapters 6,8,9** |
| 12 | Stepwise Regression (**NOV 19)** | Chapter 13 | Assignment #13 |
| 13 | Non-parametric Analysis | Chapter 14 | Assignment #14 |
| 14 | Principal Component Analysis | Chapter 20 | Assignment #20 |
| 15 | Advanced Topics,  Review **(NOV 26/DEC 2)** |  |  |
| 16 | **Final exam (DEC 5)** | **Comprehensive** |  |

**You will notice there are skips in the homework sequence. This is to keep in sync with the Chapter numbers.**