湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	Probability and Statistics
Course Code	STAT 2851
Semester	Summer 2026
Course Length	4 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	MATH 2151 Linear Algebra II

Course Description:

This course provides a comprehensive introduction to the principles of probability and statistics. Students will learn essential concepts such as discrete and continuous probability distributions, statistical inference, expectation, variance, estimation, confidence intervals, and hypothesis testing. The course combines theory with hands-on applications and computational methods, including using software like R to simulate probabilistic models and perform data analysis. By the end of the course, students should be able to apply statistical methods to solve real-world problems.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical thinking skills** – Students will engage in creative and/or innovative thinking, and/or inquiry, analysis, evaluation, synthesis of information, organizing concepts, and constructing solutions.
- **Communication skills** – Students will demonstrate effective written, oral, and visual communication.
- **Teamwork** – Students will demonstrate the ability to work effectively with others to support a shared purpose or goal and consider different points of view.
- **Social responsibility** – Students will demonstrate intercultural competency and civic knowledge by engaging effectively in local, regional, national, and global communities.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- understand and apply basic concepts of probability and statistics;

- analyze data using various probability distributions and inferential statistics techniques;
- use statistical software to simulate and analyze statistical models;
- conduct hypothesis tests and create confidence intervals;
- understand the foundations of estimation and regression analysis.

Textbooks:

Probability and Statistics for Engineers and Scientists, 9th Edition, by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye. Pearson.

Student Solutions Manual for Probability and Statistics for Engineers and Scientists, 9th Edition, by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye. Pearson.

Introduction to Probability and Statistics Using R, 1st Edition, by G. Jay Kerns

Course Requirements:

Homework Assignments
Homework assignments based on the readings and lecture materials. Students will solve problems from the textbook and perform computations using R. Some assignments will require simulating data and interpreting results.

Quizzes
Quizzes will be based on homework problems and will consist of 3-4 multiple-choice questions. Quizzes will be timed (20 minutes) and administered at the beginning of random lectures.

Lab Assignments
Lab assignments will involve hands-on work using R to simulate probabilistic models and analyze data. Assignments must be submitted as HTML files generated via R Markdown.

Exams
The midterm exam will consist of multiple-choice, short-answer, and problem-solving types of questions.
The final exam is comprehensive covering all course material. It will include a mix of theory, problem-solving, and data analysis tasks.

Assessments: Activity	**Percent Contribution**
Homework Assignments	15%
Quizzes	15%
Lab Assignments	20%
Midterm Exam	20%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Grade	Percentage of available points
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D	64-69
D-	60-63
F	0-59

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, major ones provided in writing.

STAT 2851 Schedule

Lecture	Topic	Readings
L1	Syllabus Overview	*Jay* Chapter 1
	Introduction to Probability and Statistics	
L2	Introduction to Probability and Statistics Continued	*Jay* Chapter 1
	Introduction to Data Analysis	*Ronald* Chapter 1
L3	Introduction to R	*Jay* Chapter 2
	Basic R Operations and Concepts	
	Lab 1	
L4	Data Description	*Jay* Chapter 3
	Features of Data Distributions	
L5	Probability	*Jay* Chapter 4
	Sample Spaces	*Ronald* Chapter 2
	Properties of Probability	
	Lab 2	
L6	Baye's Rule	*Jay* Chapter 4
	Random Variables	*Ronald* Chapter 2
L7	Discrete Distributions	*Jay* Chapter 5
	Discrete Random Variables	*Ronald* Chapter 3
L8	Expectation and Moment Generating Functions	*Jay* Chapter 5
L9	Continuous Distributions	*Jay* Chapter 6
	Continuous Random Variables	
L10	The Continuous Uniform Distribution	*Jay* Chapter 6
	The Normal Distribution	
	Lab 3	
L11	Multivariate Distributions	*Jay* Chapter 7
	Joint and Marginal Probability Distributions	*Ronald* Chapter 3
	Joint and Marginal Expectation	
L12	Conditional Distributions	*Jay* Chapter 7
	Lab 4	*Ronald* Chapter 3
L13	Independent Random Variables	*Jay* Chapter 7
		Ronald Chapter 4
L14	**Midterm Exam**	/
L15	Sampling Distributions	*Jay* Chapter 8

	Simple Random Samples	*Ronald* Chapter 8
	Sampling from a Normal Distribution	
	Lab 5	
L16	The Central Limit Theorem	*Jay* Chapter 8
		Ronald Chapter 8
L17	Sampling Distributions of Two-Sample Statistics	*Jay* Chapter 8
	Simulated Sampling Distributions	*Ronald* Chapter 8
L18	Estimation	*Jay* Chapter 9
	Point Estimation	*Ronald* Chapter 9
	Lab 6	
L19	Confidence Intervals for Means	*Jay* Chapter 9
	Confidence Intervals for Differences of Means	*Ronald* Chapter 9
L20	Confidence Intervals for Proportions	*Jay* Chapter 9
	Confidence Intervals for Variances	*Ronald* Chapter 9
L21	Hypothesis Testing	*Jay* Chapter 10
	Tests for Proportions	*Ronald* Chapter 10
	Lab 7	
L22	One Sample Tests for Means and Variances	*Jay* Chapter 10
		Ronald Chapter 10
L23	Two-Sample Tests for Means and Variances	*Jay* Chapter 10
	Other Hypothesis Tests	*Ronald* Chapter 10
	Lab 8	
L24	Analysis of Variance	*Jay* Chapter 10
	Sample Size and Power	*Ronald* Chapter 10
L25	**Final Exam**	/

Accommodation Statement:

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

Attendance and Expectations

All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates
All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work
The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs and Disabilities
Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.