Capital University of Economics and Business
Overseas Chinese College
Course Syllabus

Year and Semester	2022 Spring (February 28,2022-June 24,2022)
Course Name	Probabilities and Statistics
Course Code	MAT231
Course Type	☑ General Education (Required) ☐ General Education (Elective) ☐ Professional Course (Required) ☐ Professional Course (Elective) ☐ Basic Disciplinary Course
Course Credits	4
Course Hours	64
Prerequisites	Calculus, Linear Algebra
Instructor	Lemon Li
Contact Information	Office: C217 Tele: (010)83951082 Email: occ_limeng@cueb.edu.cn
Office Hour	TBA
Learning Centre	TBA
Grade/Section	2020IT
Course Time/Place	

Textbook

Jay L.Devore. *Probability and Statistics*, ISBN: 978-7-04-015560-0

Reference Book

1. M. R. Spiegel. Schaum. *Outline of Theory and Problems of Probability and Statistics*. McGraw-Hill, New York.
2. Y. G. Sinay. *Probability Theory, An Introductory Course*. Springer-Verlag, Berlin, New York.

Course Description

An introduction to probability theory and mathematical statistics that emphasizes the probabilistic foundations required to understand probability models and statistical methods. The purpose of Probability and Statistics For Engineering and Science is to provide students with comprehensive introduction to statistical models and methods most likely to encountered and used by students in their careers in engineering and the natural sciences. The course is applications-oriented and topics covered will include the probability axioms, basic combinatorics, discrete and continuous random variables, probability distributions, mathematical expectation, common families of probability distributions, and the central limit theorem, which help decision making in all world.

Student Learning Objectives

After completing this course, students will be able to:

Knowledge

- Describe the theory of probability, both discrete and continuous, including some combinatorics,

a variety of useful distributions, expectation and variance, analysis of sample statistics, and central limit theorems.

- Interpret basic theories and methods of probability and statistics.
- Apply the basic theories and methods of probability and statistics to simple problem solving.
- Be prepared for further study in statistics.

Capability

- Develop the ability to solve problems using probability and statistics.
- Construct abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to basic probability and statistics.
- Create connections between probability and other branches of mathematics.

Value

- Develop the quality and morals of being objective, integrity and dedication.
- Perceive the world with some probabilistic and statistical philosophical view.
- Realize the generalizability of Marxist philosophy.

Website Source

- Charles M. Grinstead and J. Laurie Snell's textbook Introduction to Probability: http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/book.html, an on-line textbook on probability and statistics.
- The Chance Website: http://www.dartmouth.edu/~chance/index.html
  The goal of Chance is to make students more informed, critical readers of current news stories that use probability and statistics.
- Math Archives. Probability: http://archives.math.utk.edu/topics/probability.html. Statistics: http://archives.math.utk.edu/topics/statistics.html
- The Probability Web: http://www.mathcs.carleton.edu/probweb/probweb.html

Teaching Methods

This course consists of lectures, discussions and student presentations. Students will be divided into small groups with a group leader helping others in the group. Students must be prepared to finish some small questions and small quizzes during the class.

Grade Criterion

Component	Weight	Description
Final Exam	20%	A cumulative final examination will be given based on all of the contents of the class. The exam paper may be composed of multiple-choice questions, short answer questions, essay questions, problems, and preparation of financial statements and **a summary of gains from a particular course**. Students should rely primarily on homework assignments to give them a sense of what they may see for material on

		exams.
Mid-Term Test	20%	A cumulative midterm test will be given based on all of the contents that have been taught in class. The test paper may be mainly composed of multiple-choice questions and it should be completed within 15 minutes in class.
Homework	15%	Most of the assigned homework is taken from the Exercises in the textbook. Assignments will be collected at the clearly stated date. Late assignments will not be accepted. The graded assignments will be kept by the tutor for reference and won't be returned to students.
Quizzes	15%	There will be at least 2 quizzes during the semester. Quizzes may or may not be announced in advance. It may also be used as a way to check the attendance. Quizzes will test your knowledge of both concepts and the application of those concepts.
Presentation	10%	The students will be divided into several groups to prepare a presentation. Each student is required to be involved in the presentation. The topics can be selected from the textbook or lectures. Each group need to finish a PPT related to the topic which is given and hand in the related resources to the teacher before the presentation.
Participation	10%	Individuals will be asked to participate individually in a question and answer at least 5 times during the semester. The performances should be counted in their participation.
Attendance	10%	Refer to attendance policy listed below
Total	100%	

Detailed Grade Computation

	Before Midterm	After Midterm
Attendance	5%	5%
Participation	5%	5%
Homework	5%	10%
Quizzes	5%	10%
Presentation		10%
Midterm test	20%	
Final exam		20%
Total	40%	60%

Grading Policy

A+ 97-100	A 93-96	A- 90–92	B+ 87-89	B 83-86	B- 80–82
C+ 75-79	C 70-74	C- 67–69	D+ 63–66	D 62-60	F 0- 59

Exam Schedule

Midterm Test: 8th week

Final Exam: June 20-24

Assessment of Student Performance

☛ ***Self-Study and Reading ability Practice***

Instructor will give out the chapters or the reference books to read and use class hours to have discussion; students should be able to show a proactive attitude and ability for self-study and reading. Knowledge and oral English will be elements of homework or presentation score.

☞ ***Homework***

Students should finish their homework by themselves. Copying from others will be treated as cheating and the homework scores will be lowered. Students should hand in all assignments on time. Late assignments will be accepted at the discretion of the instructor (i.e., when the student was ill or had an excused absence). Late assignments without reasonable proof will be reduced in score by 50%.

☞ ***Attendance***

Because the course covers a great deal of material, attending every class session is very important for performing well.

- Being late for 15 minutes or more is considered an absence.
- Five hours or above of unexcused absences will result in the lower level of the final grade by one grade band (e.g. from C – to D +). Any excused absence must be discussed directly with the teacher.
- Absence which is more than 1/3 of the total teaching hours will cause an F (a failing grade) directly.

but students are welcome to continue attending classes.

- An incomplete grade (I) will be considered in case of medical or family emergencies.

☞ ***Participation***

- Students should participate in classes actively. Half of participation grade is determined by their presentation in class. They are encouraged to ask questions relevant to the subject and express their own opinions. Every student should respect the ideas, opinions, and questions of their classmates.
- Students should also use office hours to ask questions or talk with the instructor for good communication and effective learning.
- Frequent visiting the instructor and chatting in English during office hours is highly recommended.
- Any misbehavior and non-class related activities in class will result in the lower level of the participation grade, including ringing cell phones.
- All above behaviors will be solely evaluated by the instructor for scoring.

☞ ***Textbook***

Students must bring the textbook to class.

Course Outline

Week	Content	Course Education

Week 1 Feb 28-March 4	●Syllabus ●Statistics, Data & Statistical Thinking Introduction •Graphical Descriptive statistics and interpretations of data	Randomness in Real world
	•Numerical Descriptive statistics and interpretations of data	
Week 2 March 7-March 11	● Random events and sample space •Properties of probability •Counting techniques	Discussion of the uncertainty and randomness
	•Conditional probabilities	Discussion of the objectivity and subjectivity of probability
Week 3 March 14-March 18	•Bayes formula •Theorem of the total probability	Case study: Find proportion of "Privacy"
	•Independent events	
Week 4 March 21-March 25	● Random variables •Discrete random variables and their probability distributions	
	•Expected value and variance •Expectation of a Function of a Random Variables	
Week 5 March28-Apr 1	•The binomial distribution probability distributions	
	•The Poisson distribution ● Continuous random variables and their distributions	History of probability and Statistics
Week 6 Apr 4-Apr 8	•Distributions of a function of continuous variables •Expected values and variance	
	•The uniform distribution •The normal distribution	How normal distribution unfold the secrete of science and society
Week 7 Apr 11-Apr 15	•The exponential distribution •Statistics and their distributions	
	•The distribution of the sample mean •The distribution of a linear combination	

Week 8 Apr 18-Apr 22	●Reviews	
	●Midterm Test	
Week 9 Apr 25-Apr 30	● Point estimation •General ideas of point estimation •The moment estimation	Point estimation in your life
	•The maximum likelihood estimation	Discussion of experience and mle
Week 10 May 2-May 6	●Confidence Interval •Introduction of confidence intervals •Interpretations of CI	Relationships between the reliability and precision of confidence interval
	•Large-sample confidence interval for population mean and proportion	
Week 11 May 9-May 13	• Intervals based on a normal distribution	
	• Intervals based on a t distribution •Case study	
Week 12 May 16-May 20	●Hypothesis testing •Hypotheses testing procedures	Relationships between type I and type II error
	•Test about a population mean	
Week 13 May 23-May 27	•Test concerning a population proportion	
	•p-values	
Week 14 May 30-Jun 3	●Chinese Review Sessions	
	●Revision and Quiz	
Week 15 June 6-June 10	●Presentations	
Week 16 June 13–June 17	**●Final Exam**	

Note: *Some chapters or sections may leave for self-study, this is the students' duty to learn and understand, they may also be included in the quizzes or exams.*

A review in Chinese may be held during L.C. and O.H. in the semester.

Teacher's Office Hour

- The instructor's office hour is shown in the front of the office door.
- Students are suggested to use the instructor's office hour and learning center to ask questions or talk with the instructor once at least per week for good communication and effective learning, which is recorded in the students' participation.
- The time can be scheduled by instructors or students, or both.

Cheating and Plagiarism

Cheating is not tolerated. Any student caught cheating on a quiz; test or exam will be given a mark of zero (0) for the particular work. At the beginning of the semester the definition of plagiarism will be carefully explained, when any thoughts or writings of another person are used, they must be clearly identified (usually one uses quotation marks) and the source notes. **If any student is caught cheating on any homework assignment, the highest score the student can earn in that course is a "C".**

Important Dates(TBA)

Spring Semester, 2022	**Feb 27, 2022— July 17, 2022**
Feb.27	Registration
Feb.28	Classes Begin
Mar.4	Last Day to Drop or Add a Course
Apr.5	Qing Ming Festival
Apr.22	Spring Sports
Apr.25 -29	Midterm Test (tentative)
May 1	Labor Day
June 3	Dragon-Boat Festival
June 20-24	Sophomore and Junior students' Final Exam
June 27-July17	Sophomore and Junior students' Social Practice
July11-15	Revision and Final Exam Period
July 18	Summer Vacation Begins

Note: *This syllabus is tentative and may be changed or modified throughout the semester. All students will be notified and a new syllabus will be given.*

Instructor: Lemon Li **Department Head: Jingning Li**