



University of International Business and Economics International Summer School

STAT 205 Probability Theory

Term: May 27 – June 27, 2019

Instructor: Jingzhi Tie

Home Institution: University of Georgia

Email: jtie@uga.edu

Wechat ID: jingzhitie

Class Hours: Monday through Thursday, 120 minutes each day

Office Hours: TBD

Discussion Session: 2 hours each week

Total Contact Hours: 66 contact hours (45 minutes each)

Credit: 4 units

Course Description:

Introducing probability and statistical inference. The course has a prerequisite of differential and integral calculus. We will use Chung and AitSahli for basic materials, and Tijms' book for examples.

Course Goals:

A student who satisfactorily completes this course will be able to:

- ✧ understand the basic rules of probability conditional probability. and expectation
- ✧ apply Bayes' theorem on changing conditional probabilities with new evidence;
- ✧ understand the difference between discrete and continuous random variables;
- ✧ work easily with several common distributions, discrete and continuous;
- ✧ understand the central limit theorem;
- ✧ understand the difference between point estimates and inference by confidence intervals, the strengths and limits of both;
- ✧ engage in critical evaluation of statistical evidence, and experimental design.

Required Textbook:

Kai Lai Chung and AitSahli – Elementary Probability Theory, fourth Edition, Springer
ISBN: 9781441930620.

Henk Tijms – Probability: A lively Introduction, Cambridge University Press
ISBN 9781108407847

Grading Policy:

Grading will be determined by a combination of class attendance and participation, and the results of your exams.

Attendance and Participation 10%.

Midterm Exam 30%.
Final Exam 60%.

Grading Scale:

Assignments and examinations will be graded according to the following grade scale:

A	90-100	C+	72-74
A-	85-89	C	68-71
B+	82-84	C-	64-67
B	78-81	D	60-63
B-	75-77	F	below 60

Class Rules:

Students are expected to come to lecture having read the material assigned for the day, and prepared to engage in active discussion about those ideas.

Attendance Policy:

Summer school is very intense and to be successful, students need to attend every class. Occasionally, due to illness or other unavoidable circumstance, a student may need to miss a class. UIBE policy requires a medical certificate to be excused. Any unexcused absence may affect the student's grade. Moreover, UIBE policy is that a student who has more than 1/3 (6 times) of the class in unexcused absences will fail the course.

Course Schedule:

Week One.

Monday: Chapter One, Set and Operations with Sets.

Tuesday: Chapter One Relations and Indicator

Wednesday. Chapter Two, Examples of probability, Definition and illustrations, Deductions from the axioms.

Thursday. Chapter Two, Arithmetical density Independent events.

Week Two.

Monday, Chapter Three, Fundamental rule, Diverse ways of sampling

Tuesday. Chapter Three, Allocation models; binomial coefficients, How to solve it

Wednesday. Chapter Four. What is a random variable? How do random variables come about, Distribution and expectation

Thursday. Chapter Four, , Integer-valued random variables, Random variables with densities, General case

Week Three:

Monday: Midterm Examination 30%.

Tuesday. Chapter Five, Examples of conditioning, Basic formulas, .

Tuesday. Chapter Five, Sequential sampling, PoLya's urn scheme

Wednesday. Chapter Five, Independence and relevance, Genetical models .

Thursday, Chapter Six, Basic properties of expectation, The density case.

Week Four:

Monday, Chapter Six, Multiplication theorem; variance and covariance, Multinomial distribution



Tuesday, Chapter Six, Generating function and the like

Wednesday, Chapter Seven, .Models for Poisson distribution, Poisson process

Thursday, Chapter seven, From binomial to normal, Normal distribution

Week Five:

Monday, Central limit theorem, Law of large numbers

Tuesday, Problems of the wanderer or gambler, Limiting schemes

Wednesday: Transition probabilities, Basic structure of Markov chains

Thursday, **final, 60%**.