



## 1. General Information

Course Subject	IIMT
Course Number	1640
Course Title	Probability and Statistics for Business
Academic Years	2023-2024
Grading Method	Letter

## 2. Instructors

Professor Cai, Zhanrui  
Subclasses: 2A

Professor Qiao Xinhao  
Subclasses: 2B,2C

## 4. Course Description

Course Description	This course introduces fundamental concepts of probability and statistics. It helps students to understand how to evaluate uncertainty using probability and conduct statistical inference. Students will learn how to solve real world problems by simple Monte Carlo simulations and linear regressions.  No programming skill is required, we will conduct simple simulations by Microsoft Excel.
Mutually exclusive	ECON1280 Analysis of Economic Data STAT1602 Business Statistics STAT1603 Introductory Statistics
Free Elective	Yes

## 5. Course Objectives

1. Concept of probability, basic laws of probability
2. Random variables, expectation, variance, and frequently used distributions
3. Statistical inference: hypothesis testing, confidence interval, p-values
4. Simple Monte Carlo simulations
5. Linear regressions and model diagnosis
6. Analysis of variance

## 6. Faculty Learning Goals

Goal 1: Acquisition and internalization of knowledge of the programme discipline
Goal 2: Application and integration of knowledge

6. Faculty Learning Goals
Goal 3: Inculcating professionalism
Goal 4: Developing global outlook
Goal 5: Mastering communication skills
Goal 6: Cultivating leadership

7. Course Learning Outcomes						
Course Teaching and Learning Activities	Aligned Faculty Learning Goals					
	1	2	3	4	5	6
CLO1. Describe uncertainty by probability	✓	✓	✓			
CLO2. Comprehend basics of statistical inference	✓	✓	✓			
CLO3. Solve real-world problems by simple Monte Carlo simulations and linear regressions	✓	✓	✓			

8. Course Teaching and Learning Activities		
Course Teaching and Learning Activities #	Expected Study Hours	Study Load (% of study)
T&L1. Lectures	36	30
T&L2. Homework	36	30
T&L3. Self study	48	40
	Total: 120	Total: 100

9. Assessment Methods			
Assessment Methods	Description	Weight %	Aligned Course Learning Outcomes
A1. Individual Take-home Assignment		20%	1,2,3
A2. Mid-Term Test/ Assessment		30%	1,2,3
A3. Final Exam		50%	1,2,3

10. Course Grade Descriptors	
A+,A,A-	Strong evidence of superb ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate and synthesis.
B+,B,B-	Strong evidence of the ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesis.
C+,C,C-	Evidence of adequate ability to fulfill the intended learning outcomes of the course at low levels of learning such as describe and apply but not at high levels of learning such as evaluate and synthesis.

10. Course Grade Descriptors	
D+,D	Evidence of basic familiarity with the subject.
F	Little evidence of basic familiarity with the subject.

11. Course Content and Tentative Teaching Schedule		
Topic/ Session	Content	Other information
1	Week 1: What is probability, sample space, counting frequency, probability laws	
2	Week 2: Conditional probability, Bayes rules, Monty Hall problem, independence	
3	Week 3: Random variables, expectation, and variance. Combinatorial numbers	
4	Week 4: Distribution, probability mass function and cumulative distribution function	
5	Week 5: Discrete random variables, Bernoulli, binomial, geometric and Poisson distributions	
6	Week 6: Continuous random variables, uniform, exponential, and normal distributions. Joint distribution and covariance	
7	Week 7: t and F distribution, Monte Carlo simulations, example of option pricing	
8	Week 8: Normal approximation, concepts of central limit theorem and law of large numbers	
9	Week 9: Sample mean and variance estimation, bootstrap	
10	Week 10: Confidence interval, hypothesis testing	
11	Week 11: Simple linear regression	
12	Week 12: Multiple linear regression	
13	Week 13: Analysis of variance	

12. Required/Recommended Readings & Online Materials	
Reading	<p>There is no mandatory reading, the course material will be self-contained.</p> <p>For reference, see</p> <p>Diez, David M., Christopher D. Barr, and Mine Çetinkaya-Rundel. OpenIntro Statistics. (2016).</p> <p>Wheelan, Charles. Naked statistics: Stripping the dread from the data. WW Norton &amp; Company, (2013).</p>

### 13. Means / Processes for Student feedback on Course

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	Conducting mid-term survey in addition to SETL around the end of the semester
✓	Online response via Moodle site
	Others

### 14. Course Policy

An orderly learning environment is extremely important for this course. Disruptive behaviors are absolutely unacceptable. Academic dishonesty includes cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Any such dishonesty will result in an F grade.

### 15. Additional Course Information

No late submission of assignment will be accepted.  
All lecture notes and necessary materials will be posted on Moodle.  
The instructor reserves all the rights to make necessary changes to the syllabus. All modifications will be announced as soon as possible.