



蘇州大學  
Soochow University

# Soochow University

## STA 420 Applied Multivariate Analysis

Winter 2021

### Course information

**Course Credits:** 4

**Contact Hours:** 58 hours

**Class Time:** 8:30 - 10:20

**Instructor:** TBA

**Course Format:** Online

### Course Description

The course is designed as a in-depth introduction to methods of applied multivariate analysis. It is aimed at develop the statistical skills to approach and analyse multivariate data correctly in an applied context. Governed by the statistical and applied minds, topics in this course will cover Matrix Algebra, Multivariate Normal Distribution, Discrimination and Classification, Cluster Analysis, Regression, etc.

### Prerequisite (s)

None.



## Learning Objectives

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

1. Have a general knowledge and understanding of many of the key concepts in applied multivariate analysis;
2. Deal with multivariate problems with theoretical approaches and assumptions;
3. Derive some fundamental classical results of multivariate analysis;
4. Analyze multivariate data using statistical software;
5. Describe statistical methods and analysis results for multivariate data.

## Methodology

Methodology	Hours	Hours of work During class	Hours of work After class
Online Video	50	88 hours (60%)	
Online Forum Discussion	8		
Assessment	30		
Personal study	30	68 hours (40%)	
Tasks	22		
Practical teaching preparation	10		
Bibliographic search	6		
<b>Total</b>	<b>156</b>	<b>88</b>	<b>68</b>

## Textbook (s)

Alvin C. Rencher, William F. Christensen, 2012, *Methods of Multivariate Analysis*, 3rd Edition.



## Tasks and Evaluation

2 Assignments	20% (10% for each)
2 Quizzes	20% (10% for each)
Midterm	25%
Final exam	35%

Students are required to attend online classes on the scheduled time. Missing classes without permission will lead to decrease in overall grade.

- Missing less than two classes: no penalty.
- Missing more than two classes: 7% will be taken off from the overall grade.

Online forum discussion is required. Students are required to post at least one question and answer at least one question on the forum weekly.

Online Tutorials are mandatory. Students will read and discuss academic articles provided. Students will also discuss the case studies for the week's lectures. Each Tutorial will be 1 hour.

All exams will be held online and the time of each exam will be limited to 1 hour. Exams must also be taken at the scheduled time. There will be no make-up exams

### Rating system:

#### 1. Assessment

ASSESSMENT ITEM	PERCENT OF FINAL GRADE
2 Assignments	20% (10% for each)
2 Quizzes	20% (10% for each)
Midterm	25%
Final exam	35%



## 2. Grading Scale

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	

## Course Content

Week	Lecture	Topics	Dues	%
1	1	Introduction: Why Multivariate Analysis		
	2	Matrix Algebra: notation and basic definitions		
	3	Matrix Algebra: operations		
	4	Online Tutorial 1	Assignment 1 due	10
2	5	Characterizing and Displaying Multivariate Data		
	6	Covariance and Correction		
	7	Multivariate Normal Distribution		
	8	Online Tutorial 2		
3	9	Multivariate Normal Density Function	Quiz 1	10
	10	Transformation and Normality		
	11	Tests on One or Two Mean Vectors		
	12	Online Tutorial 3		
4	13	Profile Analysis		
	14	One-way Models		
	15	Two-way Classification		
	16	Online Tutorial 4		



5	17	Other Models	Midterm Test	25
	18	Test on a Subvector		
	19	Tests on Covariance Matrices		
	20	Online Tutorial 5		
6	21	Test for Independence		
	22	Discriminant Analysis: Description of Group Separation		
	23	Classification Analysis: Allocation of Observations to Groups		
	24	Online Tutorial 6	Assignment 2 due	10
7	25	Multivariate Regression		
	26	Multivariate Regression (Cont.)		
	27	Canonical Correlation		
	28	Online Tutorial 7		
8	29	Interpretation		
	30	Principal Component Analysis		
	31	Principal Component Analysis (Cont.)		
	32	Online Tutorial 8	Quiz 2	10
9	33	Exploratory Factor Analysis		
	34	Validity of the Factor Analysis Model		
	35	Confirmatory Factor Analysis		
	36	Online Tutorial 9		
10	37	Cluster Analysis		
	38	Cluster Analysis (Cont.)		
	39	Graphical Procedures		
	40		Final Exam	35



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## University Regulations and Services

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

Soochow University also highly respects students' accommodation for disabilities and religions. You might contact the Student Accessibility Office if you have any questions, concerns or if you would like to report any offensive behaviors.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.