

## Tamkang University Academic Year 112, 1st Semester Course Syllabus

Course Title	LINEAR ALGEBRA	Instructor	WU SHU-FEI
Course Class	TLSXB2C DEPARTMENT OF STATISTICS, 2C	Details	<ul style="list-style-type: none"> <li>◆ General Course</li> <li>◆ Required</li> <li>◆ 1st Semester</li> </ul>
Relevance to SDGs	SDG4 Quality education		
<b>Departmental Aim of Education</b>			
<ul style="list-style-type: none"> <li>I. Cultivate students with knowledge of basic statistical theory.</li> <li>II. Cultivate students with data analysis skills.</li> <li>III. Cultivate students to become statistical professionals with management capabilities.</li> </ul>			
<b>Subject Departmental core competences</b>			
<ul style="list-style-type: none"> <li>A. Knowledge of basic statistical theory.(ratio:5.00)</li> <li>B. Logical reasoning in mathematics.(ratio:80.00)</li> <li>C. Data analysis skills.(ratio:5.00)</li> <li>D. Application of profession knowledge.(ratio:10.00)</li> </ul>			
<b>Subject Schoolwide essential virtues</b>			
<ul style="list-style-type: none"> <li>1. A global perspective. (ratio:10.00)</li> <li>2. Information literacy. (ratio:20.00)</li> <li>3. A vision for the future. (ratio:10.00)</li> <li>4. Moral integrity. (ratio:10.00)</li> <li>5. Independent thinking. (ratio:30.00)</li> <li>6. A cheerful attitude and healthy lifestyle. (ratio:10.00)</li> <li>7. A spirit of teamwork and dedication. (ratio:5.00)</li> <li>8. A sense of aesthetic appreciation. (ratio:5.00)</li> </ul>			

Course Introduction	This course introduces the techniques in solving a linear system of equations, the matrix algebra and basic theory, the vector spaces, including the inner product spaces. It also introduces the eigenvalue problems and the diagonalization of a matrix. All of these topics are useful in statistical applications and many other fields.
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**The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.**

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II. Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III. Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	Students are able to understand the solution of linear system, matrix algebra, determinant and definition of a vector space and able to use the basis and dimension of a vector space and the rank of a matrix in many applications.	Cognitive
2	Students are able to calculate eigenvalues and eigenvectors and understand the diagonalization of a symmetric matrix; to describe the meaning of a linear transformation and its fundamental properties; Students are also able to describe the kernel and range of a linear transformation; to describe an inner product space.	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCD	12345678	Lecture	Testing
2	ABCD	12345678	Lecture	Testing

Course Schedule			
Week	Date	Course Contents	Note
1	112/09/11 ~ 112/09/17	CHAPTER 1: Linear Equations and Vectors of $R^n$	
2	112/09/18 ~ 112/09/24	CHAPTER 1: Linear Equations and Vectors of $R^n$	
3	112/09/25 ~ 112/10/01	CHAPTER 1: Linear Equations and Vectors of $R^n$	
4	112/10/02 ~ 112/10/08	CHAPTER 1: Linear Equations and Vectors of $R^n$	
5	112/10/09 ~ 112/10/15	CHAPTER 1: Linear Equations and Vectors of $R^n$	
6	112/10/16 ~ 112/10/22	CHAPTER 2: Matrices and Linear transformations	
7	112/10/23 ~ 112/10/29	CHAPTER 2: Matrices and Linear transformations	
8	112/10/30 ~ 112/11/05	CHAPTER 2: Matrices and Linear transformations	
9	112/11/06 ~ 112/11/12	Midterm Exam Week	
10	112/11/13 ~ 112/11/19	CHAPTER 2: Matrices and Linear transformations	
11	112/11/20 ~ 112/11/26	CHAPTER 2: Matrices and Linear transformations	
12	112/11/27 ~ 112/12/03	CHAPTER 2: Matrices and Linear transformations	
13	112/12/04 ~ 112/12/10	CHAPTER 3: Determinants and Eigenvectors	
14	112/12/11 ~ 112/12/17	CHAPTER 3: Determinants and Eigenvectors	
15	112/12/18 ~ 112/12/24	CHAPTER 3: Determinants and Eigenvectors	
16	112/12/25 ~ 112/12/31	CHAPTER 3: Determinants and Eigenvectors	if time permitting
17	113/01/01 ~ 113/01/07	Final Exam Week	
18	113/01/08 ~ 113/01/14	Flex week, learning activities should be arranged.	
Key capabilities		self-directed learning Problem solving	
Interdisciplinary		STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)	

Distinctive teaching	classical teaching
Course Content	Logical Thinking
Requirement	<p>※請關掉手機或轉震動</p> <p>※上課不可使用notebook或平板電腦,違規者學期總分扣五分</p> <p>※上課不可吃東西,上課說話太大聲影響上課者,學期總分扣五分</p> <p>※請使用正版教科書·勿非法影印他人著作·以免觸法</p>
Textbooks and Teaching Materials	<p>Using teaching materials from other writers:Textbooks</p> <p>Name of teaching materials:</p> <p>Linear Algebra: with Applications 9/e. Williams, 2019, 滄海書局</p>
References	<p>Introduction to Linear Algebra: with Applications. DeFranza and Gagliardi. 東華書局·初等線性代數與應用,原著:Anton 9th Edition, 簡國清譯.</p> <p>Elementary Linear Algebra with Supplemental Applications, 11th Edition. Howard Anton, Chris Rorres 歐亞書局·</p>
Grading Policy	<p>◆ Attendance : 20.0 %    ◆ Mark of Usual :        %    ◆ Midterm Exam : 30.0 %</p> <p>◆ Final Exam : 30.0 %</p> <p>◆ Other 〈助教實習〉 : 20.0 %</p>
Note	<p>This syllabus may be uploaded at the website of Course Syllabus Management System at <a href="http://info.ais.tku.edu.tw/csp">http://info.ais.tku.edu.tw/csp</a> or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at <a href="http://www.acad.tku.edu.tw/CS/main.php">http://www.acad.tku.edu.tw/CS/main.php</a> .</p> <p><b>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</b></p>