# Tamkang University Academic Year 113, 1st Semester Course Syllabus

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| Course Title | LINEAR ALGEBRA | Instructor | WU SHU-FEI |
| Course Class | TLSXB2C<br>DEPARTMENT OF STATISTICS, 2C | Details | ◆ General Course<br>◆ Required<br>◆ 1st Semester<br>◆ 2 Credits |
| Relevance to SDGs | SDG4 Quality education | | |

## Departmental Aim of Education

Ⅰ. Cultivate students with knowledge of basic statistical theory.

Ⅱ. Cultivate students with data analysis skills.

Ⅲ. Cultivate students to become statistical professionals with management capabilities.

## Subject Departmental core competences

A. Knowledge of basic statistical theory.(ratio:5.00)

B. Logical reasoning in mathematics.(ratio:80.00)

C. Data analysis skills.(ratio:5.00)

D. Application of profession knowledge.(ratio:10.00)

## Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)
2. Information literacy. (ratio:20.00)
3. A vision for the future. (ratio:10.00)
4. Moral integrity. (ratio:10.00)
5. Independent thinking. (ratio:30.00)
6. A cheerful attitude and healthy lifestyle. (ratio:10.00)
7. A spirit of teamwork and dedication. (ratio:5.00)
8. A sense of aesthetic appreciation. (ratio:5.00)

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| 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. |

**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 |
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| 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 |
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| 1 | ABCD | 12345678 | Lecture | Testing |
| 2 | ABCD | 12345678 | Lecture | Testing |
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| Course Schedule | | | |
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| Week | Date | Course Contents | Note |
| 1 | 113/09/09 ~ 113/09/15 | CHAPTER 1: Linear Equations and Vectors of Rn | |
| 2 | 113/09/16 ~ 113/09/22 | CHAPTER 1: Linear Equations and Vectors of Rn | |
| 3 | 113/09/23 ~ 113/09/29 | CHAPTER 1: Linear Equations and Vectors of Rn | |
| 4 | 113/09/30 ~ 113/10/06 | CHAPTER 1: Linear Equations and Vectors of Rn | |
| 5 | 113/10/07 ~ 113/10/13 | CHAPTER 1: Linear Equations and Vectors of Rn | |
| 6 | 113/10/14 ~ 113/10/20 | CHAPTER 2: Matrices and Linear transformations | |
| 7 | 113/10/21 ~ 113/10/27 | CHAPTER 2: Matrices and Linear transformations | |
| 8 | 113/10/28 ~ 113/11/03 | CHAPTER 2: Matrices and Linear transformations | |
| 9 | 113/11/04 ~ 113/11/10 | Midterm Exam Week | |
| 10 | 113/11/11 ~ 113/11/17 | CHAPTER 2: Matrices and Linear transformations | |
| 11 | 113/11/18 ~ 113/11/24 | CHAPTER 2: Matrices and Linear transformations | |
| 12 | 113/11/25 ~ 113/12/01 | CHAPTER 2: Matrices and Linear transformations | |
| 13 | 113/12/02 ~ 113/12/08 | CHAPTER 3: Determinants and Eigenvectors | |
| 14 | 113/12/09 ~ 113/12/15 | CHAPTER 3: Determinants and Eigenvectors | |
| 15 | 113/12/16 ~ 113/12/22 | CHAPTER 3: Determinants and Eigenvectors | |
| 16 | 113/12/23 ~ 113/12/29 | CHAPTER 3: Determinants and Eigenvectors | if time permitting |
| 17 | 113/12/30 ~ 114/01/05 | Final Exam Week | |
| 18 | 114/01/06 ~ 114/01/12 | Flex week, learning activities should be arranged. | |
| Key capabilities | | self-directed learning<br>Problem solving | |
| Interdisciplinary | | STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist) | |
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| Distinctive teaching | classical teaching |
| Course Content | Logical Thinking |
| Requirement | ※請關掉手機或轉震動<br>※上課不可使用notebook或平版電腦,違規者學期總分扣五分<br>※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<br>※請使用正版教科書，勿非法影印他人著作，以免觸法 |
| Textbooks and Teaching Materials | Self-made teaching materials:Handouts<br>Using teaching materials from other writers:Textbooks<br>Name of teaching materials:<br>Linear Algebra: with Applications 9/e. Williams, 2019, 滄海書局 |
| References | 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.<br>Elementary Linear Algebra with Supplemental Applications, 11th Edition. Howard Anton, Chris Rorres 歐亞書局. |
| Grading Policy | ◆ Attendance： 20.0 % ◆ Mark of Usual： % ◆ Midterm Exam： 30.0 %<br>◆ Final Exam： 30.0 %<br>◆ Other〈助教實習〉：20.0 % |
| Note | This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php .<br>**※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.** |