

Oyama College		Year	2022		Course Title	Linear Algebra II
Course Information						
Course Code	0055		Course Category	General / Compulsory		
Class Format	Lecture		Credits	School Credit: 2		
Department	Department of Architecture		Student Grade	3rd		
Term	Year-round		Classes per Week	2		
Textbook and/or Teaching Materials	「Senkei-Daisu」, 「Senkei-Daisu-Mondaisyu」, 「Ouyo-Sugaku」, 「Ouyo-Sugaku-Mondaisyu」, SUURIKOUGAKU-SHA Co.,Ltd., in Japanese					
Instructor	SUKOU Katsuya,OKADA So					
Course Objectives						
1. Understand the definition and properties of determinants, and be able to calculate them. 2. Be able to solve simultaneous equations by using determinants. 3. Understand the relationship between linear transformations and matrices. 4. Understand the concept of eigenvalues and eigenvectors, and be able to calculate them and perform matrix diagonalization. 5. Understand the concept of vector functions, and be able to calculate them.						
Rubric						
	Ideal Level		Standard Level		Unacceptable Level	
Achievement 1	Be able to clearly explain the basic properties of determinants, and be able to accurately solve practice problems related to this.		Be able to solve practice problems related to determinants.		Unable to solve practice problems related to determinants.	
Achievement 2	Be able to clearly explain the solution of simultaneous equations by using determinants, and be able to accurately solve practice problems related to this.		Be able to solve practice problems related to simultaneous equations by using determinants.		Unable to solve simultaneous equations by using determinants.	
Achievement 3	Be able to clearly explain the basics of linear transformations, and be able to accurately solve practice problems related to this.		Be able to solve practice problems related to the basics of linear transformations.		Unable to solve practice problems related to the basics of linear transformations.	
Achievement 4	Be able to clearly explain eigenvalues, eigenvectors and diagonalization, and be able to accurately solve practice problems related to this.		Be able to solve practice problems related to eigenvalues, eigenvectors and diagonalization.		Unable to solve practice problems related to eigenvalues, eigenvectors and diagonalization.	
Achievement 5	Be able to clearly explain the concept of vector functions, and be able to accurately solve practice problems related to this.		Be able to solve practice problems related to vector functions.		Unable to solve practice problems related to vector functions.	
Assigned Department Objectives						
学習・教育到達度目標 ③						
Teaching Method						
Outline	Building on their knowledge of vector spaces, students will learn the basics of matrices and vector functions.					
Style	The class will consist mainly of lectures and exercises, with assignments and quizzes as needed.					
Notice	Lecture B (Lecture(30h) and Self-study(15h) for 1Credit)					
Characteristics of Class / Division in Learning						
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input type="checkbox"/> Applicable to Remote Class		<input type="checkbox"/> Instructor Professionally Experienced
Course Plan						
			Theme	Goals		
1st Semester r	1st Quarter	1st	Inverse matrices, Cramer's rule I	To be able to solve practice problems.		
		2nd	Area of a parallelogram, Volume of a parallelepiped	To be able to solve practice problems.		
		3rd	Sign of a permutation, Determinants of a square matrix	To be able to solve practice problems.		
		4th	Basics of determinants	To be able to solve practice problems.		
		5th	Determinants of inverse matrices, Elementary matrix transformations	To be able to solve practice problems.		
		6th	Elementary matrices, Regular matrices	To be able to solve practice problems.		
		7th	Cofactor expansion I	To be able to solve practice problems.		
		8th	Exam.			
	2nd Quarter	9th	Cofactor expansion II, Cramer's rule II	To be able to solve practice problems.		
		10th	Linear transformation on a plane I	To be able to solve practice problems.		
		11th	Linear transformation on a plane II	To be able to solve practice problems.		
		12th	Linear transformation on a space, Linearity, Composition of linear transformations	To be able to solve practice problems.		

		13th	Inverse transformations, Diagrams and linear transformations	To be able to solve practice problems.
		14th	Eigen values, Eigen vectors I	To be able to solve practice problems.
		15th	Exercise	
		16th	Exam.	
2nd Semester	3rd Quarter	1st	Eigen values, Eigen vectors II	To be able to solve practice problems.
		2nd	Diagonalization of a square matrix I	To be able to solve practice problems.
		3rd	Diagonalization of a square matrix II	To be able to solve practice problems.
		4th	Inner product, Orthogonal matrices and Orthogonal transformations	To be able to solve practice problems.
		5th	Eigen values and Eigen vectors of a symmetric matrix	To be able to solve practice problems.
		6th	Diagonalization of a symmetric matrix by using Orthogonal matrices	To be able to solve practice problems.
		7th	n-th power of a square matrix, Canonical form of quadratic curves	To be able to solve practice problems.
		8th	Exam.	
	4th Quarter	9th	Outer product of vectors	To be able to solve practice problems.
		10th	Differential of vector functions	To be able to solve practice problems.
		11th	Curves in a vector space	To be able to solve practice problems.
		12th	Surfaces in a vector space	To be able to solve practice problems.
		13th	Scalar field, Vector field, level surface	To be able to solve practice problems.
		14th	Divergence, Rotation	To be able to solve practice problems.
		15th	Exercise	
		16th	Exam.	

#### Evaluation Method and Weight (%)

	Examination	Assignments	Total
Subtotal	95	5	100
Basic Proficiency	95	5	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0