富山高等専門学校	開講年度	平成31年度 (2019年度)	授業科目	数学特講Ⅱ

科目基礎情報			
科目番号	0200	科目区分	一般 / 選択
授業形態	授業	単位の種別と単位数	学修単位: 1
開設学科	商船学科	対象学年	5
開設期	後期	週時間数	1
教科書/教材			
担当教員	河合 均		

到達目標

Students can describe and solve the solvability of simultaneous linear equations.
Students can state linear independence of vectors.
Students can understand the concept of subspace and can find dimensions and bases.
Students can obtain matrix eigenvalues and eigenvectors. Eigenvalues and eigenvectors can be applied to problems such as quadratic normalization.

ルーブリック

	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Students can discuss the solvability of simultaneous equations and solve them.	Students can solve simultaneous equations.	Students can't solve simultaneous equations.
Evaluation 2	Students can understand the concept of subspace and can find dimension bases.	Students can understand the concept of subspace.	Students can't understand the concept of subspace.
Evaluation 3	Students can obtain matrix eigenvalues and eigenvectors, and can apply them to problems concerned with matirx.	Students can obtain matrix eigenvalues and eigenvectors.	Students can't obtain matrix eigenvalues and eigenvectors.

学科の到達目標項目との関係

教育方法等

概要	We first teach the theory of simultaneous linear equations and use it to describe the linear independence of vectors. Next, we define a subspace of the number vector space and lecture on its dimensions and bases.Furthermore, we consider linear mapping and prove the dimension theorem. Finally, we give lectures on matrix eigenvalues, eigenvectors and their applications.
授業の進め方・方法	Lectures and exercises by the teacher alone
注意点	Those who do not have a score of 60 can take the certification test upon request.

授業計画

		週	授業内容	週ごとの到達目標
後期	3rdQ	1週	Guidance Simultaneous linear equations	Students can use method of elimination to slove simultaneous equations.
		2週	Linear independence linear dependence	Students can understand the simultaneous equations and the linear independence relationship, and can verify the linear independence.
		3週	linear space and subspace	Students understand the concept of subspace and can determine if it is a subspace.
		4週	Dimension and bases	Students can determine the dimensions and bases of a given subspace.
		5週	Linear mapping	Students can determine the dimensions and bases of a given subspace.
		6週	Image and kernel	Students can understand definitions of the image and kernel of linear mapping, and can determine the dimension and base of the image and kfernel.
		7週	Simension theorem	Students can understand definitions of the image and kernel of linear mapping, and can determine the dimension and base of the image and kfernel.
		8週	Intermediate examination	We do the test to confirm the students' level of understanding.
	4thQ	9週	Eigenvalue and eigenvector	Students can obtain eigenvalues and eigenvectors for 2-dim square matrix and 3-dim square matrix.
		10週	Diagonalization	Students can determine whether a given square matrix can be diagonalized.
		11週	Orthogonal matrix	Students can understand the definition of the orthogonal matrix and the nature that it satisfies.
		12週	Diagonalization by orthogonal matrix of symmetric matrix	Students can diagonalize symmetric matrices using orthogonal matrices.
		13週	Schmidt's orthogonalization method	Students can create orthonormal bases from linearly independent vectors.
		14週	Application of diagonalization	Students can normalize quadratic forms using eigenvalues.
		15週	Final exam	We do the test to confirm the students' level of understanding.
		16週	Explanation of final exam	I will explain the items that are considered to be poorly understood by students in the final exam.

モデルコアカリキュラムの学習内容と到達目標						
分類		分野	学習内容	学習内容の到達目標	到達レベル	授業週
基礎的能力	数学	数学	数学	線形変換の定義を理解し、線形変換を表す行列を求めることができる。	3	
				合成変換や逆変換を表す行列を求めることができる。	3	
				平面内の回転に対応する線形変換を表す行列を求めることができる。	3	

評価割合							
	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	合計
総合評価割合	140	0	0	0	0	60	200
Basic Ability	70	0	0	0	0	30	100
Technical Ability	50	0	0	0	0	20	70
Interdisciplinary Ability	20	0	0	0	0	10	30