COURSE: MATRIX ALGEBRA (2 credit)
CODE: MT 304

Description: The purpose of this course is to improve students' ability in understanding basic concepts of Matrix Algebra As provisions for teaching school mathematics, as prerequisite for Linear Algebra, and other course. The material included in this course are understanding of matrix, various of matrix, matrix arithmetic, system of linear equations, homogeneous systems of linear equations, matrix inverse, determinant, and transformation

Prerequisite: -

Resources:

1. Howard Anton. (1995). *Elementary Linear Algebra*. New York : John Willey & Sons, Inc.
2. Raisinghania, M.D & Aggarwal R. S (1980) *Matrices*. New Delhi : S. Chan & Company Ltd.
3. Larry Smith. (1998).*Linear* Algebra. Gottingen : Springer.
4. Muliana Halim dan Irawati. (1992). *Aljabar Linear Elementer*. Bandung : Jurusan Matematika FMIPA ITB.
5. Setiadji. (1998). *Pengantar Aljabar Linear*. Yogyakarta : FMIPA UGM.

DEPARTEMENT OF MATHEMATICS EDUCATION
FACULTY OF MATHEMATICS EDUCATION AND SCIENCE – INDONESIA UNIVERSITY OF EDUCATION

SILLABUS
COURSE: MATRIX ALGEBRA (2 SKS)
CODE: MT 304

WEEK	TOPIK ANDSUB TOPIK	GOAL	OBJECTIVE	MATERIAL	METHOD & APPROACH	INSTRUMENT	TEST	RESOURCES
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Matrix and Matrix arithmetic	The students can Understand the meaning of matrix and various of matrix	The purpose of this course are the students be able to: 1.1. express definition of matrix 1.2. make several examples of matrix using right notation 1.3. determine order of a given metric 1.4 write general shape of m x n matrix	1. The meaning of matrix	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.	Task 1	1. Howard Anton. (1995). *Elementary Linear Algebra*. New York : John Willey & Sons, Inc. 2. Raisinghania, M.D & Aggarwal R. S (1980) *Matrices*. New Delhi : S. Chan & Company Ltd. 3. Larry Smith. (1998).*Linear* Algebra. Gottingen : Springer..

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			1.5 determine location of an element of given matrix 2.1 formulate definition of certain various matrix through observation on given matrix 2.2 differentiate various of matrix 2.3 make relation between diagonal matrix, scalar matrix, and unit matrix 2.4 make minimum an example of each various of matrix	2. Various of Matrix				4. Muliana Halim dan Irawati. (1992). *Aljabar Linear Elementer*. Bandung : Jurusan Matematika FMIPA ITB. 5. Setiadji. (1998). *Pengantar Aljabar Linear*. Yogyakarta : FMIPA UGM.
2		The students can understand Matrix Operations and	3.1 determine requirement of matrix addition 3.2. determine requirement of matrix subs traction 3.3. determine requirement of multiplication between two matrices	3. Matrix Opera -tions	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.	Task 2	The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rules of Matrix Arithmetic	3.4. add a matrix and other one 3.5. do subs traction of matrices 3.6. multiply between scalar and matrix 3.7. multiply between a matrix and another one 3.8. find a_{ij} elements of product multiplication between a matrix and another one for certain i and j without finding product multiplication in general					

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			3.9. determine transpose of a matrix 3.10. determine trace of a matrix 3.11. proof matrix arithmetic theorems					
3	Discussion of home work exercises for checking the students' understanding				Question-answer method and discussion	White board		
4	System of Linear Equation	The student can understand about concept of system of linear equation and matrix.	4.1 make example of linear equations 4.2 differentiate between an example and non-example of linear equation through observation on given equations 4.3. express definition of system of linear equation	4. System of Linear Equation	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.		The same as above
			5.1. differentiate between matrix in row-echelon form and matrix in reduced row-echelon form	5. Gauss-Jordan's elimination	Expository, question-answer method, and task giving	OHP or LCD, computer, and white board.	Home work to be discussed in next meeting	

(1)	(2)	(3)	(4)	(5	(6)	(7)	(8)	(9)
			5.2 reduce an augmented matrix of linear equation system to matrix in row-echelon form 5.3 reduce an augmented matrix of linear equation system to matrix in reduced row-echelon form 5.4. solve a linear equation system using Gauss elimination 5.5. solve a linear equate ion system using gauss-Jordan elimination 5.6. make minimum one example of inconsistent linear equation system which has variable more than the equation					

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			6.1. write general shape of homogeneous system of linear equations consist of m equation with n variable. 6.2. make an example of homogeneoun system of linear equations which has trivial solution 6.3. make an example of homogeneous system of linear equations which has non-trivial solution 6.4. solve homogeneous system of linear equations 6.5. differentiate between consisten homogenious system of linear	6. Homoge-neous systems of linear equations				

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			equations and inconsistent homogeneous system of linear equation 6.6. determine geometric illustration of a homogeneous system of linear equation 6.7. determine geometric illustration of a consisten homogenious linear equation system					
6	Elementary matrix and matrix inverse and matrix inverse	The student can master about meaning of elementary matrix and invers of matrix	7.1. express definition of elementary matrix 7.2. make several examples of elementary matrix 7.3. differentiate between elementary matrix and non-elementary matrix	7.Elementary Matrix				The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			8.1. determine inverse of a matrix using elementary row operation 8.2. determine singularity of a matrix 8.3. proof the theorems of matrix's inverse 8.4. using matrix inverse for solving linear equation system	Invers of a Matrix.				
7	Discussion of home work exercises for checking the students' understanding				question-answer method and discussion	White board		
8	MID SEMSTER TEST							
9	Function of determinant and it's characteristics	The students be able to understand concept of function of determinant and it's characteristics and using it to solve linear equation system	9.1 make classification of a permutation 9.2 make definition of function of determinant through understanding of permutation and elementary multiplication product 9.3 establish formulation of determinant	9.The meaning of deter-minant function	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.	Doing exercises in the class	The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			of square matrix of four order 9.4 determine determinant value of a matrix using determinant definition. 10. 1 proof the theorems of properties of determinant function 10.2 determine value of determinant using theorems of determinant's properties	10. Properties of determinant function				The same as above
			10.3 use determinant's properties for checking is a matrix invertible or not					
11	Discussion of home work exercises for checking the students' understanding				Question-answer method and discussion	White board		

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12			11.1 find minor of an element 11.2 find cofactor of an element 11.3 determine determinant value of a matrix using cofactor 11.4 Find adjoint of a matrix 11.5 determine inverse of an invertible matrix using adjoint 11.6 using Crammer's rule to solve a linear equation system	11. Cofactor expansion and Crammer's rule	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.	Home work to be discussed in next meeting	The same as above The same as above
13	Discussion of home work exercises for checking the students' understanding				Question-answer method and discussion	White board		
14	Plane Transformation	More understand about plane transformation	12.1 determine factor of transformation 12.2 determine image equation of a geometric shape caused by a transformation	12.Translati-on, Ref-lection, Rotation, and Dilatation	Expository, question-answer method, and task giving.	OHP or LCD, computer , and white board.	Home work to be discussed in next meeting	The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			12.3 determine operator matrix for a plane transformation 13. 1 determine operator matrix for a composition of plane transformation. 13. 2 determine the image of a geometric shape caused by a composition of transformation12.3 determine operator matrix for a plane transformation 13. 1 determine operator matrix for a composition of plane transformation. 13. 2 determine the image of a geometric shape caused by a composition of transformation	 13. Composi-tion of plane transfor-mation.				

15	RESPONSE
16	FINAL TEST

Approved by:

Bandung, November 2008

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