

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 AND SUB 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 $m \times n$ 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). <i>Elementary Linear Algebra</i> . New York : John Willey & Sons, Inc. 2. Raisinghania, M.D & Aggarwal R. S (1980) <i>Matrices</i> . New Delhi : S. Chan & Company Ltd. 3. Larry Smith. (1998). <i>Linear Algebra</i> . Gottingen : Springer..

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rules of Matrix Arithmetic	3.4. add a matrix and other one 3.5. do subtraction 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		
			4.1 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 5.1. differentiate between matrix in row-echelon form and matrix in reduced row-echelon form	4. System of Linear Equation 5. Gauss-Jordan's elimination	Expository , question-answer method, and task giving. Expository , question-answer method, and task	OHP or LCD, computer, and white board. OHP or LCD, computer, and white board.	Home work to be discussed in next meeting	The same as above

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

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6	Elementary matrix and matrix inverse and matrix inverse	The student can master about meaning of elementary matrix and matrix inverse	<p>equations and inconsistent homogeneous system of linear equation</p> <p>6.6. determine geometric illustration of a homogeneous system of linear equation</p> <p>6.7. determine geometric illustration of a consistent homogeneous linear equation system</p> <p>7.1. express definition of elementary matrix</p> <p>7.2. make several examples of elementary matrix</p> <p>7.3. differentiate between elementary matrix and non-elementary matrix</p> <p>8.1. determine inverse</p>	7.Elementary Matrix				The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			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					
7	Discussion of home work exercises for checking the students' understanding				question- answer method and discussion	White board		
8	MID TERM TEST							

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
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	<p>9.1 make classification of a permutation</p> <p>9.2 make definition of function of determinant through understanding of permutation and elementary multiplication product</p> <p>9.3 establish formulation of determinant of square matrix of four order</p> <p>9.4 determine determinant value Of a matrix using determinant definition.</p>	9.The meaning of determinant function	Expository, question-answer method, and task giving.	OHP or LCD, computer, and white board.	Doing exercises in the class	The same as above
10			<p>10. 1 proof the theorems of characteristic of determinant function</p> <p>10.2 determine value of determinant using theorem s of determinant's characteristics</p>	10. Properties of determinant function				The same as above

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			10.3 use determinant's characteristics 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		
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 Cramer's rule to solve a linear equation system	11. Cofactor expansion and Cramer'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		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
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 12.3 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	12. Translation, Reflection, Rotation, and Dilatation 13. Composition of plane transformation.	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
15	RESPONSE							
16	FINAL TEST							

Mengetahui dan Menyetujui:

Bandung, November 2007

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