SYLLABUS

Date/ Revision 7 January 2016
Faculty Engineering
Approval

SUBJECT : ENGINEERING MATHEMATICS 2

1. Identification of Subject:

Name of Subject :Engineering Mathematics 2
Code of Subject :MATH-1120
SKS / ECTS :3/4
Semester :2
Study Program :B-MEE, B-INE
Lecturer :Dr. Ir. Prianggada Indra Tanaya, MME.

2. Competency

After having the course, students are expected to:

a) understand the usage of matrices in their real-life
b) understand and implement linear algebra methods for solving problems
c) aware the use of matrices and its operations

3. Description of Subject:

Linear Algebra (even the name of this course is Calculus and Linear Algebra) discusses about the content of linear algebra such as linear equation, matrices and their mathematical operations, vector spaces, linear transformation, Eigenvalues and Eigenvectors, linear programming, numerical methods and complex vector spaces. Application to those contents above will be discussed with appropriate chapters.

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4. Learning Approach

Approach : Combination of Expository - inquiry and colaborative
Method : Discussion, question answer, sample problem
Student Task : Home work and/or daily quiz
Media : LCD projector, slide.

5. Evaluation

a) Absence maximum : 25%
b) Participation in discussion : 5 points
c) Daily Quiz : 35 points
d) Final Examination : 60 points
Total : 100 points

6. Contents/ Topics of Lecturing:

Week	Content/ Topics of Lecturing	Text Book Chapter	Remark
1	**Introduction to Linear Algebra & It's Application**		
2	**System of Linear Equations :** Introduction of system of linear equations, Gaussian elimination and Gauss-Jordan elimination, application of systems of linear equations	Ch1[1]	
3	**Matrices :** operation with matrices, properties of matrix operations, the inverse of matrix, elementary matrices, application of matrix operations	Ch2[1]	
4	**Determinants :** Determinant of a matrix, determinants and elementary operations, properties of determinants, application of determinants	Ch3[1]	
5	**Vectro Spaces** Vector in R^n Vector Spaces, subspaces of vector spaces, spanning sets and linear independence, basic and dimension, rank of matrix and systems of linear equations, coordinates and change of basic, application of vector spaces	Ch4[1]	
6	**Inner Product Spaces:** Length and dot product in R^n, inner product spaces, orthonormal bases: Gram-Schmidt process, mathematical models and least square analysis, application of inner product spaces	Ch 5 [1]	

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7	**Linear Transformations :** Introduction to linear transformations, the kernel and range of a linear transformation, matrices for linear transformations, transition matrices and similarity, application of linear transformations	Ch 6[1]	
8	**Eigenvalues and Eigenvectors** Eigenvalues and Eigenvectors, diagonalization, sysmmetric matrices and Orthogonal diagonalization, application of Eigenvalues and Eigenvectors	Ch 7[1]	
9	**Complex Vector Space :** complex numbers, conjugates and division of complex numbers, polar form and DeMoivre's theorem, complex vector spaces and inner products, unitary and Hermitian matrices	Ch 8[1]	online
10	**Linear Programming :** System of linear programming, linear programming involving two variables, the simplex method-maximation, the simplex method-minimization, the simplex method: mixed constraints	Ch 9[1]	online
11	**Numerical Methods :** Gaussian elimination with partial pivoting, iterative methods for solving linear systems, power method for approximating Eigenvalues, application of numerical methods	Ch 10[1]	online
15	**Final Examination**		

7. Book Reference:

a) **Main Text Book: Elementary Linear Algebra,** Author: Ron Larson, Publisher: Cengage Learning, 7th edition.

b) **Supplement Textbooks:** Linear Algebra : A Modern Introduction, Author: David Poole, Publisher: Cengage Technology Edition, 4th edition.

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