University of Moratuwa, Faculty of Engineering, Department of Mathematics-2ed
BSc Engineering Honors Degree
Level 2 Semester 4: 2013/11/25-2014/03/24-16 weeks
Reading Week-2014/01/24-2014/02/02
CE/CP/ EN-(300)-Tue 10.15: 12.15-NA2
ER/ ME/MT/TT-(250)-Fri 10.15: 12.15-NA2

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Module Code	**MA2033**	**Title**	**Linear Algebra**			
Credits	**02**	**Hours/ Week**	**Lectures**	**02**	**Pre-requisites**	MA 1013
			Lab/Tutorials	**-**		

Learning Outcomes

At the end of this module the student should be able to

- Reduce a matrix using Gauss-Jordan reduction.
- Solve a system of n equations in m variables.
- Find the inverse of a matrix, eigen values and eigenvectors of a matrix
- Understand the dimension of a vector space, rank of a matrix and basis for a vector space.
- Understand the concepts of linear independence, linear transformation and determinants.
- Apply theories learnt above to solve engineering problems

Outline Syllabus

Vectors spaces, subspaces, linear combinations, spanning sets, linear independence and bases, column space, row space and the rank of a matrix ; Linear transformations; Eigen values and eigen vectors of nxn matrices; Inner product spaces, diagonalization of matrices, quadratic forms, Cayley-Hamilton theorem, the matrix form of a linear transformation

Detailed Syllabus

sets, systems of linear equations, groups, abelian groups, fields, vectors spaces, subspaces, linear combinations, span, linear independence, bases, dimension, inner product, Gram-Schmidt orthogonalization, linear transformations, nullity, kernel, matrix form of a linear transformation, linear functionals, dual space, eigen values and eigen vectors, characteristic polynomial, minimal polynomial, diagonalization of matrices, QR factorization, quadratic forms, norms, spectral radius, functions of matrices, numerical linear algebra

Method of Assessment

End of semester examination: 2 hour closes book paper: 70%
Mid semester examination: 1 hour open book paper: 10%
In-class assessments: 10%
Take-home assessment: 10%

References

Applied Linear Algebra, Ben Noble and James W. Daniel
Algebra, Michael Artin
A Course in Abstract Algebra, Vijay K. Khanna and S.K. Bhambri
Matrix and Linear Algebra, K. B. Datta
Linear Algebra, Seymour Lipschutz
Numerical Linear Algebra, Lloyd N. Trefethen and David Bau, III