MAT211β (Linear Algebra)
Semester I, 2012/2013

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General information

Tentative course contents

The contents in this course are very useful for mathematics, physics, computer science and other sciences. Topics include

- matrices and matrix algebra, inverse matrices, special square matrices; determinants,
- elementary transformations, elementary matrices, row echelon form and reduced row echelon form of a matrix, normal forms,
- systems of linear equations and their solutions,
- real n dimensional vector spaces, abstract vector spaces and their axioms, subspaces, linear independence, bases for vector spaces, dimension, dimension theorem, dual spaces,
- solutions of linear systmems using matrix rank,
- linear transformations form one vector space to another, Kernel and Image of a linear transformation and related theorems,
- eigenvectors, eigenvalues, Cayley-Hamilton Theorem and its applications, matrix diagonalization, minimum polynomial,
- some applications of linear algebra such as computer graphics, graph theory, errorcorrecting codes, linear economic models, linear regression (least squares), differential equations, Markov chains etc.

Prerequisites

Prior exposure to

- Algebra (MAT121β)
- Vector analysis (MAT111β)
- Calculus (MAT122β)

Course hours

Two lectures (02 hrs) & one tutorial class (01 hr) per week

- Lectures : Thursday 09.00 - 11.00
- Tutorial class : Friday 15.00 - 16.00

80% attendance should be maintained for both lectures and tutorial classes to be eligible to sit for the final examination. Except these conitions, you have to submit at least 50% tutorials due for this course unit.

Form of assessment

- End of semester examination

Course goals

- to provide students with a good understanding of the concepts and methods of linear algebra.
- to help the students develop the ability to solve problems using linear algebra.
- to connect linear algebra to other fields both within and without mathematics.
- to develop abstract and critical reasoning by studying logical proofs and the axiomatic methods as applied to linear algebra

Course objectives

Students will be able to apply the concepts and methods mentioned in the course contents, they will be able to solve problems using linear algebra, they will know a number of applications of linear algebra, and they will be able to follow complex logical arguments and develop modest logical arguments. The class discussions and library references assigned by the lecturer will introduce the concepts, methods, applications, and logical arguments, students will practice them and solve problems in weekly tutorials, and they will be tested on the final examination.

Textbooks

There's no particular text for this course. The students will find a number of books on linear algebra at varying levels of difficulty in the main library of the university.