MECXXX: Applied Linear Algebra

Hours per semester				Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment Mark	Credit Units
LH	PT	TH	CH	WTM	WEM	WCM	CU
45	00	00	45	100	60	40	3

Course description

The course will lay down the basic concepts and techniques of linear algebra needed for subsequent study. At the same time, it will provide an appreciation of the wide application of this discipline within the scientific field. The course will require development of theoretical results. Proofs and consequences of such results will require the use of mathematical rigour, algebraic manipulation, geometry and numerics.

Course objectives

A goal of the course is to provide insight into how linear algebra theorems and results can be applied in everyday life.

Course outcomes

- Comprehend vector spaces (subspaces).
- Understand fundamental properties of matrices including inverse matrices, eigenvalues and linear transformations.
- Be able to solve linear systems of equations.
- Have an insight into the applicability of linear algebra.

Teaching and Learning Pattern

- The teaching of students will be conducted through lectures, tutorials, short classroom exercises, case studies, group discussions among the students and projects aimed at solving real life problems. The lecture material will be availed to the students in advance to enable them have prior reading. Solving real life problems in each theme or a number of topics will enhance the students' understanding of the problem based learning techniques.

Assessment Method

- Assessment will be done through coursework which will include assignments, class room and take home tests, project work and presentations and a written examination. Course work will carry a total of 40% and written examination carries 60%. Coursework marks will be divided into; Assignments 5%, Tests 10% and Practical/project Work 25%.

Course content

I.	Introduction to vectors	2 hours
II.	Solving linear equations	5 hours
III.	Vector spaces and subspaces	5 hours
IV.	Orthogonality	5 hours
V.	Determinants	5 hours

VI.	Eigen values and Eigen vectors	5 hours
VII.	Linear transformations	5 hours
VIII.	Numerical linear algebra	8 hours
IX.	Complex vectors and matrices	5 hours

References

[1] Strang, Gilbert. *Introduction to Linear Algebra*. 4th ed. Wellesley, MA: Wellesley-Cambridge Press, February 2009. ISBN: 9780980232714.

[2] Thomas S. Shores, 2007 Applied linear Algebra and matrix analysis. Springer, ISBN1-10-9780387331959

[3] Carl. D Meyer, 2001 Matrix analysis and applied linear algebra. Springer ISBN-13-978-0898714548