

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Linear Algebra(1)
Course number	MATH2305
Faculty	
Department	
Course type	Major Needs
Course level	2
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - Solve systems of linear equations and homogeneous systems of linear equations by Gaussian elimination and Gauss elimination
- 2 - Reduce a matrix to either row-echelon or reduced row-echelon form
- 3 - Use matrix operations to solve systems of equations and determine the nature of the solutions
- 4 - Find the transpose and inverse of a matrix by performing operations
- 5 - Calculate determinant using row operations, column operations and expansion down any column and across any row
- 6 - Interpret vectors in two and three-dimensional space both algebraically and geometrically
- 7 - Use basic mathematical proof techniques to prove or disprove certain claims
- 8 - Understand the concepts of a linear transformation as a mapping from Euclidean vector space to another and find its standard matrix
- 9 - Understand the concept of a general vector space , basis and dimensions

## Intended Learning Outcomes

<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>* to know the three basic components of linear algebra (theory, computation and applications)</li> <li>* To introduce the students slowly and carefully to the art of developing and writing proofs</li> <li>* To solve consistent systems of linear equations by Gaussian elimination and by Gauss- Jordan elimination</li> <li>* To write the solution set of a given homogeneous system in parametric vector form</li> </ul>
<b>Intellectual Skills</b>	<ul style="list-style-type: none"> <li>* to introduce students to abstract mathematical thinking</li> <li>* To help students to think precisely and express their thoughts clearly</li> <li>* to analyze the information to calculate the correct result</li> <li>* to think creatively and precisely and describe mathematical ideas accurately</li> </ul>
<b>Professional Skills</b>	<ul style="list-style-type: none"> <li>* To find the inverse of a square matrix and to know the rules of matrix arithmetic</li> </ul>
<b>General Skill</b>	<ul style="list-style-type: none"> <li>* to be able to learn valuable skills to discover mathematical results</li> <li>* to learn how to work in groups and cooperate with others</li> </ul>

## Course Contents

<ol style="list-style-type: none"> <li>1 - Systems of linear equations ,matrices and matrix operations , Inverse , elementary matrices and a method for finding the invers</li> <li>2 - Determinant – Finding determine by row Reduction ,Eigen values and Eigen vectors of the matrix</li> <li>3 - Vectors in 2 and 3- space , norm of a vector, dot and cross product</li> <li>4 - Euclidean n-space, transformations</li> <li>5 - Vector spaces ,Subspaces,Basis and Dimension of the vector space</li> </ol>
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## Teaching and Learning Methods

1 - Lectures, Solving problems, group assignments
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## Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
First Mid Term	Week 6	20
Second Mid Term	Week 11	20
Homework	During semester	5
Attendance and participation	During semester	5
Final Exam	Week 16	50

## Books and References

Essential books	Elementary linear algebra : applications version / Howard Anton, Chris Rorres. 11th Ed, 2014
Recommended books	<p>Linear Algebra, Stephen Friedberg, Arnold Insel and Lawrence Spence,2015</p> <p>Linear Algebra with Applications ,Jeffrey Holt ,W. H. Freeman and Company 2013</p> <p>Linear Algebra with Applications, Jeanne Agnew, Robert C. Knapp,Brooks/Cole Pub. Co., 1983</p> <p>Elementary Linear Algebra, Ron Larson ,David C. Falvo ,Houghton Mifflin Harcourt Publishing Company,6 Ed.2009</p>

