

Course Specifications of  
Mathematics II – B112 2008/2009

Faculty: **Benha Faculty of engineering**

University: Banha

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Program on which the course is given : All programs

Major or minor elements of program : N.A.

Departments offering the program : All departments

Department offering the course : Department of Basic Science

Academic year/level : First year- Second semester

Date of specification approval : / / 2009

**A - Basic Information**

Title : Mathematics

Code : B112

Credit Hours : N.A.

Lecture : 4

Tutorial : 2

Lab : 0

**B – Professional Information**

**1. Overall aims of the course**

By the end of this course the student will be able to:

- Manipulate laws of matrix algebra
- Apply matrix algebra to the solution of a set of linear equations
- Know the concepts of a vector space (as an algebraic structure) and the concept of a subspace.
- Deal with linear combination and the span and linear dependence and linear independence.
- Know the definition of an inner product space and understand the orthogonality of vectors.
- Find the eigenvalues and the corresponding eigespaces and hence diagonalize square matrices.
- Know the space of free vectors  $V_3$  and use its algebra to deal with linear geometry in three dimensions.
- Deal with graphing in polar coordinates.
- Know the standard forms of conic sections and their properties.
- Know the definition of the complex number system and manipulate its algebra.
- Know the definition of an indefinite integral and its rules.
- Apply rules of integration to problems in dynamics.
- Evaluate integrals using different methods of integration.
- Deal with definite integrals and its rules and applications to areas, volumes of revolution and lengths of curves. .
- Know the concept of convergence of sequences and series and obtain Taylor's and Maclaurin's expansion of functions.

**2. Intended Learning outcomes of the course**

(a) ***Knowledge and understanding***

- (i) Acquire knowledge for subsequent courses in mathematics.
- (ii) Acquire tools for introductory and advanced engineering courses.

(b) ***Intellectual skills***

- (i) Develop prerequisite analytical skills for subsequent courses in mathematics.
- (ii) Acquire familiarity with modeling physical and engineering problems.

(c) **Professional and practical skills**

N.A.

(d) **General and transferable skills**

N.A.

**3. Contents**

Topic	Nº of hours	Lecture	Tutorial
Matrix algebra	3	2	1
Solution of linear systems and applications	3	2	1
Vector spaces and vector subspaces	3	2	1
Inner product spaces	3	2	1
Eigenvalues and eigenvectors	3	2	1
Diagonalization of matrices	3	2	1
Vector algebra and linear geometry in three dimensions.	3	2	1
Polar coordinates – conic sections	3	2	1
Complex numbers	3	2	1
Indefinite integral and its applications	6	4	2
Methods of integration	3	2	1
Definite integral and applications	6	4	2
Sequences and series – Taylor's expansion of functions	3	2	1

**4. Teaching and learning methods**

(a) **Lectures** (power point presentation recommended)

(b) **Class tutorials**

**5. Students' assessment methods**

(a) **Midterm examination**

(b) **Assignments and quizzes**

(c) **Final examination**

**5.1 Assessment schedule**

Weekly

**5.2 Weighting of assessments**

Class participation and attendance 10%

Assignments and quizzes 10%

Midterm examination 20%

Final examination 60%

**6. List of references**

**(i) Lecture Notes**

Linear Algebra and geometry Staff members

One Variable Calculus II Staff members

**(ii) Reference Books**

Thomas and Finney Latest edition

**7. Facilities required for teaching and learning**

Data show – projector

Course Coordinator

Head of Department