



## Model No.12

### Course Specifications: Mathematics (1-B)

**University:** Benha University

**Faculty:** Faculty of Engineering at Shoubra

**Department offering the program:** All

**Department offering the course:** Engineering Mathematics and Physics

#### 1- Course Data

Course Code: EMP021

Course Title: Mathematics 1- B

Specialization: All

Study Year : Prep. Year 2016 – 2017, Second Semester

Teaching Hours : 6

Lecture : 4

Tutorial : 2

Practical : 0

#### 2- Course Aims

- 2.1 Provide the students the concepts of hyperbolic and inverse functions, the methods of integration and the definite integral with its applications.
- 2.2 Teach the students the fundamentals of analytical geometry, properties of conic sections and quadratic surfaces.
- 2.3 Apply the methods of integration for modeling and solving real problems.

#### 3- Intended Learning Outcomes of Course (ILO's)

On completing this course, students will be able to:

##### a- Knowledge and understanding

- a.1 Define the hyperbolic and inverse functions.
- a.2 State the methods of integration and the applications of the definite integral.
- a.3 Describe the curves of conic sections.
- a.4 Recognize the equations of conic sections and quadratic surfaces.

##### b- Intellectual Skills

- b.1 Deduce the derivative of hyperbolic and inverse functions.
- b.2 Select the suitable method of integration.
- b.3 Determine the type of curve corresponding to quadratic equation of two variables.
- b.4 Identify the properties of conic sections.

**c- Professional and Practical Skills**

- c.1 Compute the plane area, arc length, surface area and volumes.
- c.2 Find the equation of a conic section.
- c.3 Sketch the curve of a conic section.
- c.4 Utilize the equations of quadratic surfaces.

**d- General and Transferable Skills**

- d.1 Communicate effectively.
- d.2 Use information technology for obtaining information.
- d.3 Work in a group and lead a team.
- d.4 Manage time effectively and conduct self learning.

**4- Contents**

Week	Topic	No. of Hours	
		Lecture	Tutorials
1	<b>Introduction</b> Hyperbolic and inverse functions and their properties. Fundamentals of analytical geometry and coordinates.	2 + 2	2
2	Derivative of hyperbolic and inverse functions. Equation of pair of lines.	2 + 2	2
3	Indefinite integrals of elementary functions. Equation of circle, parametric form, polar form.	2 + 2	2
4	Integration by the method of partial fractions. Tangent line of circle, radical axis, orthogonal circles.	2 + 2	2
5	Integration by parts. Equation of parabola and its curve, parametric form, polar form.	2 + 2	2
6	Integration by reduction. Tangent line of parabola, properties of parabola.	2 + 2	2
7	Definite integral. Equation of ellipse and its curve, parametric form, polar form.	2 + 2	2
8	<b>Mid-Term Exam</b>		
9	<b>Applications of the definite integral</b> : Plane area Tangent line of ellipse, properties of ellipse.	2 + 2	2
10	Volumes. Equation of hyperbola, conjugate hyperbola, properties.	2 + 2	2
11	Arc length. Quadratic equation of two variables and its curve.	2 + 2	2



12	Surface area. Line in space and equation of plane.	2 + 2	2
13	<b>Applications in parametric form:</b> plane area, arc length, surface area and volumes. Equation of sphere and properties.	2 + 2	2
14	<b>Applications in polar form:</b> plane area, arc length, surface area and volumes. Quadratic surfaces, cone, cylinder, paraboloid, ellipsoid.	2 + 2	2
15	Final Exam		

## 5- Teaching and Learning Methods

- 5.1 Lectures
- 5.2 Tutorials

## 6- Teaching and Learning Methods of Disables

Nothing

## 7- Student Assessment

### a- Student Assessment Methods

- Assignments to assess knowledge and general skills.
- Quiz to assess knowledge, intellectual and professional skills.
- Midterm exam to assess knowledge, intellectual and professional skills.
- Final exam to assess knowledge, intellectual and professional skills.

### b- Assessment Schedule

Methods of Assessment	Grading / Marks	Weighting %	Outline Details
Quiz	10	6.5 %	Week: 10
Assignments	10	6.5 %	Week: All
Mid-Term Exams	30	20 %	Week: 8      1 hour
Final Exam	100	67 %	Week 15:    3 hours

## 8- List of References

a- Course Notes	<ul style="list-style-type: none"> <li>• Lectures In Mathematic, Differential and Integral Calculus, Mohamed H. Eid, Benha Univeristy, 2013.</li> <li>• Analytical Geometry, Fathy Abdelsalam, Benha Univeristy, 2015.</li> </ul>
b- Required Books (text books)	<ul style="list-style-type: none"> <li>• Calculus, 6<sup>th</sup> Edition, James Stewart, Thomson Brooks / Cole, U.S.A, 2008.</li> </ul>



	<ul style="list-style-type: none"><li>• Exploring Analytic Geometry with Mathematica, Donated L. Vossler, Academic Press, New York, 1981.</li></ul>
c- Recommended Books	<ul style="list-style-type: none"><li>• Advanced Calculus With Applications In Statistics, 2<sup>nd</sup> Edition, A.I. Khuri, John Wiley &amp; Sons, Inc., New Jersey, 2003.</li></ul>
d- Periodicals, web sites,...	<a href="http://www.intmath.com">www.intmath.com</a> <a href="http://www.thomsonrights.com">www.thomsonrights.com</a>

**Course Coordinator :** Dr. Mohamed Husien Eid and Dr. Fathy Abdelsalam

**Head of Department:** Prof. Dr. Said Adballah

**Model No.11A****Course Specifications : Mathematics (1-B)****University:** Benha University**Faculty:** Faculty of Engineering – Shoubra**Department:** All**Matrix of Knowledge and Skills of the Course**

No.	Topics	Week no.	Knowledge and Understanding	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Derivative of hyperbolic and inverse functions. Equation of pair of lines.	1, 2	a.1, a.2, a.3, a.4	b.1, b.2 , b.3, b.4	c.1, c.2, c.3, c.4,	
2	Indefinite integrals of elementary functions. Equation of circle, parametric form, polar form.	3, 4, 5, 6	a.2, a.3	b.1, b.2 , b.3, b.4	c.1, c.2, c.3, c.4,	
3	Methods of integration Conic sections	7, 8, 9, 10	a.1, a.2	b.1, b.2 , b.3, b.4	c.1, c.2, c.3, c.4,	d.1, d.2, d.3, d.4
4	Applications of the definite integral : plane area, volumes, arclength, surface area. Equation of plane and Quadratic surfaces.	11, 12, 13	a.1, a.2, a.3, a.4	b.1, b.2 , b.3, b.4	c.1, c.2, c.3, c.4,	d.1, d.2, d.3, d.4

**Course Coordinator :** Dr. Mohamed Husien Eid and Dr. Fathy Abdelsalam**Head of Department :** Prof. Dr. Said Adballah

**Matrix of Course Aims and ILO's****Course Title: Mathematics (1- B)****Course Code: EMP021****Teaching Hours:** Lecture: 4                      Tutorial: 2                      Practical: 0                      Total: 6**Major or minor element of program:** Major**Program on which the course is given:** All**Department offering the course:** Engineering Mathematics and Physics Department**Academic year / level:** 2016-2017 Preparatory Year / First Semester**Date of specifications approval:** 16/3/2010

No.	Topics	Knowledge	Intellectual Skills	Professional Skills	General Skills
2.1	Provide the students the concepts of hyperbolic and inverse functions, the methods of integration and the definite integral with its applications.	a.1, a.2, a.3 a.4	b.1, b.2, b.3, b.4	c.1, c.2, c.3, c.4,	
2.2	Teach the students the fundamentals of analytical geometry, properties of conic sections and quadratic surfaces.	a.1, a.2, a.3	b.1, b.2	c.1, c.2, c.3, c.4	
2.3	Apply the methods of integration for modeling and solving real problems.	a.3, a.4	b.3, b.4	c.1, c.2, c.3, c.4	d.1, d.2, d.3, d.4

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