Course Specifications

Program(s) on which this course is given:	1st year in Aero-Engineering Dept.
Department offering the program:	Aeronautics and Aerospace Engineering
Department offering the course:	Engineering Mathematics and Physics Department
Academic Level:	1st year
Date	December 2014
Semester (based on final exam timing)	■ Fall ☐ Spring

A- Basic Information

1. Title:	Mathematics (2)			**Code:**		**MATH116A**		
2. Units/Credit hours per week:	Lectures	3	Tutorial	0.5	Practical		Total	3.5

B- Professional Information

1. Course description:

The course intends to introduce the students to basic mathematical skills necessary for dealing with problems they face in other courses. These skills include multiple integrals interpretation and solution, Fourier series, and infinite series.

2. Intended Learning Outcomes of Course (ILOs):

a) Knowledge and Understanding

At the end of the course the student should be able to:

1. Define and solve the problem of multiple integral (double and triple integral). Use its different applications.
2. Deal with the functions of several variables.
3. Use applications of partial differentiation
4. Expand periodic functions to its trigonometric or complex Fourier series and conclude the relation between them.
5. Explain the convergence and divergence tests for any infinite series.
6. Apply the main methods for expansion of functions in power series.

b) Intellectual Skills

At the end of the course the student should be able to:

1. Solve the problem of multiple integral, and using it to calculate area, volume, mass, centre of gravity of mass, surface area of curved surfaces.
2. Deal with functions of several variables, and applications of partial differentiation.
3. Expand periodic functions in its trigonometric or complex Fourier series, and deriving the relation between them.
4. Choose the appropriate convergence test for any infinite series.
5. Apply the main methods for expansion of functions in power series

c) Professional and Practical Skills

1. Using multiple integral to calculate plane area, volume, mass, centre of gravity of mass, surface area of curved surfaces.
2. Using partial differentiation to evaluate the extreme values for a given function, the envelope, the differentiation under integral sign. Also to calculate the gradient of a scalar function, the divergence and curl of a vector function.
3. Expanding periodic functions in its trigonometric or complex Fourier series.

	4. Studying the convergence and divergence of any infinite series and expanding functions in power series.
	d) General and Transferable Skills
	1. Computational skills. 2. Working in a group. 3. Communication skills

3. Contents

Topic	**Total hours**	**Lectures hours**	**Tutorial/ Practical hours**
Multiple Integral	14	9	5
Partial Differentiation	12	8	4
Fourier Series Expansion	11	7	4
Infinite Series	11	7	2
Total	48	31	15

4. Teaching and Learning Methods	Lectures (Y)	Practical Training/ Laboratory ( )	Seminar/Workshop ( )
	Class Activity (Y)	Case Study ( )	Projects (Y)
	E-learning ( )	Assignments /Homework (Y)	Other:

5. Student Assessment Methods

• **Assessment Schedule**	**Week**
-Assessment 1; Class test	11
-Assessment 2; Project Assignment	14
-Assessment 3; Presentations	
-Assessment 3; Midterm Exam	8
-Assessment 4; Final Exam	15

• **Weighting of Assessments**	
-Mid-Term Examination	15%
-Final-term Examination	70%
-Project	10%
-Class Test	5%
-Presentation	
-Total	100%

6. List of References

-"Mathematics for Engineering Students, First Year", Department of Engineering Math. & Physics - Faculty of Engineering – Cairo university, 2006.

- Thomas' Calculus, 12th Edition, Pearson

7. Facilities Required for Teaching and Learning

- White Board
- Data Show

Course Coordinator:	**Prof. Mehra Salama**
Head of Department:	**Prof. Mohamed Helal**