Course Specifications

Program(s) on which this course is given:	M.Sc. Aerospace Engineering
Department offering the program:	**Aerospace Engineering**
Department offering the course:	**Aerospace Engineering**
Academic Level:	Graduate: MSc, Level 6
Date	April 2015
Semester (based on final exam timing)	☐ Fall ■ Spring

A- Basic Information

1. Title:	Supersonic Aerodynamics			**Code:**		**AER613**		
2. Units/Credit hours per week:	Lectures	2	Tutorial	0	Practical	**0**	Total	2

B- Professional Information

1. Course description:	This course introduces and develops concepts in supersonic aerodynamics. Supersonic flow theory is developed and examined for normal and oblique shockwaves.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Review governing equations of fluid mechanics
	Explain the basic concepts of supersonic aerodynamics
	Understand the basic features of supersonic airfoil designs
	b) Intellectual Skills
	Apply simplifying assumptions to the governing equations in order to reduce complexity
	Solve problems of wing-like and fuselage-like bodies in supersonic flow

3. Contents

Topic	**Total hours**	**Lectures hours**	**Tutorial/ Practical hours**
Governing Equations of Fluid Mechanics (Supersonic and Hypersonic Flows)	3	3	
Wing-Like Bodies in Supersonic Flow	3	3	
Fuselage-Like Bodies in Supersonic Flow	4	4	
Real Gas Effects and Aerodynamic Heating Problems	2	2	

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

5. Student Assessment Methods

• **Assessment Schedule**	**Week**
-Assessment 1; Classwork: Attendance	1 to 12
-Assessment 2; Homework: Problems	1, 4, 6, 9
-Assessment 3; Midterm Exam	5
-Assessment 4; Final Exam	13
• **Weighting of Assessments**	
-Assessment 1; Classwork: Attendance	10
-Assessment 2; Homework: Problems	20
-Assessment 3; Midterm Exam	10
-Assessment 4; Final Exam	50
-Total	100 %

6. List of References

- **Course Notes**

Handwritten and Typed

- **Texts**

Anderson A.A., Modern Compressible Flow with Historical Perspective 3rd Ed, McGraw-Hill, 2004

Moore, F.G., Approximate Methods for Weapon Aerodynamics, AIAA, 2000

- **References**

Anderson J.D. Hypersonic and High Temperature Gas Dynamics. New York: McGraw-Hill, 2006

Lunev, Real Gas Flows with High Velocities, CRC, 2009

7. Facilities Required for Teaching and Learning

Tablet and Projector

Course Coordinator:	Assist. Prof. / Hesham Mahmoud AbdelRehim Elbanna
Head of Department:	Prof. Dr. Ayman Hamdy Mohamed Kassem