Course Specifications

Program(s) on which this course is given:	Master of Science Program
Department offering the program:	Department of Aerospace Engineering
Department offering the course:	Department of Aerospace Engineering
Academic Level:	Post Graduate
Date	March 2015
Semester (based on final exam timing)	☐ Fall ■ Spring

A- Basic Information

1. Title:	Aerodynamics of Environment and Pollution				**Code:**	AER 619		
2. Units/Credit hours per week:	Lectures		Tutorial		Practical		Total	

B- Professional Information

1. Coursedescription:	**The aim of this course** is to introduce concepts and techniques of aerodynamics as applied to Environmental and pollution modeling. Students are introduced to the concepts of Planetary Boundary Layer, its characteristics and its diurnal and seasonal variability, Concepts of Hydrostatic Equilibrium and Stability, Atmospheric Radiation, Aerosol and clouds Atmospheric Equations of motion are explained together with Atmospheric motion, small scale and large scale motion and atmospheric waves. Boundary conditions and grids used to construct detailed solutions of the equations are demonstrated. Weather and Climate Forecasting and Weather and Climate Forecast and Pollution Dispersion models and software, sources of weather data, Topological mapping and sources of space and Aerial data to model site topology and create Digital Elevation Models, DEM.. Students will also be introduced to the different scales of the environmental problems and environmental impacts assessment methodology, Authorities and organizations involved with the Environment, Local/Regional and International, Methods of measuring different Environmental aspects, Measurement Stations including data loggers and Networks of Measuring Stations.. , Selected weather modeling Software will be used to practice modeling, weather assessment including dust storm and Aerosol depth assessment.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Understand and recognize the relative roles of Earth boundary layer structure, characteristics and variability.
	Appreciate the roles of topological data including space and Aerial data to model site topology and create Digital Elevation Models, DEM and proper gridding on the quality of Environmental modeling, simulation and visualization.
	Understand the basic terminology and measures used environmental modeling such as AOD, Albedo, NVI, …etc
	b) Intellectual Skills
	Identify and evaluate the roles of surface boundary conditions, side and top boundary conditions on model outcomes.
	Apply and computationally analyze a selected simple environmental situation (Practice, formulate, Analyze, Compute, visualize).
	c) Professional and Practical Skills
	Be able to import and generate the required data for Simple site/local analysis.
	Be able to use selected readymade software to analyze environmental conditions as flow situations. And be able to assess the qualities of obtained solutions.
	d) General and Transferable Skills

	Visualize the results statically (Charts, Graphs and contour maps) and dynamically (Computed Animations).
	Assess the outcomes and Evaluate their usefulness and relevance.
	Students should be able to achieve alone and by working in groups.

3. Contents

Topic	**Total hours**	**Lectures hours**	**Tutorial/ Practical hours**

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;Class test	
-Assessment 2; Project Assignment	
-Assessment 3; Presentations	
-Assessment 3; Midterm Exam	
-Assessment 4; Final Exam	

- **Weighting of Assessments**

-Mid-Term Examination	
-Final-term Examination	
-Project	
-Class Test	
-Presentation	
-Total	

6. List of References

7. Facilities Required for Teaching and Learning

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Course Coordinator:	**Prof. Dr. Atef O. Sherif**
Head of Department:	**Prof. Dr. Ayman H. Kasem**