Course Specifications

Program(s) on which this course is given:	Ph.D.
Department offering the program:	Aerospace engineering
Department offering the course:	Aerospace engineering
Academic Level:	Post graduate
Date	
Semester (based on final exam timing)	☐ Fall ☐ Spring

A- Basic Information

1. Title:	Intakes and Nozzles				**Code:**	AER 771		
2. Units/Credit hours per week:	Lectures	3	Tutorial	---	Practical	---	Total	3

B- Professional Information

1. Coursedescription:	**This course covers both internal and external flow around intakes and nozzles in subsonic and supersonic regimes. It also introduces additional types to those types covered in undergraduate level.**
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Evaluate external drag
	Evaluate supersonic intakes off design performance
	Inference supersonic nozzle types
	b) Intellectual Skills
	Hypothesizing interactions of different subsystems
	c) Professional and Practical Skills
	Apply new emerging techniques
	d) General and Transferable Skills
	Select and/or Construct suitable mathematical models
	Devise a solution methodology

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Subsonic intakes: Internal/external flow	9	9	-
Analyze of intcrnal/extcrnal/mixed compression intakes	6	6	-
Engine inlet compatibility: Matching, Control	6	6	-
Exhaust nozzle flow analysis: Adiabatic flow, Reacting flow	6	6	-
Nozzle types/characteristics	6	6	-
Internal/external flow interactions	6	6	-
Thrust vectoring	3	3	-

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; Project Assignment	5
-Assessment 2; Project Assignment	11
-Assessment 4; Final Exam	15
• **Weighting of Assessments**	
-Mid-Term Examination	
-Final-term Examination	70%
-Project	30%
-Class Test	
-Presentation	
-Total	100%

6. List of References
Intake Aerodynamics, J.Seddon, E.L.Goldsmith,AIAA Education series,1985
Many papers, research reports/postgraduate theses as related to various topics (to be made available to students)

7. Facilities Required for Teaching and Learning	
Data show-laptop-internet	
Course Coordinator:	Prof. A.A.Hashem
Head of Department:	Prof. A.H.Kasem