Course Specifications

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

A- Basic Information

1. Title:	Design & Manufacturing of Aircraft Parts			**Code:**	AER 320			
2. Units/Credit hours per week:	Lectures	4	Tutorial	2	Practical	--	Total	6

B-Professional Information

1. Course description:	This course introduces the concepts of aircraft weight sizing. Wing load and power load. Aircraft take off, landing, climb, and cruise and maneuver point performance. Matching of pre-specified aircraft point performance to power engine load and wing load. Aircraft conceptual design. Wing, empennage, fuselage, undercarriage and propulsion system conceptual and preliminary design. Rigid body aircraft flight balance. Matching of pre-specified rigid body aircraft performance power engine load and wing load. Rigid body aircraft stability. Flexible elastic aircraft performance, flutter, divergence and control reversal phenomena and practical solutions. Design methodology of aircraft component, wing, empennage, fuselage, undercarriage, engine support. Aircraft detailed design. Aircraft flight testing.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	▪ To know the design phases and the importance of each phase. ▪ To understand the procedure to realize each design phases starting from sizing followed by conceptual design, preliminary design, detailed design, manufacturing and flight testing
	b) Intellectual Skills
	▪ To Learn the method for sizing the aircraft components ▪ To learn the methods for aircraft components preliminary design to satisfy pre-specified balance, performance and stability constraints. ▪ To learn the method of producing and testing aircraft components
	c) Professional and Practical Skills
	▪ To develop a conceptual design to satisfy pre-specified requirements ▪ To apply aircraft engineering calculations to engineering conceptual designs ▪ To define the testing procedure required to accept the design
	d) General and Transferable Skills
	▪ To Analyze calculation results and apply them to conceptual designs ▪ To Participate in team work ▪ To prepare and write professional engineering report ▪ To use of internet in search for scientific and engineering information.

3. Contents			
Topic	**Total hours**	**Lectures hours**	**Tutorial/ Practical hours**
Aircraft weight sizing	12	6	3
Aircraft point performance matching plot	18	18	6
Aircraft components conceptual and preliminary design	16	6	3
Aircraft rigid body balance, performance and stability	18	18	9
Flexible aircraft performance and design , flutter, divergence and control reversal	12	6	6
Aircraft design methodology, Aircraft detailed design, Aircraft flight testing	14	6	3
4. Teaching and Learning Methods	Lectures (60)	Practical Training/ Laboratory (30)	Seminar/Workshop ()
	Class Activity (√)	Case Study (1)	Projects (1)
	E-learning (√)	Assignments /Homework (7)	Other:

5. Student Assessment Methods	
• **Assessment Schedule**	**Week**
-Assessment 1;Class test	4,5,6,8,12
-Assessment 2; Project Assignment	7
-Assessment 3; Presentations	10
-Assessment 3; Midterm Exam	9
-Assessment 4; Final Exam	end of term
• **Weighting of Assessments**	
-Mid-Term Examination	15
-Final-term Examination	75
-Project	30
-Class Test	20
-Presentation	10
-Total	150

6. List of References
Course Notes
Essential Books (Text Books):
Roskam, J., “Airplane Design: Part I, Preliminary Sizing of Airplanes” ROSKAM AVIATION & ENGINEERING.
Stinton, D., “The Design of Aeroplane” BSP Professional Books.
Andeson J., “Aircraft Performance and Design”. McGraw-Hill.
7. Facilities Required for Teaching and Learning

Course Coordinator:	Prof. Dr. Mohamed Nader Abuelfoutouh
Head of Department:	Dr. Ayman Hamdy Kassem