Liverpool John Moores University

Title:	AEROSPACE TECHNOLOGY
Status:	Definitive
Code:	**5013ENGFRI** (117199)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	50
Total Learning Hours:	200	**Private Study:**	150		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	28
Practical	8
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Rpt		40	
Exam	Exam		60	2

Aims

To develop the students ability to understand the advanced technologies that the aerospace industry relies on in particular aerodynamics, propulsion and environmental
aspects.

Learning Outcomes

After completing the module the student should be able to:

1	Apply principles of thermodynamics and fluid mechanics to the solution of engineering problems associated with aerospace vehicles.
2	Apply theories and procedures associated with the aerodynamics and propulsion of aerospace vehicles at subsonic, transonic and supersonic airspeeds
3	Recognise the causes and methods for prevention of environmental issues within the aerospace industry

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Lab report	2	3	
Exam	1	2	3

Outline Syllabus

Subsonic Aerodynamics:
The International Standard Atmosphere (ISA), Concepts of Lift, Drag and Pitching Moment. Applications of Bernoulli's Equation to Aerodynamics. Aerofoil Section classifications. Aerofoil Section and Wing Planform characteristics and their effect on Lift. Calculation of Lift, Drag and Pitching Moment for given flight conditions. Forces acting on and performance of aircraft in various orientations of flight and flight conditions. The Lanchester-Prandtl Rule for Lift and Drag prediction.

High Speed Flight:
Critical Mach Number and development of shockwaves, Mach Angle, Effects of compressibility on Lift, Drag and Pitching Moment. Use of Prantl-Glauert and Karman-Tsien Rules to predict compressibility effects. Design Features of High Speed Aircraft

Aircraft Stability and Control:
Difference between Stability and Control. Types of Aircraft Stability. Aircraft Control in 3D Space. Pre-flight weight and balance calculations

Propulsion:
Gas power cycles, gas turbine analysis, 1-d steady flow and jet propulsion. Advanced forced convection, boundary layer theory, dimensional analysis, radiation. Propulsion Technology

Environmental Issues:
Aircraft Emissions (Gaseous emissions and noise). Effect of gaseous and noise emissions on the environment and health. Environmental legislation applicable to aviation activities. Quantitative assessment of gaseous and noise emissions. Aerotoxic Syndrome.

Learning Activities

Lectures, tutorials and laboratory work

Notes

The module introduces the student to the underlying theory and practice of aerospace technology to enable a basic understanding of aerodynamics, propulsion and environmental aspects.