

MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

16231 (ME207 sem1 / ME213 sem2) FLIGHT AND SPACEFLIGHT 1

Module Registrar: Dr M Fossati marco.fossati@strath.ac.uk	Taught To (Course): Cohorts for whom class is compulsory / elective		
Other Lecturers Involved:	Credit Weighting: 10 (ECTS 5)	Semester: 1 and 2	
Assumed Prerequisites: none	Compulsory / elective class	Academic Level: 2	Suitable for Exchange: Y

Alternative codes and credit values for those taking only one semester:

Semester 1: ME207 Flight and Spaceflight 1 (sem1) [5 Credits]

Semester 2: ME213 Flight and Spaceflight 1 (sem2) [5 Credits]

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
22	22							56	100

Educational Aim

This module aims to give a theoretical and historical background to the development of modern aircraft and spacecraft design.

Learning Outcomes

On completion of the module the student is expected to have a sound knowledge of:

- LO1 The history of flight, aircraft propulsion, and spaceflight.
- LO2 The generation of lift, drag and thrust.
- LO3 Aircraft flight instruments.
- LO4 Aircraft and rocket propulsion and rocket staging.

Syllabus

The module will teach the following:

1. History of flight.
2. Theoretical aerodynamics: aircraft layout and nomenclature, lift and drag coefficients, Bernoulli's equation.
3. Generation of lift: aerofoil aerodynamics, boundary layers, stall, high lift devices.
4. Generation of drag: lift induced, wave, form, skin friction, interference, trim, cooling.
5. Flight instruments: airspeed indicator, indicated and equivalent airspeed, altimeter, rate of climb meter, International Standard Atmosphere.
6. Bluff body aerodynamics: flows past cylinders, spheres and bluff bodies, vortex shedding industrial aerodynamics.
7. Generation of thrust: propeller theory, history of turbojet development, gas turbines, inlets, compressors, combustion chambers, turbines and afterburners.
8. Spaceflight: history of rocket development, rocket engines, multistaging, escape velocity.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1 The history of flight, aircraft propulsion, and spaceflight.

C1 Have a sound knowledge of the history of aviation and be able to discuss this.

LO2 The generation of lift, drag and thrust.

C1 Be able to explain how lift is created and what causes flow separation.

C2 Understand non dimensional numbers in relation to lift drag and Reynolds effects.

C3 Be able to calculate lift and drag forces using lift and drag coefficients.

LO3 Aircraft flight instruments.

C1 Understand how flight instruments work and be able to describe them in detail.

C2 Be able to explain the difference between true, indicated and equivalent airspeed.

LO4 Aircraft and rocket propulsion and rocket staging.

C1 be able to describe how jet and rocket engines produce thrust.

C2 be able to describe the purpose of both constant pitch and variable pitch propeller.

C3 calculate burnout velocities for multiple stage rockets.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

(within Assessment and Feedback Policy at: <https://www.strath.ac.uk/professionalservices/staff/policies/academic/>)

Assessment will be by online examination using Myplace.

Students will be able to assess their progress and obtain feedback by a number of online quizzes that will not be assessed. Tutorial sheets will be provided which may be discussed during tutorial sessions. Feedback on the December and April/May examinations will be provided automatically after the end of the examination.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams (*individual weightings*)

Examination (online)				Coursework		Practical		Project	
Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting	Number	Weighting
2	Dec & Apr/May	30mins each	100% (50% each)						
* LO1-4				*		*		*	

* **L/Os:** Indicate which Learning Outcomes (L01, L02, etc) are to be assessed by exam/coursework/practical/project as required.

Coursework / Submissions deadlines:

Resit Assessment Procedures:

1hr examination (online via Myplace) in August diet

PLEASE NOTE:

Students need to gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-assessed during the August diet. This re-assessment will consist entirely of an exam. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

****Purchase essential ***Purchase recommended **Highly recommended reading
 *Simply for reference (do NOT purchase)

*** "Aircraft Flight" by R H Barnard & D R Philpott, Longman, ISBN 0-582-00338-5

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No
		Check timetable webpages for details

Session: 2023/24

Approved:

Course Director Signature: S Connolly (on behalf of E Henderson)

Date of Last Modifications: 25/08/2023

(Updated August 2023)

