Liverpool John Moores University

Title:	Aircraft Systems Design A
Status:	Definitive
Code:	**7101UAS** (126085)
Version Start Date:	01-08-2019
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
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Academic Level:	FHEQ7	**Credit Value:**	20	**Total Delivered Hours:**	33
Total Learning Hours:	200	**Private Study:**	167		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	3
Tutorial	8

Grading Basis: 50 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Aerodynamics calculation for a given wing geometry	40	
Portfolio	AS2	Performance prediction, estimation and validation of a given UAV system	60	

Aims

This module aims to provide knowledge for pre-concept design and conceptual design of a UAV, to develop the fundamental knowledge of how systems are integrated in the design, development and deployment of the UAV.

Learning Outcomes

After completing the module the student should be able to:

1	Calculate UAV performance and critically assess flight capabilities.
2	Analyse and apply concepts of UAV technology.
3	Analyse and apply principles of UAV system functions, system interfaces and their integration.
4	Evaluate characteristics of a diverse range of UAV vehicles and their operation.

Learning Outcomes of Assessments

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

Aerodynamics calculation	1	2	
Performance prediction	2	3	4

Outline Syllabus

- *Introduction to Unmanned Aircraft Systems.*
- *Overview of Fixed-wing and Rotary UAV Systems.*
- *Introduction to Design and Selection of the UAV System.*
- *UAV Design Standards and Regulatory Aspects.*
- *UAV Operating Environments and Navigation.*
- *Aspects of Airframe Design.*
- *Propulsion Systems.*
- *Rotor Systems.*
- *Control Stations.*
- *Communications.*
- *UAV Flight Control Systems and Stability.*

Learning Activities

This is a knowledge-based module which will be steered by means of lectures, tutorials and practical sessions. These will provide insights into the fixed-wing and rotary UAV design process and guide independent research.

The lectures will address design of the key UAV components and the practice session will show how to apply knowledge covered in the lecture material. A few UAVs (Rotary and Fixed-Wing) are used to enhance conceptual design. Computational tasks will include various types of analysis specified by worksheets and implemented via manual calculation or MATLAB programs. The philosophy is based on what UAV look like, what they do and how they perform.

Notes

This module provides a course in aircraft design.