Liverpool John Moores University

Title: UAV Construction
Status: Definitive
Code: **7201DRO**   (124797)
Version Start Date: 01-08-2020

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Frederic Bezombes	Y

Academic Level:	FHEQ7	**Credit Value:**	10	**Total Delivered Hours:**	30	
Total Learning Hours:	100	**Private Study:**	70			

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	3
Practical	7
Tutorial	20

Grading Basis: 50 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Technology	UC-AS1	Weekly assessment of a build blog maintained by the student	50	
Practice	UC_AS2	Final assessment of the UAV as a system in operation.	50	

Aims

To enable students to acquire the knowledge and practical skills needed to create, test and fly a functional UAV system. Starting from basic components and culminating a safe and successful maiden flight.

Learning Outcomes

After completing the module the student should be able to:

1 Demonstrate and possess all of the intellectual, knowledge and practical skills necessary to successfully build a fully functional UAV.
2 Accurately record steps in a build process to form a formal record and act as the basis for a maintenance manual and other UAV management functions.
3 Program and test all sub-systems in a safe and effective manner.
4 Plan and execute a safe and successful maiden test flight of a UAV system

Learning Outcomes of Assessments

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

Weekly assessment   1   2   3

Final assessment of the   3   4
UAV 1

Outline Syllabus

An initial lecture will review the building procedure to be followed. Students will commence the module with a commercial UAV kit, such as the DJI Flamewheel F550. They will, under supervision, acquire the skills necessary to assemble the UAV: soldering power systems, assembling the airframe, installing the power systems (motors, speed controllers etc.), installing the control systems (e.g. a NAZA V2 Flight Controller) and navigation systems (a DJI GPS compass and location systems).
A second lecture, delivered at the mid-point of the module, will focus on programming the UAV's systems and failsafe mechanisms and discuss current practice with regard to firmware updating policies in UAV practice. Once the UAV is physically complete the student will proceed to program the basic systems such as: the flight controller, control transmitter and GPS system using industry standard software. This to include the execution of any necessary firmware updates etc.
A final lecture will explain the procedure to be followed for safe and effective ground tests and pre-flight tests of a new UAV and the methods to be adopted for a safe maiden test flight. Students will then ground test the system and plan a flight test prior to carrying out an actual maiden flight of the system they have constructed.

Learning Activities

There will be 3 one hour lecture sessions at mile posts in the module, as described in the syllabus. The bulk of the module will be delivered via supervised practical hands-on UAV construction in the laboratory. There will be a short field experience near the end of the module to test fly and evaluate the performance of the new UAV.

Notes

This module provides experience in the practice of drone construction.