Module specification

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Module Code	ENG772
Module Title	UAS Technology and Application
Level	7
Credit value	20
Faculty	FAST
HECoS Code	100229
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Unmanned Aircraft System Technology MSc Unmanned Aircraft System Technology with Advanced Practice	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	20 hrs
Placement tutor support	0 hrs
Supervised learning e.g., practical classes, workshops	10 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**30** hrs
Placement / work-based learning	0 hrs
Guided independent study	170 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	Jun 2018
With effect from date	Sept 2022
Date and details of revision	Aug 2022: learning outcomes, assessment and syllabus update in engineering revalidation
Version number	2

Module aims

To support the development of the student in the following areas:

- To apply advanced modelling and analysis to the solution of drone technology related problems.
- To be able to specify, select and assemble flight and payload components and subsystems suitable to an advanced UAV application.
- Demonstrate a proficiency in the skills required to safely operate a UAS.

Module Learning Outcomes - at the end of this module, students will be able to:

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: M2 & M4

1	Critically evaluate the technology and terminology relating to the component elements of an unmanned aircraft system.
2	Critically analyse the airworthiness of a UAS, considering the role, limitations and purpose of the components that comprise a UAS.
3	Analyse the operational parameters required to conduct an advanced UAS mission and evaluate the current problems associated with the successful and safe conduct of a drone mission.

Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1: An individually prepared portfolio consisting of a range of assessments such as case studies, laboratory work and Moodle Quiz, introducing the topic areas of each learning outcomes. Guidance material will be provided, which the students will use to generate a Portfolio of work. Assessment one is an individual prepared portfolio and represents 100% of the overall module mark.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-3	Portfolio	100%

Derogations

Credits shall be awarded by an assessment board for those Level 7 modules in which an overall mark of at least 50% has been achieved with a minimum mark of 40% in each assessment element.

Learning and Teaching Strategies

A series of workshop style lectures with student-led seminars and small group activities. Directed learning using library and internet resources will be facilitated using Moodle and MS Teams. This module will also follow the ALF (Active Learning Framework) guidelines, which will include alternative methods of assessment and a blended approach to delivery, with some theory and software sessions being delivered online (depending on requirements and student experience).

Indicative Syllabus Outline

- UAV System Technology, e.g., Types of drones, Sustainability and impact on environment. Aerodynamics, Transmitters and Receivers, Operational and performance envelopes, UAS flight stability and control theory.

- UAS Design for Airworthiness, e.g., meaning and importance of airworthiness, reliability and maintenance procedures, UAS Inspection, Safety Studies and the design for redundancy and dormant failure modes.

- Payload Technology, e.g., payload centre of gravity, freight conveyancing techniques, camera technology, video storage, Real-time video transmission systems.

- Drone Operations, e.g., mission planning and Risk Assessment, UK Airspace operating principles, Airmanship and aviation safety, Navigation and charts.

- Developing and emerging applications of UAVs, e.g., Search and Rescue, Agriculture, Conservation, Disaster relief, Filmmaking and photography.

Indicative Bibliography:

Essential Reads   *.*

A. Elliott, *Build Your Own Drone Manual. The Practical Guide to Safely Building, Operating and maintaining an Unmanned Aerial Vehicle (UAV).* Haynes, 2016.

Other indicative reading

W. B. Garner, *Model Airplane Propellers. DCRC Club Newsletter,* Vol 55, Issue 4/5, 2009.

A. Juniper, *The Complete Guide to Drones.* 2nd edn. Octopus Publishing Group*, 2018.*

R. Austin, *Unmanned Aircraft Systems: UAVs Design, Development and Deployment.* Wiley-Blackwell, 2010.

D. M. Marshall, et al., *Introduction to Unmanned Aircraft Systems, Second Edition.* CRC Press, 2016.

Plus, various others to be signposted on Moodle.

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the

content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

Core Attributes
Engaged
Enterprising
Creative
Ethical

Key Attitudes
Commitment
Curiosity
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Organisation
Critical Thinking
Emotional Intelligence
Communication