

<b>Module Code:</b>	ENG 414
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<b>Module Title:</b>	Introduction to Drone Technology and Operations
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<b>Level:</b>	4	<b>Credit Value:</b>	10
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<b>Cost Centre(s):</b>	GAME	<u>JACS3</u> <b>code:</b>	H400
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<b>Faculty</b>	FAST	<b>Module Leader:</b>	R.Bolam
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Scheduled learning and teaching hours	18 hrs
Guided independent study	82 hrs
Placement	0 hrs
<b>Module duration (total hours)</b>	<b>100 hrs</b>

*Guidance - normally, the university would expect to see the following amounts of contact time and independent learning time for taught modules as part of its Modular Curriculum Framework;*

<i>Level</i>	<i>Credit volume</i>	<i>Overall learning hours</i>	<i>Contact learning hours</i>	<i>Independent learning hours</i>
<i>Level 3</i>	<i>20 credits</i>	<i>200 hrs</i>	<i>40</i>	<i>160</i>
<i>Level 4</i>	<i>20 credits</i>	<i>200 hrs</i>	<i>36</i>	<i>164</i>
<i>Level 5</i>	<i>20 credits</i>	<i>200 hrs</i>	<i>30</i>	<i>170</i>
<i>Level 6</i>	<i>20 credits</i>	<i>200 hrs</i>	<i>24</i>	<i>176</i>
<i>Level 7</i>	<i>20 credits</i>	<i>200 hrs</i>	<i>21</i>	<i>179</i>

<b>Programme(s) in which to be offered (not including exit awards)</b>	Core	Option
This is a stand-alone module.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<b>Pre-requisites</b>
Basic computer literacy skills

**Office use only**

Initial approval: 18/02/2019  
 With effect from: 01/04/2019  
 Date and details of revision:

Version no:1

Version no:

## Module Aims

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

To gain a knowledge of drone operations, historical development and current applications.

To gain a knowledge of drone technology at a conceptual and working level.

To experience the skills required to operate a drone.

## Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

### At the end of this module, students will be able to

### Key Skills

At the end of this module, students will be able to		Key Skills	
1	Demonstrate a knowledge of the correct terminology relating to the components of a drone system and explain the purpose of the components that comprise a UAV.	KS5	KS4
		KS1	
2	Calculate the power requirements for the operation a multi-rotor and a fixed wing UAV.	KS10	KS6
3	Outline the historical context and potential future roles for UAV's.	KS9	KS6
		KS5	
4	Use a drone simulator to fly a basic mission whilst in GPS hold mode: take-off, fly a rectangular circuit and land.	KS9	KS2
		KS3	

### Transferable skills and other attributes

- Working with others
- Managing self
- Problem solving
- Familiarisation with relevant software packages

## Derogations

None

**Assessment:**

**Assessment 1:** An on-line (e.g. Moodle) 40 question, multi-choice quiz covering all aspects of the syllabus.

**Assessment 2:** A simulated flight exercise.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration or Word count (or equivalent if appropriate)
1	1-3	Quiz	70	N/A
2	4	Simulator Practical	30	N/A

**Learning and Teaching Strategies:**

The module will be taught with lectures, laboratory sessions and simulated flight exercises.

Students enrolled on the stand alone delivery mode will be taught over a six-week period with six 3 hours contact sessions. Or as a three day single block of contact.

**Syllabus outline:**

**Unmanned Air Vehicle (UAV) system Technology**

The anatomy of a drone. Types of drone; fixed wing and multi-rotor designs. Aerodynamics. Power storage and Propulsion systems. Control technology. Flight Controllers. GPS. Internal Navigation Systems.

**Drone Operations**

Mission planning and Risk Assessment for safe drone operation. UK Airspace operating principles. Airmanship and aviation safety. Navigation and charts. Simulated drone flying exercises.

**Historical Context**

Timeline of drone use. Civil and military historical applications. Current applications and potential future uses.

<b>Indicative Bibliography:</b>
<b>Essential reading</b>
<ul style="list-style-type: none"><li>• Civil Aviation Publication CAP 393 The Air Navigation Order. CAA</li><li>• Civil Aviation Publication CAP 722 Unmanned Aircraft System Operations in UK Airspace. CAA</li><li>• Federal Aviation Administration FAA-G-8082-22 (2016) Remote Pilot-small unmanned air systems- Study Guide. FAA</li><li>• Juniper A. (2015) The Complete Guide to Drones. Octopus Publishing Group.</li></ul>
<b>Other indicative reading</b>
<ul style="list-style-type: none"><li>• Elliott, A. (2016) Build Your Own Drone Manual. The Practical Guide to Safely Building, Operating and maintaining an Unmanned Aerial Vehicle (UAV). Haynes.</li></ul>