

MODULE SPECIFICATION FORM

Module Title:	Avionics and Flight Dynamics	Level:	5	Credit Value:	10
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Module code: (if known)	ENG574	Cost Centre:	GAME	JACS2 code:	H430
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Semester(s) in which to be offered:	1	With effect from:	July 2015
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Office use only: To be completed by AQSU:	Date approved: July 2015 Date revised: Version No: 1
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Existing/New:	Existing	Title of module being replaced (if any):	N/A
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Originating Academic area:	Engineering and Applied Physics	Module Leader:	Z Chen
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Module duration (total hours)	100	Status:	Free-standing 10-credit component comprising first half of ENG547 (Avionics, Flight Dynamics and Control).
Scheduled learning and teaching hours	36	core/option/elective (identify programme where appropriate):	
Independent study hours	64		
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	0%
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Programme(s) in which to be offered: Engineering European Programme (Non Award Bearing)	Pre-requisites per programme (between levels):	None
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Module Aims: To develop an understanding of the principles of flight dynamics, linking this to sensors and actuators for aircraft control and guidance thus to demonstrate how this branch of engineering integrates with the other main systems within an aircraft.
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Expected Learning Outcomes		
<u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:		
<ol style="list-style-type: none"> 1. understand flight dynamics and select the appropriate avionics sensor to measure the corresponding motion variable; 2. analyse the functional structure of avionics systems within a modern aircraft and to define the performance of given component sub-systems; (KS 3, 10) 		
<u>Key skills for employability</u>		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 1. Written, oral and media communication skills, 2. Leadership, team working and networking skills 3. Opportunity, creativity and problem solving skills 4. Information technology skills and digital literacy 5. Information management skills 6. Research skills </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 7. Intercultural and sustainability skills 8. Career management skills 9. Learning to learn (managing personal and professional development, self management) 10. Numeracy </td> </tr> </table>	<ol style="list-style-type: none"> 1. Written, oral and media communication skills, 2. Leadership, team working and networking skills 3. Opportunity, creativity and problem solving skills 4. Information technology skills and digital literacy 5. Information management skills 6. Research skills 	<ol style="list-style-type: none"> 7. Intercultural and sustainability skills 8. Career management skills 9. Learning to learn (managing personal and professional development, self management) 10. Numeracy
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Assessment:

Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%). **Details of indicative assessment should also be included.**

Assessment is by means of a portfolio of practical, design and problem solving tasks covering all outcomes. (This corresponds to 'Assessment 1' of ENG547.)

Assessment number (use as appropriate)	Learning Outcomes met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Portfolio	100%		2,000

Learning and Teaching Strategies:

The module will be delivered by a set of structured lectures backed up by tutorials, practical and computer-based Laboratory work and assignments, including use of videos. Approximately 30% of module time will be spent on practical investigations and will include the use of computers and flight simulation software.

Syllabus outline:

Principles of Flight Instruments: altimeter, VSI, air speed indicator, Mach number, Compressibility, density errors, IAS, TAS. Attitude Indicator, Direction Indicator, Radio Magnetic Indicator (RMI), Magnetic variation & deviation, Turn Coordinator.

Sensors and Actuator: static pressure, pitot pressure, pitot tube, air data computer, gyroscopes, accelerometers, electrical actuators, hydraulic actuator

Flight Dynamics Principles: review control surfaces, aircraft handling and flying qualities, aircraft stability; Aircraft modelling for control, Longitudinal Dynamics, Lateral Dynamics.

Bibliography:Essential Reading:

Kayton, M & Fried, W.R. (1997) *Avionics Navigation Systems*, John Wiley & Sons.

Recommended reading:

Spitzer, C.R. (2006) *Digital Avionics Handbook*, 2nd Edn., CRC Press.