

## MODULE SPECIFICATION FORM

Module Title:	<b>Pneumatics and Hydraulics</b>	Level:	<b>4</b>	Cedit Value:	<b>10</b>
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Module code: (if known)	<b>ENG422</b>	Cost Centre:	<b>GAME</b>	JACS2 code:	<b>H300</b>
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Semester(s) in which to be offered:	<b>2</b>	With effect from:	<b>July 2015</b>
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<b>Office use only:</b> To be completed by AQSU:	Date approved: July 2015 Date revised: Version No: 1
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Existing/New:	<b>Existing</b>	Title of module being replaced (if any):	N/A
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Originating Academic area:	<b>Engineering and Applied Physics</b>	Module Leader:	<b>N. Burdon</b>
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Module duration (total hours)	100	Status:	<b>Free-standing 10-credit component comprising second half of ENG463 (Aircraft Systems).</b>
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):	<b>0%</b>
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<b>Programme(s) in which to be offered:</b>  <b>Enginering European Programme (Non Award Bearing)</b>	Pre-requisites per programme (between levels):	<b>None</b>
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<b>Module Aims:</b> To develop an understanding of basic pneumatic systems and advanced hydraulic systems to be used in mechanical and aeronautical applications.
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<p><b>Expected Learning Outcomes</b></p> <p><u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. To explain the operation of hydraulic and pneumatic systems and individual components then analyse component performance.</li> <li>2. Carry out system and component performance analysis.</li> <li>3. Relate the hydraulic and pneumatic systems studied to actual industrial or aeronautical systems.</li> </ol> <p><u>Key skills for employability</u></p> <table border="0"> <tr> <td>1. Written, oral and media communication skills,</td> <td>7. Intercultural and sustainability skills</td> </tr> <tr> <td>2. Leadership, team working and networking skills</td> <td>8. Career management skills</td> </tr> <tr> <td>3. Opportunity, creativity and problem solving skills</td> <td>9. Learning to learn (managing personal and professional development, self management)</td> </tr> <tr> <td>4. Information technology skills and digital literacy</td> <td>10. Numeracy</td> </tr> <tr> <td>5. Information management skills</td> <td></td> </tr> <tr> <td>6. Research skills</td> <td></td> </tr> </table>	1. Written, oral and media communication skills,	7. Intercultural and sustainability skills	2. Leadership, team working and networking skills	8. Career management skills	3. Opportunity, creativity and problem solving skills	9. Learning to learn (managing personal and professional development, self management)	4. Information technology skills and digital literacy	10. Numeracy	5. Information management skills		6. Research skills	
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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.**

The assessment is based on a range of practical labworks and investigations presented as a single portfolio to cover all outcomes. (This corresponds to 'Assessment 1' of ENG463.)

For example, there could be two major design exercises, or investigations; one for pneumatic systems and one for hydraulic systems.

Assessment number (use as appropriate)	Learning Outcomes to be met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Coursework	100%		1500

**Learning and Teaching Strategies:**

The module will be presented to students through a specified series of lectures assisted by notes given to the student at the start of each lecture. Demonstrations will also be arranged to show the operation and set up of a pneumatic and hydraulic systems before the students are expected to carry out their own designs. Where possible, visits to local industries will be arranged to demonstrate actual system operations. Relevant videos will also be used to aid the learning process. Practical assignment exercises will be devised to enhance the students' learning. Approximately one third of the time will be devoted to practical activity.

**Syllabus outline:**

**Aircraft Systems:** Identification and purpose of airframe components - mainplane, tail/fin; flight controls and control surfaces; power plant; electrical system; flight and engine instrumentation,

**Hydraulics:** Principle and operation of individual components within typical systems and examine various applications. Principle and operation of complete hydraulic systems and discuss the arrangement of the components to enable specific functions to be carried out. Analyse the operation of each component within the system. Advantages and disadvantages of hydraulic systems.

**Pneumatics:** Principle and operation of individual components within typical systems. Principle and operation of complete aeronautical/mechanical systems. Analysis of performance of individual components and system operation.

**Bibliography**Essential Reading:

Moir & Seabridge, (2009). *Aircraft Systems*. (Suffolk UK: PEP)

Recommended Reading:

Daly S, (2006). *Automotive Air conditioning and Climate Control System*. (Oxford UK: Elsevier)

Turner I C, (1995). *Engineering Application of Pneumatics & Hydraulics*. (Oxford UK: Butterworth Heinemann)

Parr EA., (1999). *Hydraulics & Pneumatics*. (Oxford UK: Butterworth Heinemann)