PRIFYSGOL glyndŵr UNIVERSITY

MODULE SPECIFICATION FORM*

Module Title:	**Developing Aircraft Technologies**	Level:	**6**	Credit Value:	**10**

Module code: (if known)	**ENG665**	Cost Centre:	**GAAE**	JACS2 code:	H410

Semester(s) in which to be offered:	**1**	With effect from:	**July 2015**

Office use only: To be completed by AQSU:	Date approved: **July 2015** Date revised: Version No: 1

Existing/New: **Existing**	Title of module being replaced (if any):

Originating Academic area:	**Engineering and Applied Physics**	Module Leader:	**R Bolam**

Module duration (total hours)	100	**Status:** core/option/elective (identify programme where appropriate):	**Free-standing 10-credit component comprising half of ENG621 (Modern Aircraft Materials and Technologies).**
Scheduled learning and teaching hours	36		
Independent study hours	64		
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	**0%**

Programme(s) in which to be offered: **Enginering European Programme** (Non Award Bearing)	Pre-requisites per programme (between levels):	**None**

Module Aims:

To develop an understanding of current aircraft technology and forward-looking experimental developments within the world-wide aircraft industry and to anticipate the adoption of particular technologies in the future.
To apply comprehensive analytical methods to materials and technology, including eco-auditing, from industrial perspective.

Expected Learning Outcomes

Knowledge and Understanding:
At the completion of this module, the student should be able to:

1. Demonstrate knowledge of a range innovative, experimental and prototype aircraft;
2. Critically analyse the present and future legislation and green effects for airframe, propulsion and control innovations for novel aircraft and compare with more established conventions;
3. Predict the success of design innovations (including eco-designs) and consider possible improvements. *(KS 6, 7)*

Key skills for employability

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
7. Intercultural and sustainability skills
8. Career management skills
9. Learning to learn (managing personal and professional development, self management)
10. Numeracy

Assessment: *Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%).*

Assessment is by means of an formal report covering all outcomes. Students are required to investigate an individual topic, chosen in agreement with the lecturer, which involves an in-depth probe into the 'forefront of the subject' of aeronautical, or aerospace, engineering. suitable topics would be the use of novel materials such as composite, or the trends in the use of unmanned aircraft and drones.
(This corresponds to Assessment 2 of ENG621.)

Assessment number (use as appropriate)	Learning Outcomes met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Report	100%		2000 words

Learning and Teaching Strategies:

The module should be largely investigative in nature but with some direction though guidance notes within the written assignment exercise. Work should be guided by keynote lectures (limited in number) and supported by occasional small group tutorials. The material should be guided in the light of current/recent developments but with an onus put on each student to develop a deeper knowledge via individual or small group work. The student would be expected to use resources and library, statistical projections, practical testing or other methods to verify the effects of developments.

Syllabus outline:

Current technologies: Survey of the range of current issues regarding aircraft technological development and an in-depth knowledge of one, or a few, specific topic(s). The topics and issues considered herein are only indicative:

Aircraft Developments: Comprehensive investigation of developments; for example, Airbus A350 and Boeing Dreamliner 787, unmanned combat and transport aircrafts etc.

Technological developments: materials used, airfoil and fuselage shapes and configurations (canard/delta/conventional), drag reduction measures, engines, other propulsion, eco-designs, fuel efficiency measures (e.g. the incorporation of sharklets).

Environmental legislation: Investigation of current EU legislation and "green" methods in aircraft evaluation, viability of the developments investigated, extrapolate trends to predict future aircraft design features from environmental perspective.

Bibliography:

Essential reading:

Strong, B. (2008) *Fundamentals of Composites Manufacturing: Materials, Methods and Applications*, 2nd Edn., Dearbon, Michigan: Society of Manufacturing Engineers.

The Aeronautical Journal: Royal Aeronautical Society (www.aerosociety.com), London.

Recommended reading:

Sholte, J. (2005) *Nanotechnology industry trends and applications*, Oxford: John Wiley and Sons.

Reports

Aeronautics and air transport: beyond vision 2020; towards 2050 (2010) Belgium: ACARE.

Aerospace and defence technology report (2003) DTI publication on Aerospace in 2020. London: DTI, HMSO.

European Aeronautics: A vision for 2020 (2001) Luxembourg: European Communities.

Periodicals

Flight International: Reed Business international. London.

Journal of Aerospace Engineering (part G): Institution of Mechanical Engineers (www.imeche.org), London.

Publications by the American Institute of Aeronautics and Astronautics (www.aiaa.org).