PRIFYSGOL glyndŵr UNIVERSITY

MODULE SPECIFICATION FORM

Module Title:	**Design Implementation**	Level:	**4**	Credit Value:	**10**

Module code: (if known)	**ENG486**	Cost Centre:	**GAME**	JACS2 code:	**H150**

Semester(s) in which to be offered:	**2**	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):	N/A

Originating Academic area:	**Engineering and Applied Physics**	Module Leader:	**O. Durieux**

Module duration (total hours)	100	Status: core/option/elective (identify programme where appropriate):	**Free-standing 10-credit component comprising second half of ENG462 (Intro to Eng Design and Practice).**
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:

1. To provide a practical insight into, and experience of, the engineering design process and to relate this to a range of engineering activities including workshops principles and practice;
2. To contextualise these activities within the professional standards of the engineering profession and hence to evaluate and report on the process undertaken.

Expected Learning Outcomes

Knowledge and Understanding:

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

1. Relate and apply professional engineering standards to product design; *(KS 7)*
2. Select materials, components and tools; hence realise a product design using practical skills;
3. Evaluate the success of a design using suitable testing methods;
4. Report on the exercise as a complete activity. *(KS 1)*

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 (%). ***Details of indicative assessment should also be included****.*

Assessment is 100% in-course. The assessment is based on either a major design project or a series of smaller exercises involving specification, component and tool selection, implementation (construction process), testing, evaluation and reporting. On-going feedback will be provided to the students for the duration of the module.
(This can be treated as compatible with Assessment 2 of the 20 credit module ENG462).

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, 4	Report	100%		1,500

Learning and Teaching Strategies:

The module may be considered as a practically based mini-project, with supportive and background studies involving keynote lectures, covering product design and construction. Alternatively, either area of work may consist of a programme of smaller exercises, depending on the specialist area of engineering being covered.

Professional studies, including development of common skills, will be integrated with the practical activities for application and assessment. The emphasis will be on recording, reporting and presentation relating to the practical activities.

Syllabus outline:

Design process: Stages in design; stages in development; apply to software and to hardware product, maintaining a log report of activities.
(Specification, task analysis, outline design, selection of components/materials, detailed design including test definition or evaluation parameters, implementation, testing, evaluation of tests, reiteration as necessary, conclusions, reporting). Refer to quality (quality is designed in, not built in).

Workshop Practice: *(topics to be contextualised for the specialism being studied.)*
Selection of materials and components (the design specification have been previously defined). Planning and construction of a mechanical product or an electrical/electronic circuit or device; implementation of product (already designed using CAD or ECAD); correct use of hand tools, power tools, formers, cutters, machine tools, etching processes, etc, as required;

Health and Safety: comply with Health and Safety procedures, carry out risk assessment.

Personal skills: Self-evaluation (reflective log); target-setting and managing time; listening, speaking, non-verbal communication; note-taking; log report; formal report of complete exercise; presentation. (Reinforcement of health, safety, sustainability, ethical, economic and social considerations during the design/production process.)

Bibliography

Essential reading:

Cross, N. (2008) *Engineering Design Methods: Strategies for Product Design*, 4th Edn., Wiley-Blackwell.
Ashby, M.F. (2010) *Materials Selection in Mechanical Design*, 4th Edn., Butterworth-Heinemann.
Jiles, D. (2001) *Introduction to the Electronic Properties of Materials*, 2nd Edn., CRC Press.

Recommended reading:

Higgins, R. & Bolton, W. (2010) *Materials for Engineering and Technicians,* 5th Edn., Newnes.
Shackelford, J.F. (2008) *Introduction to Materials Science for Engineers*, 7th Edn., Prentice-Hall.
Giudice, F. et al. (2006) *Product Design for the Environment: A Life Cycle Approach*, CRC Press.
Bolton, W. (2001) *Electrical Electronic Measurement & Testing*, Butterworth-Heinemann.
Irene, E. (2008) *Electronic Materials Science: Surfaces, Interfaces, and Thin Films for Microelectronics*, Wiley-Blackwell.
Ulrich, R.K. & Schaper, L.W. (2003*) Integrated Passive Component Technology*, Wiley-Blackwell.

Health and Safety:

HSE (2006) *Essentials of Health and Safety at Work*, 4th Edn., London: HSE – Free-to-download version available at: http://www.hse.gov.uk/pubns/priced/essentials.pdf.