UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Team Project
Module Code	ENG7011-D
Academic Year	2021/2
Credits	40
School	Department of Mechanical and Energy Systems Engineering
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Tutorials	24 short course style
Directed Study	352 (this could include access to workshop for prototype development - in Sem 2 ? if conditions allow)
Project Supervision	24 (14 online and 10 face to face)

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year
BDA	University of Bradford / Non-Standard Academic Year

Module Aims

The aim of this module is to provide the advanced knowledge base necessary to bring a complex product, system or project to a successful delivery, through a systematic approach to product development and systems engineering, deployed within a multi-disciplinary context representative of the dynamics of real world engineering design teams.
Students will develop advanced skills in systems engineering design and product development processes, as well as project management, and strong personal skills for team performance management.

Outline Syllabus

1.Introduction to Competitive Design.
2.Product development frameworks and processes; Total design and Axiomatic design principles; the Failure Mode Avoidance framework for lean product development.
3.Principles of consumer focused engineering and tools to support acquiring consumer insight, and translation to engineering requirements. Product / System Design Specification. Product planning.
4.Systems Engineering Fundamentals; functional models for system representation and design decomposition.
5.Concept generation and selection. Principles of innovation; TRIZ and USIT.
6.The functional framework for robust engineering design; robustness through noise factors management; countermeasure development; robust design verification; the role of DFMEA in managing the design process.
7.Lean product development and systems engineering management. Global product development operations. Managing the design and development process.
8.Project and People skills for successful Competitive Design. Effective communication.

Learning Outcomes

Outcome Number	Description
01	Critically evaluate the complex nature of the processes involved in product development operations and the inherent multidisciplinarity of modern systems engineering design.
02	Explain the principles of axiomatic design, consumer focused engineering and robust engineering design.
03	Discuss approaches to manage complexity in modern systems engineering based on structured design methods.
04	Justify the selection of a framework and process for product development.
05	Demonstrate your ability to plan and complete the design of an interdisciplinary system, product or project by using a formal product development framework.
06	Demonstrate your ability to apply formal design tools for function analysis and decomposition, and function failure mode analysis.
07	Apply formal tools for innovation and countermeasure development.
08	Develop and implement strategies for robustness improvement and development of robust design verification methods.
09	Demonstrate skills in data management; data presentation; data interpretation;
10	Demonstrate ability for systematic problem solving;
11	Demonstrate enhanced skills for communication, teamwork & leadership, personal management.

Learning, Teaching and Assessment Strategy
Product design and development frameworks, processes and tools, will be introduced with a series of short-course style lectures. The module will start with a short course teaching block which will cover methods and tools for product development and systems engineering design (including formal design methods, failure mode avoidance, and team management techniques). Industry / expert guest lectures will cover specialist topics such as perceived quality, user interaction design, HMI / HCI, ASO. The design project report will be the basis for assessment. Most of the materials used in the module have been developed though collaborative work with industry, developed on the principles of constructivist learning within a problem based teaching context. Reference to real world engineering experience and case studies based on current and recent applied research are made throughout the module.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework	Phase 1 Team based project report 80%; team based project oral presentation 20% (1500 words per student)	10%
Summative	Coursework	Phase 2 Team based project report 80%; team based project oral presentation 20%	20%
Summative	Coursework	Report 80%; oral presentation 20%	70%
Referral	Coursework	Supplementary Re-presentation of individual student's contribution to the group project (6000 words)	100%
Formative	Coursework	Project development presentations for formative assessment and peer review	N/A

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:
This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.
