MODULE SPECIFICATION

Part 1: Information			
Module Title	Design, Materials and CAD/CAM		
Module Code	UFMFD8-30-2	Level	Level 5
For implementation from	2019-20		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		

Pre-requisites	Design, Materials and Manufacturing 2019-20
Excluded Combinations	None
Co- requisites	None
Module Entry requirements	None

Part 2: Description

Educational Aims: See Learning Outcomes

Outline Syllabus: The syllabus aims to provide: Understanding of the power and flexibility of advanced CAD and CAM software, hardware and methodologies. An introduction to solid modelling. A description of techniques associated with Computer Aided Manufacturing, CNC part programming, Tooling, and Inspection. The development of a 3D CAD solid model of a part and an understanding of CAM for machining the modelled part. Demonstrations of the integration between design and manufacture. The course will include elements of machine design:

Using standard mechanical components (fasteners, seals, bearings, etc.) and features (location, limits and fits, welds, stress raisers, etc.)

Selection or specification of bought-out equipment (making use of catalogue library and Technical Index)

Principles of materials selection in engineering design: implementation of the material index principle in computer-based materials selection

Structure-property relations in materials: For example, effects of alloying, casting, mechanical

working and heat treatment on the properties of metals; effects of process conditions on the properties of engineering ceramics

Failure mechanisms in components and materials: failure by: buckling, plastic deformation, fracture, fatigue, creep and corrosion; mechanisms involved in these failures and designing against failure

Composite structures, anisotropic conditions, high performance composites, metal matrix and ceramic matrix composites

NDT procedures and the role of NDT in engineering design

Teaching and Learning Methods: The key aim of the course is to establish design practices using scheduled and independent learning modes. It emphasises a practical hands-on design approach.

Scheduled learning includes lectures, computer tutorials using CAD and CAM software, coursework, collaborative group work, worked tutorial sessions, demonstration, practical classes and workshop activities.

Independent learning includes hours engaged with essential reading, preparation, assignment preparation and completion.

Students will be required to complete assignments in their own time using University based CAD/CAM facilities.

Contact hours include workshop time under technician supervision

Activity (hours)
Contact (84)
Assimilation and skill development (108)
Coursework (40)
Exam preparation (68)
Total (300)

Contact hours include workshop time under technician supervision

Part 3: Assessment

Component A1, a two hour end of module examination has been chosen to test the understanding and knowledge of the fundamental principles under controlled conditions.

Component B1 assessment is made up of a design embodiment task and a materials assignment. Students are typically expected to work in groups of 4 to 6 team members. The groups will have to present their work at the end of the first semester and this will be assessed by the module tutors.

Component B2 assessment is made up of a solid modelling task. Students are typically expected to work in groups of 4 to 6 team members. The groups will have to present their work at the end of the second semester and this will be assessed by the tutor.

Component B3 assessment is made up of a report summarising the design embodiment and solid modelling tasks. This will require individual online submission and will be assessed by the module tutor. The report will contain screenshots of the designs and a reflection of the process up to a maximum of 750 words. A template will be provided to help structure the report.

The design project includes machine design calculations, 3D CAD models of engineering components and a materials task.

For each of the group presentations, the mark for each student will be made up of a group mark for the overall quality of the work and an individual mark derived from answers to questions about the design process.

The referred coursework will consist of an individual portfolio of work where the calculations and designs are submitted electronically together with a 750 word individual report.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		7.5 %	Individual written report
Presentation - Component B		37.5 %	Group presentation (machine design calculations, materials task)
Presentation - Component B		30 %	Group preentation (cad)
Examination - Component A	✓	25 %	Examination (2 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		75 %	Portfolio consisting of machine design calculations, materials task, 3D CAD models and individual written report
Examination - Component A	✓	25 %	Examination

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
To show a detailed knowledge and understanding of the implementation of CAD/CAM within the design and manufacturing cycle	MO1
To demonstrate subject specific skills with respect to manufacturing methodologies and technologies	MO2
To be able to design machine components throughout the entire engineering process from the customer design brief and the design specification including structural integrity assessment and practical applications	MO3
To be able to evaluate and implement solutions to design embodiment of mechanical components using engineering principles	MO4
To demonstrate subject specific skills with respect to developing three-dimensional models of products using a CAD system	MO5
To show a detailed knowledge and understanding of the principles and procedures for materials selection and their integration with design	MO6
To explain failure mechanisms, their origin and the presentation of data and hence avoidance of failure by materials selection and use	MO7
To be able to explain materials manipulation processes and their implications for different aspects of materials properties	MO8

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	216
Total Independent Study Hours:	216
Scheduled Learning and Teaching Hours:	
Face-to-face learning	84
Total Scheduled Learning and Teaching Hours:	84
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ufmfd8-30-2.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Aerospace Engineering (Manufacturing) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering (Manufacturing) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering (Design) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering (Design) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Manufacturing) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering (Manufacturing) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Manufacturing) {Apprenticeship} [Sep][PT][UCW][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Manufacturing) {Apprenticeship} [Sep][PT][UCW][5yrs] BEng (Hons) 2018-19
Aerospace Engineering (Design) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering (Design) {Apprenticeship} [Sep][PT][COBC][4yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19
Aerospace Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19