Module Code:	ENG50M

Module Title:	Advanced CAD and Prototyping

Level:	5	**Credit Value:**	**20**

Cost Centre(s):	GAME	JACS3 **code**: HECoS **code**:	J511 100050

Faculty	**Faculty of Arts, Science and Technology**	**Module Leader:**	Martyn Jones

Scheduled learning and teaching hours	30 hrs
Guided independent study	170 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Guidance - normally, the university would expect to see the following amounts of contact time and independent learning time for taught modules as part of its Modular Curriculum Framework;

Programme(s) in which to be offered (not including exit awards)	Core	Option
Stand Alone Module (aligned to BEng Automotive Engineering for QA purposes only)	☐	✓

Pre-requisites
The students must have basic CAD skills and can read a simple drawing with dimensions and symbols

Module Aims

The module provides students an insight into an advanced computer aided design (CAD) package and how to create 3D models from surfaces. Additionally rapid prototyping methods will be discussed in depth to allow students to be able to select appropriate methods for use.

Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to		Key Skills	
1	Create 3D CAD models using extrusions and revolves	KS1	KS4
		KS3	KS9
2	Use surfaces and Boolean operations to create 3D models	KS4	KS9
		KS10	
3	Select appropriate rapid prototyping technologies for applications	KS3	KS5
		KS4	KS9

Transferable skills and other attributes

To organise study time, to study independently, to learn from feedback;
To develop skills for use of software languages and interfaces techniques;
To implement CAD/CAM system to design and production;
To develop skills for using a computer simulation package.

Derogations

None

Assessment:

Indicative Assessment Tasks:

Assessment 1- A multi Choice in class assessment on how to use an advanced CAD packages to create and interrogate 3D CAD models

Assessment 2 – A case study for selecting an appropriate 3D printing process for a particular engineering application

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration or Word count (or equivalent if appropriate)
1	1, 2	Practical	50%	2hr
2	3	Case Study	50%	1000 words

Learning and Teaching Strategies:

Lectures will deliver key concepts, ideas, theories and examples. It is planned that this will be delivered 3 hours a week across 10 weeks in either / both semester 1 and 2.
Tutorials and workshops (lab sessions) will allow the further exploration of the lectures and use exercises to give students the opportunity to investigate, discuss and acquire further subject specific knowledge through individual work.
Self-study exercises and reading are also given.
The assessment for the module will allow students the opportunity to explore key concepts and theories whilst developing an appreciation of 'real-life' issues and situations.
Students will have access to lecture materials and resources, via the University's VLE platform.

Syllabus outline:

- 2D sketching, using constraints and advanced sketching techniques (mirror/symmetry/linked dimensioning)

- Advanced 3D modelling using surfaces, patterns, and Boolean operations.

- Create a CAD model suitable for rapid manufacture using 3D printing

- 3D prototyping technologies and their applications.

Indicative Bibliography:
Essential reading
R Wessekink (2017), *A practical guide to 3D printing: overview of technologies and their applications in the industry, Windesheim.*
Other indicative reading
R. ALavala (2013) *CAD/CAM: Concepts and Applications*, PHI Learning