Module Descriptor

Title	Design for Manufacturing Processes		
Session	2025/26	**Status**	Published
Code	ENGG10086	**SCQF Level**	10
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	P Vichare		

Summary of Module

The design through manufacturing cycle now relies heavily on computer assisted methods to convert conceptual design into consumer and industrial products. This module will cover manufacturing methods and techniques currently used within these application sectors, focusing strongly on the simulation of the methods to manufacture a component. Module will introduce students to various manufacturing process and corrosponding design requirements. These scenarios and case-studies encompass manufacture of automotive, aerospace, die and mould engineering components. Students will gain in-depth knowledge of number of topics ranging from process planning to manufacturing strategy selection.

Subject matter will be delivered mainly by a series of lectures and an innovative programme of laboratory demonstrations using 5 axis CNC machining facility were the practical nature of the module will be emphasised and students will gain experience in using state-of-the-art design and manufacturing software. During the course of this module students will develop their UWS Graduate Attributes. Academic Universal and Work-ready attributes: Students will gain knowledge and understanding of this important discipline as well as having the opportunity to develop a broad range of ICT, technical and transferable skills.

This module has been reviewed and updated, taking cognisance of the University's Curriculum Framework principles. For example, module will be delivered mainly by an innovative laboratory demonstrations, recorded lecture content supporting students to organise their own study time and the use of real-world practical problems, industry standard Computer Aided Engineering activities developing digital intelligence meta-skills.

Module Delivery Method	On-Campus[1] ☒	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☐	Term 2	☒	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate a broad knowledge and design requirements of product manufacturing processes.
L2	Read, understand and use GD&T specifications for product development
L3	Analyse design requirements and configure manufacturing resources using design for manufacturing guidelines.
L4	Simulate and analyse manufacturing processes
L5	N/A

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 10** Knowledge and understanding of computer aided design and manufacturing methods and techniques associated with the use of simulations and data generation in design and manufacturing environments. Specific knowledge and understanding of the application and practices associated with simulation and manufacturing methods and the specific tools associated with the communication of design and manufacturing concepts. Knowledge of the appropriateness of methods and techniques to various manufacturing environments.

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Practice: Applied Knowledge and Understanding	**SCQF 10** Applying knowledge and understanding to develop design and manufacturing strategies for a range of consumer and industrial product types. Assessing different strategies with respect to obtaining appropriate efficient solutions to design and manufacturing problems. Making use of specialised computer aided design and manufacturing techniques to simulate design and manufacturing processes and to generate appropriate data.
Generic Cognitive skills	**SCQF 10** Undertaking and assessing complex definitions and requirements. Making judgments on appropriateness of solution methods and strategies for engineering and design and manufacturing simulations. Perform at a conceptual level when planning and designing. Bringing information together from a variety of sources during problem solving.
Communication, ICT and Numeracy Skills	**SCQF 10** Ability to perform, interpret and evaluate numerical, geometrical and graphical data to create simulations and solveengineering and design problems. Ability to use variables and equations as well as plan open ended tasks. Using communications skills to write technical reports, including text and illustration and making use of appropriate 3Dmethods to produce design and manufacturing information. Using computer aided design and manufacturing hardware and software and associated ICT equipment such asnetworks to support and perform a variety of simulation tasks.
Autonomy, Accountability and Working with Others	**SCQF 10** Identifying and addressing their own learning needs both during and out with class time. Identifying solution routes and strategies using their own initiative. Team-working with peers and support staff. .

Prerequisites	**Module Code** ENGG09056	**Module Title** Computer Aided Design 1
	Other or equivalent	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours. This module will be delivered via a blend of online pre-recorded lectures and classroom tutorial. A range of formative video tutorials will ensure engagement on all topic areas with video recordings of the software for support out of class. Use of discussion forums will be encouraged. Assessment will be via a coursework utilising access to CAD/CAM (or equivalent) software.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	12
Tutorial / Synchronous Support Activity	24
Independent Study	164
n/a	0
n/a	0
n/a	0
TOTAL	200

Indicative Resources

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Course notes, presentations and case studies will be provided.

Hardware/Software: Solidworks software + 40 seat PC Lab with corresponding network facilities and suitable PCs. Software site licences required.

C. McMahon, 'CADCAM : principles, practice and manufacturing management', Addison Wesley Longman (1998), ISBN: 0201178192

I. Zeid, 'Mastering CAD/CAM', McGraw Hill Higher Education (2005), ISBN: 0072868457

T. Chang, R.A. Wysk, and H. Wang 'Computer-aided manufacturing', Pearson Prentice Hall (2006), ISBN: 0131429191

S. Suh, 'Theory and design of CNC systems', Springer (2008), ISBN: 9781848003361

K. Apro, 'Secrets of 5-Axis Machining', Industrial Press, Inc. (2008), ISBN:0831133759

Xu XW, He Q (2004) Striving for a total integration of CAD, CAPP, CAM and CNC. Robotics and Computer-Integrated Manufacturing 20 (2):101-109.

doi:http://dx.doi.org/10.1016/j.rcim.2003.08.003

Knight, W., Boothroyd, G., Faulkner, L. (2005). Fundamentals of Metal Machining and Machine Tools, Third Edition. Boca Raton: CRC Press.

ASME Y14.5-2009, Dimensioning and Tolerancing; Engineering Drawing and related documentation practices, American Society of Mechanical Engineers.

(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following: The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. Students will scan their attendance, via the attendance scanners, each time they are on-campus, they will have their attendance recorded in class and they will be expected to login to the VLE several times per week. Students who are unable to attend a timetabled session, due to illness or other circumstance, should notify their Programme Leader. Across the School an 80% attendance threshold is set. Students who fall below this, will be referred to the Student Success Team to see how they can be best supported in their studies.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code. Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has laboratory-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Engineering Physical Sciences**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Design
Moderator	B Aresh
External Examiner	B Bryant
Accreditation Details	N/A
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	Module Descriptor copied to 2025/26 template and resources list updated to reflect ILR feedback, Attendance, Engagement and

	EDI statements updated.

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Class test 40% Weighting
Assessment 2
Essay: Coursework 60% Weighting
Assessment 3
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test	☒	☒	☐	☐	☐	40	2

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Essay	☒	☒	☒	☒	☐	60	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
N/A	☐	☐	☐	☐	☐		
Combined total for all components						100%	2 hours

Change Control

What	**When**	**Who**
Module Descriptor copied to 2025/26 template and resources list updated to reflect ILR feedback, Attendance, Engagement and EDI statements updated.	26/03/2025	Parag Vichare
