

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Design for Manufacturing Processes			
Code: ENGG10086	SCQF Level: 10 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Computing Engineering and Physical Sciences		
Module Co-ordinator:	Dr Parag Vichare		
Summary of Module			
<p>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 corresponding 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.</p> <p>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.</p> <p>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.</p>			

Module Delivery Method					
Face-To-Face	Blended	Fully Online	HybridC	Hybrid 0	Work-Based Learning
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
See Guidance Note for details.					

Campus(es) for Module Delivery						
The module will normally be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	<input type="checkbox"/>	Term 2	<input checked="" type="checkbox"/>	Term 3	<input type="checkbox"/>

Learning Outcomes: (maximum of 5 statements)	
At the end of this module the student will be able to:	
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

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)	<p>SCQF Level 10</p> <p>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.</p> <p>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.</p> <p>Knowledge of the appropriateness of methods and techniques to various manufacturing environments.</p>

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

	Team-working with peers and support staff.	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: ENGG09056	Module Title: Computer Aided Design 1
	Other:	Or equivalent
Co-requisites	Module Code:	Module Title:

*Indicates that module descriptor is not published.

Learning and Teaching	
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.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	Student Learning Hours (Normally totalling 200 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
	Hours Total 200
**Indicative Resources: (eg. Core text, journals, internet access)	
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, 'CAD/CAM : 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.

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](#).

(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 and Physical Sciences
Assessment Results (Pass/Fail)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
School Assessment Board	Engineering
Moderator	Balaji Aresh

External Examiner	F Inam
Accreditation Details	N/A
Changes/Version Number	1.01 (was 1.00 - Original) Module Delivery Changed to Face-To-Face from Hybrid C. Module delivery hours updated to reflect Curriculum Framework norms.

Assessment: (also refer to Assessment Outcomes Grids below)

Assessment 1 - Class test (Essay)

(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.)

Assessment Outcome Grids (See Guidance Note)

Component 1						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class Test (written)	✓	✓			40	0

Component 2						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Essay	✓	✓	✓	✓	60	0
Combined Total for All Components					100%	0 hours