

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Computer Aided Design 1			
Code: ENGG09056	SCQF Level: 9 (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 Balaji Aresh		
Summary of Module			
<p>The role of Computer Aided Design (CAD) systems and associated techniques are proving to be ever more critical as enabling technologies in the engineering and design environment. Great emphasis is now being placed on these technologies.</p> <p>This module will develop students' knowledge of, and practice using an industry standard CAD system. It will provide an introduction to the engineering design process, an understanding of the role which CAD and Product Data Management (PDM) systems play in their effective implementation, and the strategic importance of CAD/ PDM systems for enterprise-wide product modelling will be introduced. Secure product data/information exchange/storage/authorising mechanisms and relevant scenarios in product development will also be covered throughout this module. Students will use Solidworks package, gaining experience/knowledge of navigating through menus and workbenches. They will learn to implement parametric relationships, Feature-Based Design, assembly modelling and for creating engineering drawings as a part of product design and development process.</p> <p>During the course of this module students will develop their <u>UWS Graduate Attributes</u>. 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 checked="" type="checkbox"/>	Term 2	<input 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	Recognise the impact of CAD and PDM systems on the product design and development process.
L2	Demonstrate the use a CAD parametric modelling approach to capture design requirements and to configure a product geometry using feature-base modelling tools.
L3	Employ assembly modelling techniques to create product assemblies
L4	Produce engineering drawings using industry-standards.

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 9</p> <p>A broad knowledge and understanding of computer aided design (CAD) methods and techniques and how these fit into engineering and design strategies.</p> <p>A critical knowledge and understanding of the application, techniques and practices associated with CAD in the engineering and design environment.</p> <p>To gain specific knowledge of the appropriateness of methods and techniques for different CAD related problems/scenarios.</p> <p>Knowledge and understanding of health & safety, diversity, inclusion, cultural, societal, environmental and commercial</p>

	<p>matters, codes of practice and industry standards when undertaking and evaluating design activity.</p> <p>Understanding of mitigation of security risks in relation to accessing and storing data and digital equipment. Making use of specialised 3D modelling techniques to produce efficient design</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 9</p> <p>Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.</p> <p>Making use of specialised 3D modelling techniques to produce efficient design solutions.</p> <p>Applying specialised CAD techniques to solve engineering and design problems such as parameterisation methods or automation techniques.</p> <p>Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.</p> <p>Select and critically evaluate technical literature and other sources of information to solve complex problems.</p>
Generic Cognitive skills	<p>SCQF Level 9</p> <p>Undertaking, evaluating and assessing critical CAD methods. Making judgements on appropriateness of CAD solution strategies. Being able to develop conceptual solutions and strategies to CAD related problems and activities.</p> <p>Critically discuss solution strategies and issues associated with CAD techniques.</p> <p>Bringing information together from a variety of sources during problem solving and being able to perceive potential problems with methods and strategies.</p>
Communication, ICT and Numeracy Skills	<p>SCQF Level 9</p> <p>Ability to perform, interpret and evaluate complex numerical, geometrical and graphical data and using it to solve problems.</p> <p>Ability to use variables and equations. Ability to integrate existing software with other applications such as spread sheets.</p>

	<p>Using communications skills to write detailed, technical reports, including text and illustration. Communicate using CAD systems through animated sequences and other standard presentation media.</p> <p>Using CAD hardware and software and associated ICT equipment and systems such as networks to support and perform a wide range of problem solving and CAD related tasks.</p>				
Autonomy, Accountability and Working with others	<p>SCQF Level 9</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 and informed judgements.</p>				
Pre-requisites:	Before undertaking this module the student should have undertaken the following:				
	<table border="1"> <tr> <td>Module Code:</td> <td>Module Title:</td> </tr> <tr> <td>Other:</td> <td></td> </tr> </table>	Module Code:	Module Title:	Other:	
	Module Code:	Module Title:			
Other:					
Co-requisites	<table border="1"> <tr> <td>Module Code:</td> <td>Module Title:</td> </tr> </table>	Module Code:	Module Title:		
Module Code:	Module Title:				

*Indicates that module descriptor is not published.

Learning and Teaching	
<p>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.</p>	
<p>Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:</p>	<p>Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)</p>
Lecture/Core Content Delivery	12
Tutorial/Synchronous Support Activity	24
Independent Study	164

	Hours Total 200
**Indicative Resources: (eg. Core text, journals, internet access)	
<p>The following materials form essential underpinning for the module content and ultimately for the learning outcomes:</p> <p>Course notes, presentations and case studies will be provided.</p> <p>Hardware/Software: Solidworks software + 40 seat PC Lab with corresponding network facilities and suitable PCs. Software site licences required.</p> <p>Chang, K. H. (2015). E-Design: Computer-aided Engineering Design, Academic Press.</p> <p>Planchard, D. (2022). Engineering Design with SOLIDWORKS 2022: A Step-by-Step Project Based Approach Utilizing 3D Solid Modelling, SDC Publications. Shih, R. and P. Schilling (2022). Parametric Modelling with SOLIDWORKS 2022, SDC Publications.</p> <p>Tony Liu, D. and X. William Xu (2001). A review of web-based product data management systems. Computers in Industry 44(3): 251-262.</p>	
<p>(**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)</p>	
Attendance and Engagement Requirements	
<p>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.</p>	
Equality and Diversity	
<p>The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.</p>	
<p>(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)</p>	

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	Parag Vichare
External Examiner	P Lewis
Accreditation Details	This module is part of the IMechE accredited programmes BEng/Meng (Hons) Aircraft and BEng/Meng (Hons) Mechanical Engineering.
Changes/Version Number	1.01 (was 1.00 - Original) Module Coordinator changed to Dr B. Aresh from TBC. Module Delivery Changed to Face-To-Face from Hybrid C. Module Moderator changed to Parag Vichare from Tony Leslie.

Assessment: (also refer to Assessment Outcomes Grids below)
Assessment 1 - Class test (MCQ and Descriptive questions)
Assessment 2 - Class test (3D Modelling- Practical)
Assessment 3 - 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)	✓				20	2

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
Class test (practical)		✓			30	2

Component 3						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Essay		✓	✓	✓	50	
Combined Total for All Components					100%	4 hours