

University of the West of Scotland

Module Descriptor

Session: 2024/25

Title of Module: Computer Aided Design 2			
Code: ENGG09057	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 Parag Vichare		
Summary of Module			
<p>Product development, regardless of application area, involves configuring, organising, structuring, storing, and tracking the product data created by a design and development team. Today products are designed independently as well as collaboratively using global supply chain which may involve the use of advanced 3D computer aided modelling packages for managing design complexity.</p> <p>This module extends the use of Solidworks package, allowing students to gain experience/knowledge of constructing, modifying and constraining 3d wireframes for configuring surface based geometry for capturing product specifications and requirements. Smart-design and productivity techniques used for complex assembly designs will be introduced. Kinematic mechanisms and simulations will be configured for building Digital Mock-ups. Mixed-reality techniques, Analysis tools and feasibility/optimisation methods currently used within the design process will be utilised.</p> <p>During the course of this module students will develop their UWS Graduate Attributes. Academic Work-ready attributes: Knowledgeable and understanding of computer aided design methods and techniques for product development.</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 smart-design and productivity techniques for configuring complex design scenarios
L2	Apply wireframe and surface modelling tools to capture design requirements and to configure/edit a product geometry
L3	Generate advanced assembly modelling and management techniques to create complex product assemblies
L4	Design and develop kinematic mechanisms and demonstrate an ability to use analysis tool for feasibility/optimisation study
L5	Demonstrate the use Mixed-reality techniques for collaborative product design/review process

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 specialised 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 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.</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 9</p> <p>Applying knowledge and understanding to develop solid and surface modelling solutions for a range of mechanical and aircraft engineering problems.</p> <p>Assessing and analysing different design options with respect to obtaining a suitable design solution. Making use of specialised 3D modelling techniques to produce efficient design solutions.</p> <p>Making use of Kinematic techniques to confirm range of movement of a design.</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> <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>
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. Formulate and analyse complex design problems to reach substantiated conclusions using CAD systems.</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. Make use of multi-purpose integrated software systems to solve or provide solutions to complex CAD related activities.</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> <p>Communicate effectively on complex engineering matters with technical and non-technical audiences using CAD and mixed-reality tools</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:	<p>Before undertaking this module the student should have undertaken the following:</p> <table border="1" data-bbox="515 1323 1359 1478"> <tr> <td data-bbox="515 1323 794 1406">Module Code: ENGG09056</td> <td data-bbox="802 1323 1359 1406">Module Title: Computer Aided Design 1</td> </tr> <tr> <td data-bbox="515 1417 794 1478">Other:</td> <td data-bbox="802 1417 1359 1478">Or equivalent</td> </tr> </table>		Module Code: ENGG09056	Module Title: Computer Aided Design 1	Other:	Or equivalent
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	
<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</p>	<p>Student Learning Hours (Normally totalling 200)</p>

undertaken to achieve the module learning outcomes are stated below:	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.

Tran, P., SOLIDWORKS 2022 Intermediate Skills: Expanding on Solids, Surfaces, Multibodies, Configurations, Drawings, Sheet Metal and Assemblies. 2021: SDC Publications.

Tran, L., Mastering Surface Modelling with SOLIDWORKS 2022: Basic through Advanced Techniques. 2021: SDC Publications. Chang, K.H., E-Design: Computer-aided Engineering Design. 2015: Academic Press.

Chang, K.H., Motion Simulation and Mechanism Design with SOLIDWORKS Motion 2021. 2021: SDC Publications (Schroff Development Corporation).

(**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	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 Parag Vichare from TBC. Module Delivery Changed to Face-To-Face from Hybrid C. Module Moderator changed to Balaji Aresh from Tony Leslie.

Assessment: (also refer to Assessment Outcomes Grids below)

Assessment 1 - Class test (3D Modelling)

Assessment 2 - 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)	Learning Outcome (5)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class Test (Practical)	✓	✓				30	2

Component 2							
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Learning Outcome (5)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Essay		✓	✓	✓	✓	70	0
Combined Total for All Components						100%	2 hours