

Session: 2022/23

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<b>Title of Module: Computer Aided Design CAD</b>			
<b>Code: ENGG08002</b>	<b>SCQF Level: 8</b> (Scottish Credit and Qualifications Framework)	<b>Credit Points: 20</b>	<b>ECTS: 10</b> (European Credit Transfer Scheme)
<b>School:</b>	School of Computing, Engineering and Physical Sciences		
<b>Module Co-ordinator:</b>	Parag Vichare		
<b>Summary of Module</b>			
<p>The role of Computer aided Design (CAD) systems and 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 and this module introduces the student to this important area.</p> <p>This module will give students a detailed introductory insight into the use of CAD Systems. An introduction to the engineering design process and the role which CAD systems play in its effective implementation will be given. A review of CAD systems is given as well as the strategic importance of enterprise-wide product modelling will be introduced. Feature-Based Design, Assembly data management, secure product data/information exchange/storage/authorising mechanisms (using PDM digital vault systems) and relevant scenarios in product development will be covered as a part of this module. The appropriate use of non-dimensional modelling scenarios will be covered in addition to simple parametric relationship aspects.</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>			

<b>Module Delivery Method</b>					
<b>Face-To-Face</b>	<b>Blended</b>	<b>Fully Online</b>	<b>HybridC</b>	<b>HybridO</b>	<b>Work-based Learning</b>
✓	✓				
<p><b>Face-To-Face</b> Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.</p> <p><b>Blended</b> A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered "blended" if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations</p> <p><b>Fully Online</b> Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.</p> <p><b>HybridC</b> Online with mandatory face-to-face learning on Campus</p> <p><b>HybridO</b> Online with optional face-to-face learning on Campus</p>					

**Work-based Learning**

Learning activities where the main location for the learning experience is in the workplace.

**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)

Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓						

**Term(s) for Module Delivery**

(Provided viable student numbers permit).

Term 1		Term 2		Term 3	
	✓				

**Learning Outcomes: (maximum of 5 statements)**

On successful completion of this module the student will be able to:

- L1. Characterise and employ appropriate advanced solid geometry feature creation methods and techniques.
- L2. Develop basic parametric relationships in the model creation process.
- L3. Configure product assembly using various assembly constraints.
- L4. Produce engineering drawings and describe modelling methodology

**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 8.</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>Specific and detailed 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 &amp; 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 8.</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 &amp; safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.</p> <p>Making use of specialised CAD techniques to solve engineering and</p>

	<p>design problems such as parameterisation methods or automation techniques.  Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.  Select and critically evaluate technical literature and other sources of information to solve complex problems</p>	
Generic Cognitive skills	<p>SCQF Level 8.  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 8.  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>	
Autonomy, Accountability and Working with others	<p>SCQF Level 8.  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>	
<b>Pre-requisites:</b>	Before undertaking this module the student should have undertaken the following:	
	<b>Module Code:</b> ENGG07004	<b>Module Title:</b> <u>Technical Communications</u>
	<b>Other:</b>	or equivalent
<b>Co-requisites</b>	<b>Module Code:</b>	<b>Module Title:</b>

\* Indicates that module descriptor is not published.

**Learning and Teaching**

The learning and teaching activity for this module include lectures, laboratories, tutorials, practical activities and the advanced application of software.	
<b>Learning Activities</b> During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	<b>Student Learning Hours</b> (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Laboratory/Practical Demonstration/Workshop	12
Asynchronous Class Activity	164
	200 Hours Total
<b>**Indicative Resources: (eg. Core text, journals, internet access)</b>	
<p>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.</p> <p>Hardware/Software: PTC Creo software + 40 seat PC Lab with corresponding network facilities and suitable PCs. Software site licences required.</p> <p>Laboratory: Metrology, rapid prototyping facilities.</p> <p>Suggested Reading: Ingham, P CAD Systems in Mechanical &amp; Production Engineering, Heinemann Newnes*. Riley, P Computer Aided Engineering, International Business Press* K. Lee, Principles of CAD/CAM/CAE Systems, Addison Wesley Longman*. Archibald, M Mechanical Engineering Design with pro/Engineer, Schroff Development Corp.* Shah J, Mäntylä M, 'Parametric and Feature-Based CAD/CAM', Wiley-Interscience*</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>	
<b>Engagement Requirements</b>	
In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: <a href="#">Academic engagement procedure</a>	

### Supplemental Information

<b>Programme Board</b>	Engineering
<b>Assessment Results (Pass/Fail)</b>	No

<b>Subject Panel</b>	Engineering
<b>Moderator</b>	Tony Leslie
<b>External Examiner</b>	P Lewis
<b>Accreditation Details</b>	This module is accredited by IMechE as part of BEng (Hons) Mechanical Engineering.
<b>Version Number</b>	2.12

**Assessment: (also refer to Assessment Outcomes Grids below)**

Class test (30%): Practical modelling skill assessment using solid modelling features

Coursework (70%): A reflective report on product modelling and design methodology

(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 Handbook.)

**Assessment Outcome Grids (Footnote A.)**

<b>Component 1</b>							
<b>Assessment Type (Footnote B.)</b>	<b>Learning Outcome (1)</b>	<b>Learning Outcome (2)</b>	<b>Learning Outcome (3)</b>	<b>Learning Outcome (4)</b>	<b>Weighting (%) of Assessment Element</b>	<b>Timetabled Contact Hours</b>	
Class test (practical)	✓	✓			30	3	
<b>Component 2</b>							
<b>Assessment Type (Footnote B.)</b>	<b>Learning Outcome (1)</b>	<b>Learning Outcome (2)</b>	<b>Learning Outcome (3)</b>	<b>Learning Outcome (4)</b>	<b>Weighting (%) of Assessment Element</b>	<b>Timetabled Contact Hours</b>	
Essay	✓	✓	✓	✓	70	0	
<b>Combined Total For All Components</b>					100%	3 hours	

**Footnotes**

A. Referred to within Assessment Section above

B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).

This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

### **Equality and Diversity**

The programme leaders have considered how the programme meets the requirements of potential students from minority groups, including students from ethnic minorities, disabled students, students of different ages and students from under-represented groups. Students with special needs (including additional learning needs) would be assessed/accommodated and any identified barriers to particular groups of students discussed with the Enabling Support Unit and reasonable adjustments would be made for classes and site visits

[UWS Equality and Diversity Policy](#)

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)