

Module Title:	Modelling Design Features
Language of Instruction:	English
Credits:	5
NFQ Level:	7
Module Delivered In	2 programme(s)
Teaching & Learning Strategies:	A combination of lecture and demonstration introduce learners to more advanced feature-based, parametric solid-modelling. The focus of this module is on demonstrating the fundamental skills and concepts central to the successful use and integration of three-dimensional solid modelling with other course work. The module is designed around process or task-based training with particular emphasis on the process and procedures necessary to complete a distinct solid modelling task. Solid modelling skills are introduced by a series of interactive demonstrations and work examples. These work examples are followed by pedagogical-sequenced exercises designed to allow learners to practice the various skills that have been discussed and used in the work examples. Course-defined projects will be set as submission requirements for this module. Students will prepare a suite of files to include a solid model assembly (parts and assembly files), a general assembly drawing, and detailed parts drawings fully-dimensioned and annotated as required for fabrication. Examples and exercises will be used to demonstrate additional solid-modelling skills. Tutorial exercises will allow students to practice these skills.
Module Aim:	The aim of this module is to further develop 3D modelling skills and 2D technical drawing skills to facilitate and support Design Studio 3 (Industrial Design) work. Learners will consider design for manufacture, assembly and quality and will be expected to explore three dimensional form, internal details and to incorporate actionable design guidelines to reduce/eliminate defects during the injection moulding process. This module is closely aligned with course work undertaken during the Repositioning Project undertaken within the Design Studio 3 (Industrial Design) module. To introduce learners to more advanced modelling. Learners will be introduced to alternative 3D modelling techniques such as Surface and Hybrid modelling. Learners will have opportunities to practice 3D modelling of base parts using Surface and Hybrid modelling strategies. To provide interactive demonstrations of more advanced part and assembly modelling techniques to fully capture design intent. To provide learners an opportunity to model a variety of actionable design guidelines and common design features covered in the Engineering element of this module. To integrate more three-dimensional solid-modelling, computer-aided two-dimensional drawing and, if required, rapid prototyping outputs for course work in other modules.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Recall principle modelling concepts necessary for successful three dimensional solid modelling.
LO2	Demonstrate an intermediate level of proficiency in computer-aided solid-modelling and surface-modelling when designing individual parts and assemblies.
LO3	Demonstrate an acceptable level of proficiency in using sketches and features necessary for building sheet metal part files and assemblies.
LO4	Present a record of all exercises prepared during the delivery of the module on suitable storage media for assessment.
LO5	Demonstrate an understanding of the actionable design guidelines and common design features covered in the materials appreciation element of this module.
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Surface and Hybrid 3D Modelling

Learners will be introduced to more advanced 3D modelling techniques such as Lofting, Surface Modelling and Hybrid Modelling. Learners will be afforded the opportunity to practice advanced modelling techniques and replicate details and features on a selection of case study products from the Red Dot Awards archive.

Sheet Metal Part Modelling

Modelling sheet metal parts in 3D CAD applications to cover sheet metal specific features such as Base Flange, Edge Flange and Mitre Flange features, Hems, Sketched Beads, Tabs and Jogs, Auto Relief Options, Adding Bends and Bend Allowance, Rip Feature and Flatten for sheet metal developments.

Moulding Internals

Learners will receive instruction on actionable design guidelines for injection moulding of parts such as the importance of maintaining a constant wall thickness, smooth transitions, rounded edges, adding draft angles, moving part lines, undercut avoidance, shut-offs, stripping undercuts, side action cores to reduce/eliminate common injection moulding design defects. Learners will also be introduced to common design features used in moulded products such as ribs, bosses, snap-joints, living hinges, threads, texture, lettering and symbols, and process-appropriate tolerance specifications.

Design for Manufacture and Assembly

Design for manufacture to look at injection mould design: gates, runner systems, shutoffs, cores and cavities, ejectors, two and three plate designs, plate manufacture. Learners will have practical experience of making a simple silicone cut mould and experience of vacuum casting for material preparation and mould filling.

Assessment Breakdown	%
Continuous Assessment	100.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Case Studies	Submission of three case studies implementing lofting, surface modelling and hybrid and other advanced 3D CAD modelling techniques to replicate details and features on case study products selected from the Red Dot Awards archive.	1,2	25.00	n/a
Project	Submission of CAD files, parts and assembly file of form generation and internal details for the Repositioning Project, a studio-based project undertaken in Design Studio 3 (Industrial Design)	1,2,3,4,5	75.00	Sem 1 End

No Project

No Practical

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
Workload Type	Frequency	Average Weekly Learner Workload
Lecture	Every Week	4.00
Total Hours		4.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_DHPDI_B	Bachelor of Arts (Honours) in Product Design Innovation	5	Mandatory
CW_DHIDE_D	Bachelor of Arts in Design	5	Mandatory