DSGN H3601: Advanced Manufacturing

Module Title:	Advanced Manufacturing
Language of Instruction:	English

Credits:	10

NFQ Level:	8

Module Delivered In	2 programme(s)

Teaching & Learning Strategies:	The module will be delivered using lectures and on site tutorials with a mixture of presentations, example exercises, question and answer sessions, group discussions and online resources. Laboratory classes will be delivered to students working in groups to obtain experimental data with subsequent individual reporting/assessment.

Module Aim:	The aim of this module is to provide students with an in-depth understanding of manufacturing, the design process and computer integrated engineering. A key element of the module is to develop the student's team working ability. Part of the assessment for this module is a group based project (in groups or four or five) to model and present a significant engineering artifact such as, for example, a complete car or aircraft.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Develop, test and validate and implement advanced parametric CAD Modeling.
LO2	Describe and implement various computer aided methods;
LO3	Understand the significance of the engineering design process and the part it plays in the manufacture of products and components;
LO4	Understand the significance of parametric modelling & computer aided manufacture and the part they play in the design of products and components;
LO5	To work effectively as part of a team in an engineering project environment.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
DSGN H2003 Manufacturing and CAD or equivalent

DSGN H3601: Advanced Manufacturing

Module Content & Assessment

Indicative Content
Advanced CAD Modelling & Design o Part and Assembly design using industry standard parametric modelers, o Design of parts for CNC manufacture and simulation o CAM principles and techniques, o Assembly methodologies, contextual based part design. Assembly configurations, Product data management. o Advanced Parametric equations, advanced excel based design tables, motion analysis. o Geometric tolerancing and Design with model-based definition in accordance with ISO 1101-2017. o Generation of professional engineering production drawings, templates
Advanced Manufacturing methods. o Conversational programming o Machine setting & tool selection & fixturing o Computer aided manufacture and implementation (Milling up to 3+2 and turning up to mill turn) o in-process and post-process Inspection (manual & automated) o Other technologies such as; Wire EDM, Turning centres, hybrid manufacture o 5 Axis simultaneous machining o Introduction to automated probing o CMM and manufacturing intent o Control systems & FMS + IOT
Computer integrated engineering o Computer aided methods and implementation o Parametric modellers o Implementation of Computer integrated manufacturing
Automation and Control Technologies: o Material Handling and Identification Technologies o Fundamentals of NC Technology o Computer Numerical Control o Distributed Numerical Control o Applications of NC o NC Part Programming
Product Design and CAD/CAM in the Production System: o Product Design and CAD o CAD System Hardware o CAM, CAD/CAM, and CIM
Process Planning and Concurrent Engineering: o Process Planning o Computer-Aided Process Planning o Concurrent Engineering and Design for Manufacturing o Advanced Manufacturing Planning
Production Planning and Control Systems: o Aggregate Production Planning and the Master Production Schedule o Material Requirements Planning o Capacity Planning o Shop Floor Control o Inventory Control o Extensions of MRP

Assessment Breakdown	%
Continuous Assessment	50.00%
Project	50.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Students will be assessed on their ability to work as part of a design and manufacturing team, to produce a significant engineering artifact such as, for example, complete car or aircraft components. Students will be assessed under the following criteria • Use of project planning tools, demonstrate an ability to coordinate the project and function as a design-team member. • Demonstrate skills in producing high quality engineering components • Demonstrate skills in fixturing and machine setup. • Be able to interface 3D CAD skills with other engineering software. • Produce a CAD/CAM portfolio containing all material	1,2,3,4,5	50.00	Ongoing

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Students will be assessed on their ability to work as part of a design team, and present a significant engineering artifact such as, for example, a complete car or aircraft. Students Will be assessed under the following criteria • Use Project planning tools, demonstrate an ability to coordinate the project and function as a design team member. • Demonstrate skills in producing high quality engineering schematics/Drawings of individual components and assemblies • Demonstrate skills in animating moving mechanism components within the chosen model. • Be able to interface 3D CAD skills with other engineering software. • Produce a CAD portfolio containing all material	1,3,4,5	50.00	Sem 1 End

No Practical

No End of Module Formal Examination

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

DSGN H3601: Advanced Manufacturing

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lab/Lecture	12 Weeks per Stage	2.00
Laboratory	12 Weeks per Stage	4.00
Estimated Learner Hours	15 Weeks per Stage	11.87
	Total Hours	250.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EMMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	5	Mandatory
CW_EEMEC_D	Bachelor of Engineering in Mechanical Engineering	5	Mandatory