Module specification

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Refer to the module guidance notes for completion of each section of the specification.

Module code	ENG436
Module title	CAD/CAM
Level	4
Credit value	20
Faculty	FAST
Module Leader	Dr M. Jones
HECoS Code	100374
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
HNC Mechanical Technology	Option

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**60** hrs
Placement / work based learning	0 hrs
Guided independent study	140 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	August 2016
With effect from date	September 2021

For office use only	
Date and details of revision	6 July 2021, revalidated
Version number	Version 2

Module aims

To provide integration of the two subject areas of computer-aided design and computer-aided manufacture (CAD/CAM). It will enable the student to acquire a broader and deeper understanding of the practical applications of a CAD/CAM system.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Produce a component drawing suitable for machining and transfer onto a CAM system.
2	Create a 3D simple surface and use Rapid prototyping to produce a component.
3	Transfer data generated in CAD to a CAM system for subsequent machining.
4	Simulate the cutter paths on a CAM system to optimise the machining sequences.

Assessment

Indicative Assessment Tasks:

Assessment is 100% in-course.
Assignments are practical works which demonstrate application and understanding of the processes involved.

Assessment One: Portfolio 1 will include a short report and pictures of CAD modelling, pictures of the model produced in RP, as well as computer files if necessary (2000 words).

Assessment Two: Portfolio 2 will include a short report and pictures of the simulated paths and a Numerical Code file (first & last pages) generated by the programme (2000 words).

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2	Portfolio	50%
2	3, 4	Portfolio	50%

Derogations

None.

Learning and Teaching Strategies

The module will be introduced to learners through a specific series of tutorials assisted by notes via VLE platform. The major learning strategy is practical-based learning in the CAD CAM laboratory. Demonstrations will be used to introduce the software and occasional lectures used to disseminate theory. Relevant videos will also be used to aid the learning process.

Indicative Syllabus Outline

Component drawing:
Configure the hardware contained within a typical CAD workstation. Production of CAD profiles using the more common types of editing facilities. Drawing attributes and structure with specific reference to associated profile data and parts listing.

3D Surface:
Use of world axis to produce geometry suitable for transfer to a CAM system. 3D surfaces generated for visualisation and subsequent machining.

Transfer data:
Structured CAD data with reference to suitable datum and direction lines. Methods of transfer: STEP, DXF and IGES. CAD layers used to help tooling sequences with consideration to tool changes.

Cutter Paths:
Tooling sequences optimised by using simulated cutting times generated within CAM system. Tooling data files containing calculated speeds and feeds to suit component material. Cutting direction and offset determined with due consideration for component accuracy and finish. Clamping and general workholding safety considered with reference to clamping methods including program controlled clamping. Numerical Code generation.

Generation of .stl file from 3D geometry for transfer to Catalyst software and generation of tool paths for Rapid Prototyping.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

Norton R. L. (2020) CAM Design and Manufacturing Handbook. Norton Associates LLC, 3rded.

Sareen, K. K., Grewel, C. S. (2007) Cad-Cam: Theory and Concepts. S Chand & Co Ltd

Other indicative reading

Groover M. (2008) CAD/CAM: Computer-Aided Design and Manufacturing. Pearson Technology

Rembold. U., Nnaji, B. O., Store, A. (2000) Computer Integrated Manufacturing and Engineering. Addison-Wesley, 3rded.

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. Click here to read more about the Glyndwr Graduate attributes

Core Attributes
Engaged
Enterprising
Creative
Ethical

Key Attitudes
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Leadership and Team working
Critical Thinking
Communication