

**Glasgow School of Art Course Specification**  
**Course Title: Design for Manufacture 4**

*Please note that this course specification is correct on the date of publication but may be subject to amendment prior to the start of the 2024-25 Academic Year.*

<b>Course Code:</b>	<b>HECOS Code:</b>	<b>Academic Session:</b>
UoG EXT4092		2024-25

<b>1. Course Title:</b>
Design for Manufacture 4

<b>2. Date of Approval:</b>	<b>3. Lead School:</b>	<b>4. Other Schools:</b>
PACAAG April 2020	School of Design	N/A

<b>5. Credits:</b>	<b>6. SCQF Level:</b>	<b>7. Course Leader:</b>
20	10	Nick Bell

<b>8. Associated Programmes:</b>
BEng/MEng Product Design Engineering

<b>9. When Taught:</b>
Semester 1

<b>10. Course Aims:</b>
<p><b>Aim – General</b> This course aims to familiarise students with the fundamental aspects of Design for Manufacture. With the aim to improve product manufacturability by value engineering, reduction in material usage and responsibility/sustainability considerations.</p> <p><b>Aims – Specific</b> To develop the ability to undertake and manage a studio-based design project and report including the design, engineering, development, testing, evaluation and prototyping of a specified product.</p> <p>To develop the ability to work in an effective, confident and autonomous manner.</p> <p>To develop confidence and proficiency in Designing for Manufacture where these skills can be transferred to a commercial/professional working situation.</p> <p>Provide an overview and insight into this essential field of product development</p> <p>Improve product specification by value engineering, reduction in material usage etc, sustainability considerations.</p>

To help students become aware of the future self-development needs of the young professional engineer. With particular emphasis on the need for skills other than technical competence and endeavours to give an appreciation of the expectations of the professional engineer. These will include:

Product/Project Management  
Supplier and Vendor selection.

#### **11. Intended Learning Outcomes of Course:**

By the end of this course students will be able to:

Understand and apply the appropriate/specific manufacturing processes, and present them fully detailed.

Understand how CAD/simulation tools can be applied to design concepts in order to refine, simulate and prepare data for manufacture.

Understand the costs involved in manufacturing.

Demonstrate an ability to develop questionnaires; interview and reporting skills and understand how engineers operate in industry.

Demonstrate technical and environmental factors that influence the ability to innovate. Identifying and addressing relevant aspects of sustainability and environmental impact.

#### **12. Indicative Content:**

Phase 1: The understanding

In this phase students will demonstrate their understanding of Design for Manufacture and how it relates to product design engineering. This should draw on information from the initial mapping sessions, seminars and the subsequent self-study and presentations. The issues typically associated with Design for Manufacture in Product Design Engineering should be identified and discussed.

Week1: Overview of the course and assessment criteria.

- Paper on the wall exercise, students list process they are aware of under the following topics:
- Forming, Joining, Cutting, Finishing and Assembly
- Post-it exercise: low cost-high output 'v' hi cost-low output, grouping process and manufacturing technology against units of production. Market price and economies of scale.
- Self-study: Individual students allocated a process and highlight the challenges.
- Week2: Presentations: 2 mins max Discuss challenges from Self-study exercise
- Case Study: Electronic Consumer Goods, Nick Bell
- Self-study: Material Considerations for the process from Wk1
- Week3: Presentations: 2 mins max Discuss Material Considerations from Self-study exercise

Phase 2: The User Profile, Specification and Concept Development

- Produce a focus board for specified user
- Develop concepts from 3 different materials and 3 different processes.
- Students will have to apply evaluation techniques for final concept selection.
- Consideration must be given to designing out the costs, eg Snap fit/self jiggling against fastened together...This will also help when highlighting assembly methods and how to design parts so they cannot be assembled in wrong order.
- Insights will be provided that cover: tampo print, laser etched, in mold detail etc.
- Week4: Case Study
- Self-study: Assembly Methods
- Week5: Concept development
- Week6: Concept development/ Industrial visit
- Week7: 3 Concept Presentation
- Week8: Chosen Concept Development/Material Selection/Industrial Visit
- Week9: Chosen Concept Development
- Week10: Design for Economic Manufacture. Tooling design and sourcing.

Phase 3: Product Embodiment

- Detailed General Arrangement drawing
- Costings for a set number of units.
- CAD data and mouldflow analysis.
- 1:1 prototype of your product
- Solidworks tooling feature drawing (if applicable)
- Design Journal

**13. Description of Summative Assessment Methods:**

The main aspects of Summative assessment are: written assignments, practical projects, presentations

Assessment Method	Description of Assessment Method	Weight %	Submission week (assignments)
Project Report	Written Project report that focuses on key design for manufacture challenges	100	End of Semester 1 teaching

**13.1 Please describe the Summative Assessment arrangements:**

The completed Design for Manufacture assignments and project outcomes will form the basis for the summative assessment. The final grade will be submitted to the University of Glasgow, School of Engineering Exam Board.

**14. Description of Formative Assessment Methods:**

Engagement with formative assessment is a mandatory requirement.

Student and peer feedback are offered throughout project with detailed feedback provided after interim presentation. The main areas of student engagement are: seminars, critiques, workshops, tutorials

**14.1 Please describe the Formative Assessment arrangements:**

After most assessment events, studio staff provide feedback. The purpose of this is to help students understand areas of strength and weakness and provide advice for future direction or further learning.

Feedback for DfM4B will consist of verbal comments made during studio critique or presentation, or one-to-one in the studio. Main assessment events will be followed-up by written feedback, accompanied by a tutorial discussion with studio staff.

**15. Learning and Teaching Methods:**

<b>Formal Contact Hours</b>	<b>Notional Learning Hours</b>
35	200

**15.1 Description of Teaching and Learning Methods:**

Industrial Visits, Group Critique

Timetable: Tuesday 09:00-13:00

**16. Pre-requisites:**

None

<b>17. Can this course be taken by Exchange/Study Abroad students?</b>	Yes
<b>18. Are all the students on the course taught wholly by distance learning?</b>	No
<b>19. Does this course represent a work placement or a year of study abroad?</b>	No
<b>20. Is this course collaborative with any other institutions?</b>	No
<b>20.1 If yes, then please enter the names of the other teaching institutions:</b>	
N/A	

**21. Additional Relevant Information:**

N/A

**22. Indicative Bibliography:**

Making it - Manufacturing for Product Design; C. Lefteri, Pub. Laurence King Manufacturing Processes for Design Professionals; R. Thomson, Pub. Thames and Hudson