

Course Code:

EXT4092

Session

2017/18

1. Course Title:

Design for Manufacture 4 (EXT4092)

2. Version

1.1

Date of Production/ Revision

2016/17

Approval Date

30 August 2017 PACAAG

3. Level:

4

4. Credits:

20

5. Lead School/Board of Studies:

School of Design

6. Course Contact:

Nick Bell

7. Course Aims:

Aim – General

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.

Aims – Specific

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.

To develop the ability to work in an effective, confident and autonomous manner.

To develop confidence and proficiency in Designing for Manufacture where these skills can be transferred to a commercial/professional working situation.

Provide an overview and insight into this essential field of product development

Improve product specification by value engineering, reduction in material usage etc, sustainability considerations.

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.

8. 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.

9. 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: tamper 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

10. Description of Summative Assessment:

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

10.1 Please describe the Summative Assessment arrangements:

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

11. Formative Assessment:

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

11.1 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.

12. Collaborative:Yes No **12.1 Teaching Institutions:**

Glasgow School of Art

13. Requirements of Entry:

None

14. Co-requisites:

None

15. Associated Programmes:

Product Design Engineering

16. When Taught:

Semester 1

17. Timetable:

Tuesday 09:00-13:00

18. Available to Visiting Students: Can this course be taken by visiting students? Please tick either yes or no.

Yes

No

19. Distance Learning:

Yes

No

20. Placement:

Yes

No

21. Learning and Teaching Methods:

Method	Formal Contact Hours	Notional Learning Hours (Including formal contact hours)
Lecture	8	10
Studio	0	120
Seminar/Presentation	5	10
Tutorial	5	10
Workshop	14	30
Laboratory work		
Project work		
Professional Practice		
E-Learning / Distance Learning		
Placement		
Examination		
Essay		
Private Study	Not Applicable	
Other (please specify below)	3	20
TOTAL	35	200

22. Description of "Other" Teaching and Learning Methods:

Industrial Visits, Group Critique

23. Additional Relevant Information:

24. Indicative Bibliography:

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

Date of production / revision

April 2017