



Materials and Manufacturing

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**Swansea
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Founded 1853

*Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives*

Module content

Overview.

Introductions

Background

Course content:

- Module covers semesters 1 & 2
- Lectures -manufacturing processes and material selection
- Demo Practical – Product Breakdowns
- Short Design for manufacturing tasks
- Tutorials - Assignment
- Manufacturing company visits

Module content

- Design for Manufacture – (Manufacturing choice)
- Assemblies and production lines
- Manufacturing Drawings
- Low volume high volume
- Batch manufacturing
- Material choices
- Material selection
- Tooling Design
- Surface finishes
- Post processes
- packaging
- Smart materials – photochromic, graphene etc..

Manufacturing processes

Moulding

Injection/reaction injection/compression moulding

Blow moulding

Rotational moulding

Vacuum forming

Pressing

Extrusion

(Surface finishes colours post processes)



Manufacturing processes

Cutting

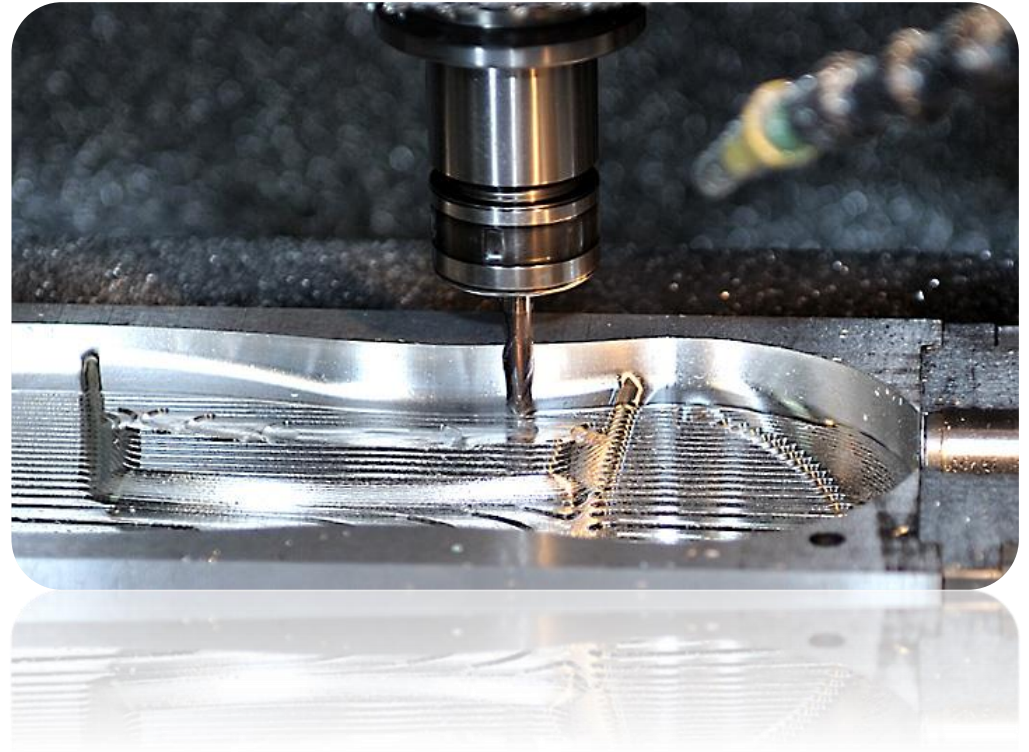
Laser cutting

Waterjet cutting

Plasma cutting

CNC machining – Subtractive manufacturing

Welding, Fabrication



Manufacturing processes

Casting

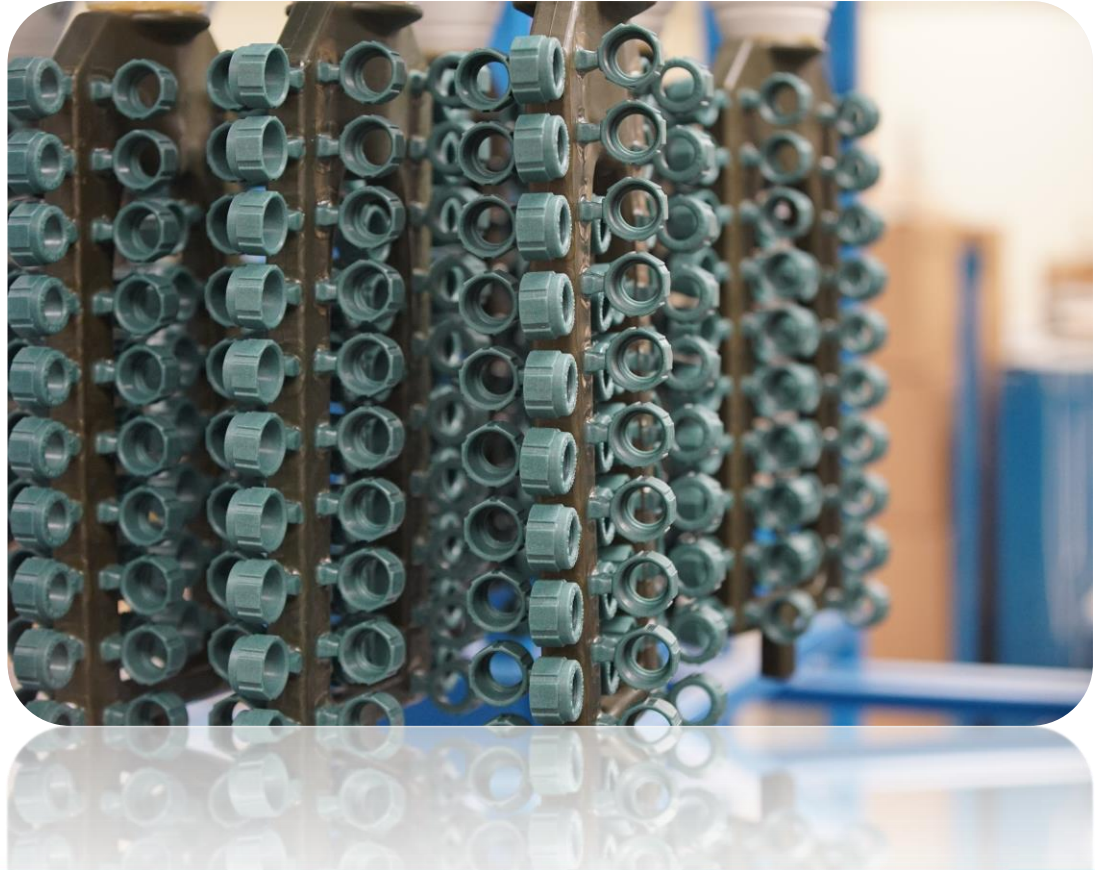
Vacuum casting

Slip casting

Investment casting

Lost wax casting

Die casting



Manufacturing processes

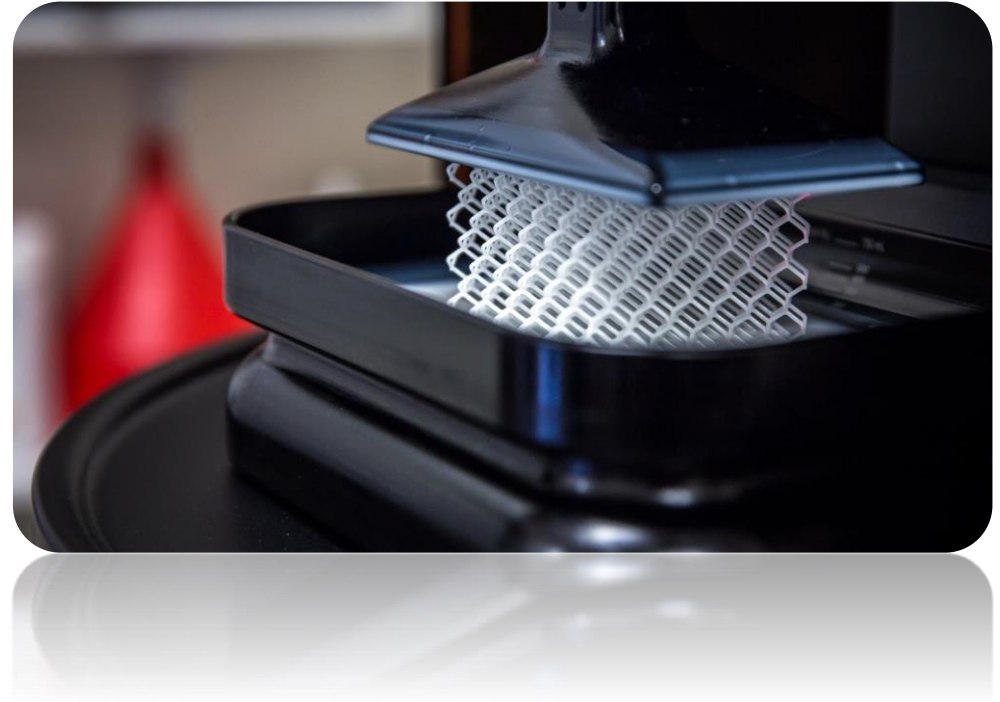
Additive Manufacturing

Technology overview

3D farming

Fabrication

Other processes for Fabrics, composites
and PCB manufacture



Reading

Essential

Thompson, R. & Kim, YY. (2011) Product and Furniture Design (The Manufacturing Guides). Thames & Hudson.

Thompson, R. (2011) Prototyping and Low-volume Production (The Manufacturing Guides). Thames & Hudson.

Thompson, R. & Thompson, M. (2011) Sustainable Materials, Processes and Production (The Manufacturing Guides). Thames & Hudson.

Recommended

Lefteri, C. (2011) Making It: Manufacturing Techniques for Product Design (2nd edition). Laurence King Publishing Ltd.

Thompson, R. (2007) Manufacturing Processes for Design Professionals. Thames & Hudson.

Callister, W. (2002) Materials and Design: The Art and Science of Materials Selection in Product Design. Butterworth-Heinemann.

Background

Hudson, J. (2011) Process: 50 Product Designs from Concept to Manufacture. (2nd edition). Laurence King Publishing Ltd.

Bramston, D. (2009) Basics Product Design 02: Material Thoughts. AVA Publishing.

ASSIGNMENT 1

Research a given manufacturing process; identify companies that provide this service, identify the range of appropriate materials listing their physical properties, performance characteristics and provide examples of specific design applications and (where possible) source a range of material/component samples, design guides and data sheets. Using an agreed template, produce a PDF 'design guide' from the research material collected for inclusion in a shared studio/moodle reference resource for all students.



Thank You



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