3D Printing Information and Requirements

Technology

Our 3D Print Service (powered by Hobs) has six state of the art 3D Printers. They consist of two colour jet ProJet 660 powder printers, and four CubePro 'plastic' printers. The powder printers are manufactured by 3D Systems and these are our primary machines

How it works:

Powder print technology places a layer of powder in the print chamber and prints a cross section of the model on each layer. The print bed is lowered after each successive layer and the process is repeated until the full 3D model is complete. The powder acts as a support material during printing and is later removed by vacuuming. The unused material is returned to the printer and is recycled for use in the next print.

Benefits:

The 3D Systems 'Colour Jet' printers are the only 3D printers in the industry with the ability to create full colour models. The 3D Systems CubePro™ printers are the latest in their class and deliver the industry's best desktop experience using ABS. The CubePro printers build a model by using a plastic extrusion method.

Print Dimensions

3D Systems ProJet 660 has a print chamber measuring: **L 381 x W 254 x H 203 mm**

Larger models can be produced by slicing the model into several sections. These can be joined together during the finishing process.

3D Systems CubePro™ has a print chamber measuring: **L 275 x W 265 x H 240 mm**

Print time

The Projet 660 prints at approximately 25mm per hour in the Z direction (height).

A model will usually take 24 to 48 hours from submission to completion. It is in your interest to produce print ready models in order to keep the file fixing to a minimum, reducing overall cost.

The CubePro™ print speed refers to extruded volume – 15mm per second. A 'typical' model will take several hours complete.

Cost

The cost varies greatly depending on the size and volume of the model. The main factor is volume. The volume of material used is multiplied against a fixed price point and additional charges are applied for file fixing and finishing time.

It is useful to note that a 20 cm cube is eight times the volume of a 10 cm cube. Therefore, if you can reduce the 3D print size by half you reduce the cost by a factor of eight. A solid cube will cost far more than a hollow one and a 'wireframe' cube will be the cheapest due to the small amount of material used. For example a 'space-frame' structure will be much cheaper to print than a solid I-beam due to the relative amounts of material used.

Payment

Payment can be made via the MMU MET card payment service or a standard debit / credit card.

Submitting models

Students will be required to submit models for initial file checking and volume assessment. These will be used to provide a price quote, giving details of file fixing, printing and finishing times. The student will have to complete a written submission form and make payment prior to the model being printed.

Typical file types that can be submitted include AutoCAD, Revit, 3ds Max, Inventor, and SketchUp. Ideally, files should be submitted using the .stl format but the following formats are also accepted .fbx, .obj, .3ds, .3dm, .skp, .dwg.

Further considerations:

Save a copy of the model that you have produced and remove any collateral data such as layers and interior details that are not required for production of the final 3D print. Export this version as a .stl file and submit it to MMU 3D Print Service.

Revit

When converted to .stl the file can be very large. Export as a medium detail file. If an

exterior model is required, all internal detailing, walls & furniture should be deleted before exporting.

3ds Max

This may produce very large files when exporting as .stl. but generally very good.

SketchUp

Imports directly into Magics- but often requires a lot of file fixing.

File preparation and fixing

Often models exported from 3D software packages are not ready to print. Files have to be checked for issues such as correct alignment of normals in order to make the mesh “watertight” and so ensure a successful print. The model will often need to be re-scaled, shrink-wrapped and hollowed out, and the time this takes is proportional to the “quality” of the exported model. It is therefore important to produce good 3D models that will reduce the file fixing time and save on the cost. See glossary for explanation of these terms.

Adjustments for the print model

Small sub-millimetre details are visible on the surface of a model. The minimum thickness for a freestanding structure is 1mm, but ideally 2 or 2.5mm thickness is required to survive the printing and finishing process. Therefore, details like balustrades and railings will be thickened up to minimum tolerances.

Materials and finishes

The ProJet 660 incorporates professional 4-channel CMYK colour 3D printing to produce exceptional high-resolution models. Ideal for stop motion animation, professional model shops, architects, consumer product design and development,

digital manufacturing, fine art production and more. All models produced can be sanded, drilled, tapped, electroplated and have a high temperature resistance ideal for use in moulding.

Collecting the model

The student will be expected to collect his/her model within the time period agreed between

MMU Faculty and MMU 3D Print Services. MMU 3D Print Services cannot take any responsibility for the safekeeping of the 3D printed item after the agreed period.

Summary of 3D Printing:

- Latest 3D Print Technology
- Five to ten times faster than other technologies
- Output multiple models in hours
- Full colour
- Low operating cost (one fifth of competing technologies)
- Unused build materials are recycled
- Ability to print text labels and images directly onto models
- Complexity is not a limiting factor
- Provides the student with a highly employable skill set in a rapidly expanding marketplace
- Can be used with other 3D technologies (eg, augmented reality) for stunning presentations.