

3D Printing Professional Learning

FULL-DAY RUN SHEET

Unlock the potential of 3D
printing in the classroom.

08:30 - 16:30

4 MODULES

Build.
Fix.
Teach.

Fundamentals, classroom applications,
jigs, fixtures, and practical moulding.

MODULES

- 01 Introduction to 3D Printing
- 02 3D prints in the classroom
- 03 Jigs in action
- 04 Mould session

PROGRAM OVERVIEW

Day at a glance

A practical full-day program moving from foundational knowledge to hands-on use of jigs, fixtures, and moulds.

08:30 - 09:00	Arrival Snacks, coffee and networking	BREAK
09:00 - 10:30	Module 1 Introduction to 3D Printing	PRESENTATION
10:30 - 11:00	Morning tea Morning tea and coffee	BREAK
11:00 - 12:30	Module 2 3D prints in the classroom	MIXED MODE
12:30 - 13:30	Lunch Lunch and workshop tour	BREAK
13:30 - 14:45	Module 3 Jigs in action	PRACTICAL
14:45 - 15:15	Afternoon tea Afternoon tea	BREAK
15:15 - 16:30	Module 4 Mould session	PRACTICAL

Program flow

Learn the fundamentals, connect them to classroom applications, then apply the ideas through practical jig and mould sessions.

MODULE 1

Introduction to 3D Printing

Establish the technology fundamentals before moving into classroom use and practical applications.

09:00 - 10:30

PRESENTATION

3D Printing Fundamentals

- 3D printing refers to additive manufacturing (AM), a broad class of manufacturing methods involving the sequential addition of materials, as opposed to subtractive manufacturing.
- Introduction to the family of 3D-printing technologies:
 - FDM
 - Stereolithography
 - Laser sintering
 - Multi Jet Fusion
 - Niche AM, including layered paper printers and house printers

Deep dive into FDM - the printer of the classroom and hobbyist

- FDM printer configurations
- Three axes and their control systems
- Hot ends and extruders - how they function and their limitations
- Which materials can be printed and why
- Run-through of commonly used materials

Practical lens

The focus is not only on how the machine works, but on the operating limits and material choices that shape reliable classroom use.

From digital model to reliable print

09:00 - 10:30

PRESENTATION

Slicing - converting the file into the language of the printer

- Slicing converts a model into tool paths in 2D slices.
- Slicing considerations - precision and mechanical properties
- Overhangs
- Advanced slicing settings

Models and data types

- Meshes and why they are used
- File types and model repositories
- CAD-created files
- 3D scanners and their place in the classroom

Keeping your printer primed

- Common printer errors
- Troubleshooting 101
- Servicing schedule

10:30 - 11:00 · Morning tea

Morning tea and coffee before the classroom applications module.

MODULE 2

3D prints in the classroom

Connect the strengths and limitations of 3D printing to useful teaching tools and curriculum-linked demonstrations.

11:00 - 12:30

MIXED MODE

Summary of educational usefulness

- How printers stack up against competing technologies such as laser cutters, routers, and hand tools
- Advantages of 3D printing: precision, complexity, and its set-and-forget nature
- Disadvantages of 3D printing: slow speed, moderate material cost, and limited machine availability for whole-class printing
- These attributes make 3D printers well suited to creating instructional aids, tools, jigs, and moulds

Instructional aids and links to projects and syllabus points

- Gearing ratios and leverage
- Beam designs
- Working cross-sections of various mechanisms
- Wave patterns

Demonstration focus

Use physical examples to make mechanisms and relationships visible, tangible, and easier to explain.

Jigs, fixtures, and moulds

11:00 - 12:30

PRESENTATION · DEMONSTRATION · CAD

Jigs and fixtures

- Jigs can be used for multiple material types and profiles and are highly customisable.
- Jigs can be reused for student cohorts of varying age and experience.
- Open CAD software and demonstrate the process of designing simple custom jigs for a range of geometries. Teachers can watch or follow along in their CAD packages.

Moulds

- Background of moulding and the different kinds of mould design required for varied applications, including:
 - Pouring
 - Stamping
 - Vacuum
 - Oven cure
 - Compression
- Open CAD software and create simple moulds from STEP files of designs encountered online.
- Examine overhangs and create pull lines; design alignment features and release geometry such as chamfers and pins; discuss the use of multipart and flexible moulds.

12:30 - 13:30 · Lunch and workshop tour

A one-hour break before the practical afternoon sessions.

MODULE 3

Jigs in action

Experience how practical jigs are created or acquired, then used to improve repeatability, accuracy, and access.

13:30 - 14:45

PRACTICAL

Jig use - create, acquire, and use

- Custom shims, spacers, and washers
- Contour gauge
- Custom wood mitring guide
- Custom-geometry tube mitring guides
- Custom sanding blocks
- Drill dowel guide
- Welding and soldering jigs
- Dovetail and finger-joint guides

Practical principle

The value of the print is often not the finished object itself, but the way it makes another task safer, clearer, faster, or more repeatable.

14:45 - 15:15 · Afternoon tea

A short break before the final practical mould session.

MODULE 4

Mould session

Move from basic one-part moulds toward more intricate multipart examples, while examining material and surface-preparation choices.

15:15 - 16:30

PRACTICAL

Design and preparation

- Examine the design considerations and material choices of a series of pre-printed moulds.
- Progress from basic one-part moulds to intricate multipart moulds.
- Discuss how to prepare mould surfaces for varying material layups.

Create parts from the moulds

- Wax
- Soap
- Plaster
- Urethane foam

Flexible moulding

- Create silicone moulds from 3D prints.
- Use silicone moulds to allow complex shapes and overhangs to be cast in a range of materials.

End of program · 16:30

A full day moving from additive-manufacturing fundamentals to practical classroom tools, reusable jigs, and mould-making techniques.