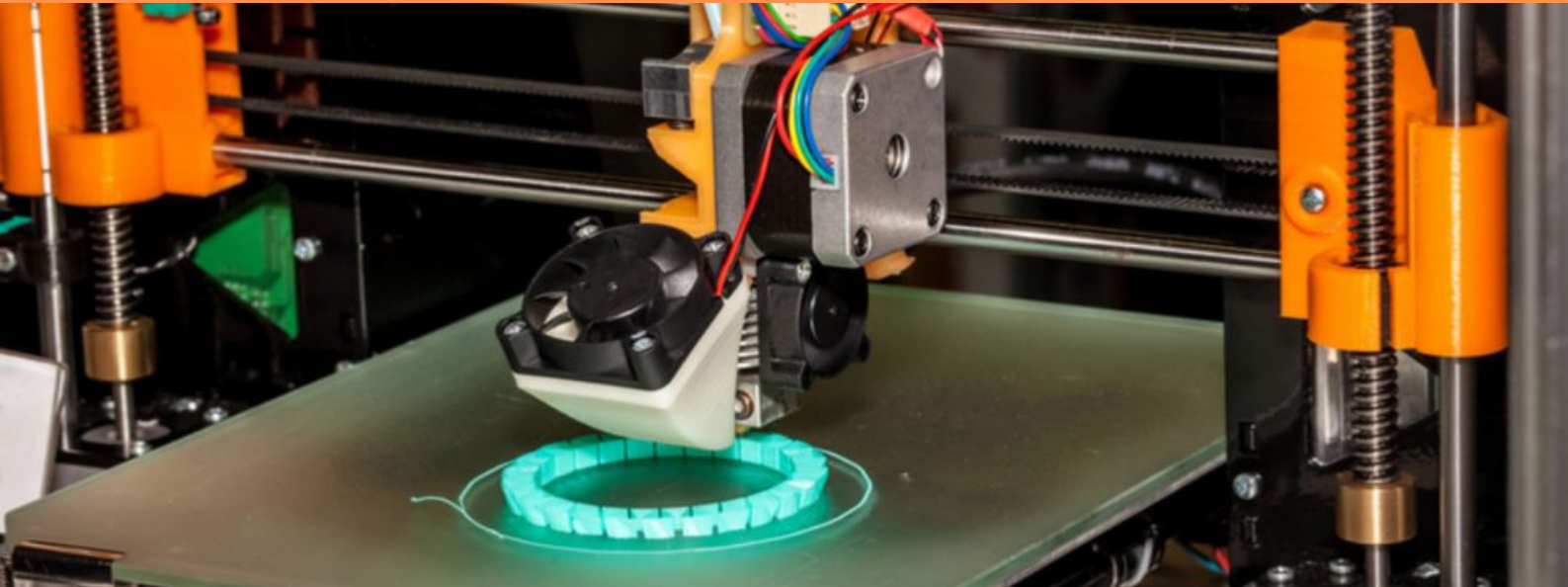




Biz Advice & Solutions

Manufacturing Consulting & Training Solutions for Small Businesses



3D printing is a rapidly growing technology used in business, manufacturing, and crafting everyday items. Among various 3D printing technologies, Fuse Deposition Model 3D (3D FDM) printing stands out as a cost-effective option, gaining prominence in business and manufacturing. Mass production of 3D FDM printers in recent years has significantly reduced acquisition costs, making it more accessible.



FDM printing is increasingly applied in business and manufacturing, with ongoing exploration of its potential applications. However, there's a gap in expertise and understanding of its uses. The courses outlined in this document offer participants a training track to develop a working familiarity with 3D FDM technology, creating opportunities for employment, business growth, and skill development.

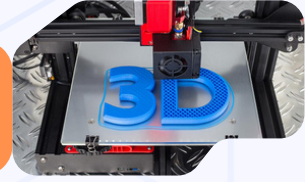
These skills serve as a foundation for pursuing employment and business opportunities for individuals and small businesses.



Our services

Consulting

Tailored 3D Solutions for Your Business



At Business Advice & Solutions, we understand that the landscape of manufacturing is evolving rapidly, and staying ahead means embracing innovation. Our consulting and training solutions are specifically designed for small businesses that are ready to integrate additive manufacturing or 3D printing into their operations. We don't just offer generic advice; we dive deep into the unique realities and challenges of your business to provide tailored solutions that enhance efficiency, reduce costs, and streamline processes. With our expert guidance, your business will not only keep up but become a leader in the manufacturing revolution. Let's transform your operations and print a brighter future together.

3D Production layout & set up

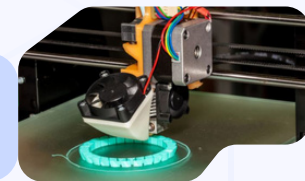
From Blueprint to Reality – Transform Your Floor with Tailored 3D Strategies



We specialize in crafting customized production layouts that are not just innovative but also intimately aligned with the unique needs of your business. Our approach is hands-on and reality-based, ensuring that the solutions we provide tackle the actual challenges you face. From optimizing space to streamlining workflows, our tailored 3D printing setups are designed to enhance your operations, boost efficiency, and elevate your production capabilities. Partner with us to build a production environment that's as dynamic and forward-thinking as your business aspirations.

Onsite Training

Expert 3D Printing Training Tailored for Your Team



Our tailored onsite trainings are designed to prepare both employers and employees for the next level of operational excellence. We understand that every business has its unique realities and challenges, which is why our training programs are customized to fit your specific needs. By enhancing your team's understanding of 3D printing technology, we help you optimize your operations, innovate your production processes, and stay ahead of the curve. Let's shape the future of your business together with training that's as advanced as the technology it teaches.

Additive Manufacturing. 3D Printing Technology Training Overview

3D printing technology is swiftly expanding across sectors like commerce, production, artisanal crafts, and routine commodities. Among the diverse 3D printing methods, Fused Deposition Modeling (FDM) 3D printing is emerging as the most promising and affordable option, gaining significant traction in the commercial and manufacturing spheres. The widespread manufacturing of FDM 3D printers over the past half-decade to eight years has drastically reduced acquisition costs, making it widely attainable and feasible.

FDM printing technology is progressively integrating into numerous facets of commerce and production, with job roles and potential uses continually evolving alongside this technology's growth. Currently, there is a noticeable lack of expertise in this field and a broad scope of applications, both existing and prospective. The educational programs outlined herein provide a straightforward learning path that guides learners from a baseline understanding to practical proficiency in FDM 3D printing, enabling them to seize employment, entrepreneurial, and skill enhancement prospects. The competencies imparted here will lay the groundwork for individuals and smaller enterprises to explore vocational and business ventures.



COURSE 1 **3D FDM Basics**

Teach the foundations of Fused Deposition Model (FDM) printing to serve as an introduction to the technology and provide a foundation for the next classes



COURSE 2 **3D FDM Applications**

Provide the participants an introduction to 3D printing applications as a crafter, modeler, or a 3D printing technician



COURSE 3 **Advanced topics in 3D FDM**

Provide the participants an introduction to 3D printing solutions by understanding the use of the tools in the workflow to produce a model.

COURSE GOALS AND OBJECTIVES

Take the participant through a series of courses that provide a valuable skill in today's technology-driven market.

The courses are designed to be a foundation for growth and teach the basics and applications of this technology for the individual to use as a new technical skill.

Teach the foundations of 3D FDM printing:

- 3D FDM Safety
- 3D FDM technology basics
- 3D FDM practical applications

Offer the participants a certification of skills for each class by the MRC and BA&S:

Level 1: Certification of Working Familiarity with 3D FDM technology

Level 2: Certification of Working familiarity of 3D FDM applications

Level 3: Certification of Practical Application of 3D FDM technology

The courses will also provide the participants with a course booklet as an instructional textbook of the content being taught and as a reference of the concepts and skills taught

COURSE 1: Introduction to 3D Printing with FDM

Course Description:

Teach the foundations of Fuse Deposition Model (FDM) printing to serve as an introduction to the technology and provide a foundation for the next classes offered by the Business Advice & Solutions and MRC.

This course (with breaks and hands-on exercises) is 2 hours in length with and extra 1 hour optionally available for additional help.

Total time to block for course is 3 hours.

Lesson Take-away(s):

- A working familiarity with 3D FDM printing, uses, and applications.
- The participant will have sufficient skills taught to operate a 3D FDM printer.

Pre-requisites for module:

- None other than a desire to learn about the technology.
- Participant should know how to use a computer and a standard printer or photocopier as a foundational skill.
- A user-provided computer is optional (course provides one for 1-on-1 learning of software).

Core Learning Objectives/Topics:

- 3D Printing History
- 3D Printer types
- Introduction to Fuse Deposition Model (FDM) printers
- Introduction to FDM safety
- Introduction to FDM filament materials o Introduction to FDM applications (business and crafting)
- FDM models and slicers
- Level the bed: how to get a good First Layer
- Printing a model
- Introduction to 3D printing defects

Learning Materials:

- Introduction to 3D Printing with FDM printed materials.

In-Class (hands-on) Activities:

- learning basic Slicer software usage
- 3D printer bed leveling.
- Print a simple model (in-class)
- Identify common defects in printing

COURSE 2: Introduction to 3D Printing Applications

Course Description:

- Building on the foundations of Course 1, this course focuses on application of the technology for the beginner in 3D FDM printing.
- Provide the participants an introduction to 3D printing applications as a crafter, modeler, or a 3D printing technician.
- Small business or serious 3D technician hopefuls will find this course handy to teach how to use the technology.
- Course 1 and this course take the 3D printing beginner to the level of being able to learn practical and real-world applications of 3D printing technology.
- This course (with breaks and hands-on exercises) is 2 hours in length with an extra 1 hour optionally available for additional help.
- Total time to block for course is 3 hours.

Lesson Take-away(s):

- A deeper working familiarity with 3D FDM printing, uses, and applications.
- The participant is exposed to more advanced concepts in 3D FDM such as model printing production and quality control.

Pre-requisites for module:

- Course 1 is strongly recommended as the skills needed for this course assume the participant can operate a 3D FDM printer (a user can test out of Course 1 to get into this class).
- Participant should know how to use a computer and a standard printer or photocopier as a foundational skill.
- A user-provided computer is optional but strongly recommended (course provides one for 1-on-1 learning of software).

Core Learning Objectives/Topics:

- 3D FDM safety o Introduction to the roles of a 3D Printer operator
- 3D FDM printer maintenance and upgrades

- First Layer Adhesion: fighting the good fight to get it right o 3D FDM Technology applicability in crafts, business, and engineering
- The world of free models: the good, the bad, and the ugly
- The Slicer: a toolkit in itself for 3D printing (with Cura) o Introduction to quality control: defects and dimensionality
- 3D FDM filament materials: ABS, PLA, PETG, TPU, and others in the filament zoo)
- Introduction to manufacturing: orders, scheduling, productions, quality control, manufacturing topologies

Learning Materials:

- Introduction to 3D Printing Applications printed materials • In-Class (hands-on) Activities:
- Model rendering with Cura (knobs, dials, and settings)
- Printing a model and checking its dimensionality
- Testing a printed model end-functionality (does it work?)
- Printing defects identification and strategies to resolve

COURSE 3: Advanced topics in 3D FDM Printing

Course Description:

- Building on the foundations of Course 1 and Course 2, this course focuses on problem solving in business using 3D FDM technology.
- Provide the participants an introduction to 3D printing solutions by understanding the use of the tools in the workflow to produce a model.
- This course introduces scanners and parametric CAD for model development.
- Course 1 and this course take the 3D printing beginner to the level of being able to learn practical and real-world applications of 3D printing technology.
- This course (with breaks and hands-on exercises) is 2 hours in length with and extra 1 hour optionally available for additional help.
- Total time to block for course is 3 hours.

Lesson Take-away(s):

- The participants will learn about model creation, model print production, end-use suitability, and 3D printing solutioning.
- The participants will get tips on FDM quality control and sustained model print production.
- This course provides the foundation to understand how to manufacture using 3D FDM printers.

Pre-requisites for module:

- Participants in Course 1 and Course 2, experience with 3D FDM, or a practical background in engineering or manufacturing.
- Participant should know how to use a computer – knowledge of scanners and experience with CAD is a plus (but not required).
- A user-provided computer is required for the hands-on exercises.

Core Learning Objectives/Topics:

- 3D FDM safety
- 3D FDM printer maintenance for production
- 3D FDM printer as a business machine (limitations, capabilities)
- Scanners: model creation technology with photogrammetry
- CAD and model creation (FreeCAD)
- 3D FDM for business and manufacturing (machine cells and parallel production of parts)
- IoT and 3D FDM: Introduction to Octoprint and remote print job management
- Topics in quality control: defects and dimensionality