



MADE RIGHT HERE

Maker Professional Training

Curriculum Overview

05/2018

Program Logistics

The Maker Professional Registered Apprenticeship is composed of three unique components: **Knowledge Training, Skills Training, and Job Placement.**



The **Knowledge Training** component of the program consists of 11 Maker Professional Classroom Trainings, provided by Made Right Here, and delivered weekly over the course of the first 10 weeks (MP01 is delivered at orientation). It also encompasses one **30-day** personal project, one **60-day** personal project, and a final **group** project, delivered monthly over the three months in that order. Participants start both their 30 and 60-day project on day one, and deliver the 30-day at their 30-day review, their 60 at their 60-day review, and then complete the group project in month three.

The **Skills Training** component of the program consists of 12 Equipment Workshops, and 12 Skill Building Workshops. **Equipment Workshops** are designed to orient individuals to the operation of various machinery and processes. **Skill Building Workshops** are designed to build professional level skills on the equipment and the software that may support the equipment. Generally, one Equipment Workshop, and one Skill Building Workshop are delivered per week for the duration of the three months. The Equipment and Skill Building Workshops are customizable at your Authorized Training Site to meet employer requirements for training.

Job Placement is the critical key component to the entire program. Ideally, participants are placed on day one via a **Joint Hiring Committee**. While this is preferred, placement may occur during the training program.

Maker Professional Knowledge Training Curriculum

Curriculum is taught on a weekly basis (one per week). The Maker Professional Knowledge Training Curriculum consists of the following classes:

MP01 - INTRODUCTION TO MAKER PROFESSIONAL – 4 Hours

- **LEARNING OBJECTIVES**
 - Overview the Project Goal: Systemic Framework for Start-up Local and Domestic Manufacturing
 - Create a positive and productive learning environment through teambuilding activities.
 - Explain the history of manufacturing in the US and its relevance to the Maker Movement.
 - Explain the purpose of the Maker Movement and its important role in manufacturing and the economy.

- **MAKER PROFESSIONAL COMPETENCIES**
 - 2a: Demonstrate ability to develop shared goals and objectives
 - 2f: Demonstrate effective communication skills - sharing openly and willingly
 - 2i: Demonstrate ability to model trust and openness in teams

MP02 - MAKER ESSENTIALS – 3 Hours

- **LEARNING OBJECTIVES**
 - Describe the importance and uses of math in the manufacturing environment.
 - Calculate dimensions of basic shapes using geometric formulas and trigonometry.
 - Demonstrate proper use and measurement with rulers, calipers, and protractors.
 - Interpret basic elements of a blueprint, including title blocks, multiviews, lines, symbols, dimensions, and tolerances.

- **MAKER PROFESSIONAL COMPETENCIES**
 - 1j: Demonstrate awareness and ability to apply concepts related to shop math- fractions, trigonometry, angles, etc.

MP03 - BASIC PROJECT PLANNING – 3 Hours

- **LEARNING OBJECTIVES**
 - Explain the essentials of selecting, planning and completing a basic project.
 - Using Project Planning and Timeline Templates, plan, document, and complete a staff-approved, basic project within the first 30 days of your program.
 - Demonstrate ability to conduct research and apply critical thinking skills to locate and utilize information to complete a project. (1b)
 - Demonstrate ability to understand project management and conduct estimation of project requirements. (1c)

- **MAKER PROFESSIONAL COMPETENCIES**
 - 1b: Demonstrate ability to conduct research and apply critical thinking skills to locate and utilize info to complete project
 - 1c: Demonstrate ability to understand project management and conduct estimation of project requirement

MP04 - PRODUCT DESIGN AND PROTOTYPING – 3 Hours

- **LEARNING OBJECTIVES**
 - Describe the stages in the design cycle of a product.
 - Explain important factors to be considered in the design of the product.
 - Describe the process and importance of prototyping.
 - Explain how to design a product for ease of manufacture and assembly (DFMA methodology).
 - Create rapid prototypes and improvements for a product.

- **MAKER PROFESSIONAL COMPETENCIES**
 - 1a: Demonstrate ability to question - establishing a system for communications in improvements in process
 - 3a: Demonstrate ability to conduct Inventory of current process/product in order to reengineer it
 - 3b: Demonstrate ability to engage in and conduct Ideation- generation and development of new ideas (demonstration of model)
 - 3h: Demonstrate understanding the process for design and manufacturability capabilities
 - 1h: Demonstrate knowledge of document control as it applies to start-ups- maintaining document quality

MP05 - CREATIVITY AND INNOVATION – 3 Hours

- **LEARNING OBJECTIVES**
 - Define ‘innovation’ and explain its significance.
 - Apply human-centered design methodologies to innovation and creative thinking.
 - Explain the role of failure in innovation as an integral part of the process.
 - Explain the process of creating customer value in innovation.
 - Create a Value Proposition Canvas for a product or service.
- **MAKER PROFESSIONAL COMPETENCIES**
 - 3b: Demonstrate ability to engage in and conduct Ideation- generation and development of new ideas (demonstration of model)
 - 3c: Demonstrate ability to engage in creative thinking - out of the box thinking (demonstration of model)
 - 3d: Demonstrate ability to engage in Brainstorming processes and sessions- seeing multiple possibilities and solutions (demonstration of model)
 - 3e: Demonstrate the effective use of Iterative processes
 - 3g: Demonstrate ability to conduct value creation - process of marketing and selling ideas to others
 - 3h: Demonstrate understanding the process for design and manufacturability capabilities

MP06 - UNDERSTANDING STARTUPS – 3 Hours

- **LEARNING OBJECTIVES**
 - Describe characteristics of startup companies and their employees.
 - Describe the phases of the startup development cycle.
 - Apply the process of customer development to create a sustainable business model.
 - Explain the role of the failure in creating successful startups.
 - Given a fictitious product or service, collaborate with teammates to complete a Business Model Canvas.
- **MAKER PROFESSIONAL COMPETENCIES**
 - 1i: Demonstrate how to write and devise components of a business plan
 - 2a: Demonstrate ability to develop shared goals and objectives
 - 2c: Effectively demonstrate ability to communicate to diverse populations
 - 2d: Demonstrate understanding of various roles in a team and how to collaborate effectively with given roles
 - 2h: Demonstrate ability to make decisions- reaching conclusions, being flexible and cooperative
 - 5f: Demonstrate awareness and grasp of the big picture- translating complex ideas into something understandable

MP07 - WORKING IN TEAMS – 3 Hours

- **LEARNING OBJECTIVES**
 - Describe advantages and challenges associated with working in teams.
 - Apply personality profile assessments to facilitate teambuilding.
 - Describe Tuckman’s five phases of team development.
 - Describe the characteristics of team conflict and apply conflict-resolution tools.
 - Apply the five-step decision making model to effectively solve a problem.
- **MAKER PROFESSIONAL COMPETENCIES**
 - 2a: Demonstrate ability to develop shared goals and objectives
 - 2c: Effectively demonstrate ability to communicate to diverse populations
 - 2d: Demonstrate understanding of various roles in a team and how to collaborate effectively with given roles
 - 2h: Demonstrate ability to make decisions- reaching conclusions, being flexible and cooperative
 - 2i: Demonstrate ability to model trust and openness in teams
 - 2k: Demonstrate ability to master the tools in conflict resolution - defining problems, generating, evaluating and implementing solutions
 - 2l: Demonstrate models and processes in both multidisciplinary and interdisciplinary teaming

MP08 - MANUFACTURING AND PRODUCTION – 3 Hours

□ **LEARNING OBJECTIVES**

- Explain important considerations and requirements for manufacturing a product.
- Describe "cradle to cradle" and "green" manufacturing and product design practices.
- Describe the process of eliminating wasteful practices to create a "Lean" organization, including JIT (just-in-time) inventory control, and standardization.
- Explain the process of commercialization and marketing a product.

□ **MAKER PROFESSIONAL COMPETENCIES**

- 1c: Demonstrate ability to understand project management and conduct estimation of project requirements
- 1d: Demonstrate understanding of the cost of quality - define ROI system
- 1f: Demonstrate understanding of JIT (just in time)- minimizing the inventory
- 1g: Demonstrate understanding of Lean- improving processes for efficiency
- 1e: Demonstrate an understanding ISO- proprietary, industrial, and commercial standards
- 3i: Demonstrate ability to understand and engage in process of commercialization and production requirements

MP09 - MAKER SAFETY – 3 Hours

• **LEARNING OBJECTIVES**

- Explain the role of OSHA in industrial safety and regulation.
- Demonstrate proper use of personal protective equipment (PPE) in an industrial environment.
- Describe industrial safety procedures for fires, hazardous materials, lifting, walking and working surfaces, lockout/tagout, and general workplace safety.

MP10 - PROFESSIONAL PERSONA – 3 Hours

• **LEARNING OBJECTIVES**

- Describe the components of a professional persona, including personality, appearance, competencies, and differentiation.
- Describe how to cultivate a professional online presence.
- Create an online professional portfolio that highlights strengths, skills, and abilities.
- Demonstrate effective communication in a business environment, including in-person and online communications.
- Demonstrate active participation in group processes and provide constructive feedback.

• **MAKER PROFESSIONAL COMPETENCIES**

- 2f: Demonstrate effective communication skills - sharing openly and willingly
- 5a: Demonstrate leadership skills and abilities - how to communicate to a team as a leader
- 5c: Demonstrate ability to provide constructive feedback
- 5d: Demonstrate ability to conduct Informed communication- accurately conveying information
- 5g: Demonstrate one's mastery of the role of active listening in communication
- 5i: Demonstrate ability to present in front of groups of people
- 5j: Demonstrate ability to satisfactorily conduct meetings - meeting structure
- 4g: Demonstration of poise under difficult situations
- 4j: Demonstration of being prepared and organized, as reflected in appropriate dress attire

MP11 - PROFESSIONAL COMMUNICATIONS – 3 Hours

• **LEARNING OBJECTIVES**

- Describe important aspects of human communication, including both verbal and nonverbal methods.
- Utilize models and frameworks for effective communication.
- Utilize guidelines for asking questions and listening effectively.

• **MAKER PROFESSIONAL COMPETENCIES**

- 1a: Demonstrate ability to question - establishing a system for communications in improvements in process
- 2f: Demonstrate effective communication skills - sharing openly and willingly
- 2g: Demonstrate ability to understand and apply communications framework - keys - being flexible and cooperative
- 5d: Demonstrate ability to conduct Informed communication- accurately conveying information
- 5g: Demonstrate one's mastery of the role of active listening in communication
- 3g: Demonstrate ability to conduct value creation - process of marketing and selling ideas to others
- 5f: Demonstrate awareness and grasp of the big picture- translating complex ideas into something understandable
- 5i: Demonstrate ability to present in front of groups of people
- 5j: Demonstrate ability to satisfactorily conduct meetings - meeting structure

Maker Professional Skills Training Curriculum

One Equipment workshop and one Skill Building workshop is taught each week for a total of 12 each. The Incite Focus Technical Curriculum consists of the following class options that are selected to create the trainees Individualized Training Plan:

EQUIPMENT WORKSHOPS – 2 Hours each

- CNC cutting - Blade SBU
- CNC cutting - Laser SBU
- Laser level 2 with rotary stage
- Large format CNC mill SBU - 2D, 2.5D
- Large format CNC mill SBU - 3D and 2 sided
- Precision CNC mill SBU - 2D, 2.5D
- Precision CNC mill SBU - 3D & 2 sided
- Additive Manufacturing - FDM SBU
- Additive Manufacturing - SLA SBU
- Mold making SBU
- Casting SBU
- PCB production
- Electronics assembly and test
- Microcontrollers
- Composites 2 - process
- Composites 3 - molds
- Composites 4 - fabrication
- Mechanical design 1 - material properties
- Mechanical design 2 - design and assembly

SKILL BUILDING WORKSHOPS – 2 Hours each

- CAD representations and exchange formats
- 2D CAD 1 - Raster
- 2D CAD 2 - Vector
- 3D CAD 1 - Introduction
- 3D CAD 2 - Basics
- Parametric CAD
- Laser engraving techniques
- Electronic design basics
- Modeling for 3D additive manufacturing
- Computer and coding concepts
- Embedded microcontroller coding introduction
- Host coding introduction
- Sensors: Input devices
- Sensors: Output devices
- Networking and communications
- Composites 1 - design
- Machine design