**Tab 1**

## Training Plan: AI Kickstart for Manufacturers

This introductory training package is designed to demystify AI for manufacturing professionals and spark ideas for its application within their operations.

**Target Audience:** Manufacturing leaders, managers, supervisors, and technical staff with little to no prior exposure to Artificial Intelligence. This is an ideal entry point for those attending or considering the "Future-Proof Your Factory" flagship workshop.

**Course Duration:** Half-day (approx. 3-4 hours)

**Learning Objectives:**

* **Key Learning Outcome 1:** Understand fundamental AI concepts relevant to manufacturing, including machine learning, data, and common AI applications like predictive maintenance and quality control.
* **Key Learning Outcome 2:** Identify potential AI use cases within their specific operations by analyzing existing challenges and opportunities through an AI lens.
* **Key Learning Outcome 3:** Gain initial hands-on experience with 1-2 beginner-friendly AI tools, demonstrating that AI is accessible and not solely the domain of data scientists.

**Course Modules/Agenda:**

* **Module 1: What is AI (and What Isn't It?) in Manufacturing?** (Approx. 45 mins)
  + Simple definition of AI, Machine Learning, and Data Science.
  + Dispelling common myths about AI.
  + Focus on AI as a tool to augment human capabilities, not replace them entirely.
  + Brief overview of key AI techniques (e.g., supervised vs. unsupervised learning in simple terms).
  + Interactive discussion: What challenges in your factory feel "unsolvable" with current methods?
* **Module 2: AI in Action: Relevant Manufacturing Use Cases** (Approx. 60 mins)
  + Exploring practical examples of AI in manufacturing:
    - Predictive Maintenance (identifying equipment failure before it happens)
    - Quality Control (automated visual inspection, defect detection)
    - Process Optimization (improving efficiency, reducing waste)
    - Supply Chain Optimization (forecasting demand, managing inventory)
    - Robotics and Automation (AI-enhanced automation)
  + Case studies (brief and relatable) of manufacturers successfully using AI.
  + Brainstorming session: Potential AI opportunities within the participants' own facilities based on the use cases discussed.
* **Module 3: Getting Hands-On: Exploring Beginner-Friendly AI Tools** (Approx. 75 mins)
  + Introduction to 1-2 tools from the low-cost/free list that are most intuitive for beginners:
    - **Teachable Machine (Google):** Focus on its simplicity for image classification (e.g., a quick demo of training a model to recognize different simple objects or simulated "good/bad" parts).
    - **Google Sheets/Excel with basic AI Add-ons/Functions:** Demonstrate simple data analysis tasks like identifying trends or basic forecasting on sample manufacturing data using built-in features or easy-to-use add-ons (like a basic forecasting function).
  + Guided mini-exercise: Participants follow along with the facilitator to perform a very simple task in one of the tools (e.g., upload a few images to Teachable Machine and see the interface, or use a forecasting function in a spreadsheet).
* **Module 4: Q&A and Next Steps** (Approx. 30 mins)
  + Addressing participant questions.
  + Summarizing key takeaways.
  + Providing resources for further learning (links to tools, introductory articles, relevant websites).
  + Discussing how this kickstart connects to more advanced AI training and the "Future-Proof Your Factory" concepts.

**Tools and Resources:**

* Presentation slides.
* Internet access.
* Computers for participants (or shared screens for demonstrations).
* Access to Google Sheets/Excel (or demonstrate a single platform).
* Access to the Teachable Machine website.
* Small, simple datasets for spreadsheet exercises.
* Sample images for Teachable Machine demo (or simple physical objects to classify).
* Handout with key terms, use cases, and links.

**Assessment Strategy:**

* Active participation in discussions and brainstorming.
* Completion of simple guided exercises.
* Q&A engagement.

**Tab 2**

## Training Plan: Operational AI Excellence

This training package dives deeper into practical AI applications, focusing on leveraging specific low-cost/free tools to drive tangible improvements in manufacturing operations.

**Target Audience:** Manufacturing engineers, process improvement specialists, quality control professionals, production supervisors, and data-curious individuals who want to apply AI directly to operational challenges. Assumes participants have a basic understanding of manufacturing data and processes, and ideally have attended or are familiar with the concepts from "AI Kickstart."

**Course Duration:** Full-day (approx. 7-8 hours)

**Learning Objectives:**

* **Key Learning Outcome 1:** Master a curated set of low-cost/free AI tools for tasks like process optimization, quality control, and basic predictive analysis by working through hands-on exercises.
* **Key Learning Outcome 2:** Develop a framework for identifying, planning, and executing AI pilot projects within their operational area, including data requirements and success metrics.
* **Key Learning Outcome 3:** Learn to measure and articulate the ROI (Return on Investment) of AI initiatives in manufacturing using practical examples and simple calculation methods.

**Course Modules/Agenda:**

* **Module 1: Recap and Operational AI Opportunities** (Approx. 45 mins)
  + Quick recap of AI fundamentals and manufacturing use cases.
  + Deep dive into specific operational areas ripe for AI adoption (e.g., bottleneck identification, yield improvement, defect reduction, machine performance monitoring).
  + Activity: Participants identify 2-3 specific operational challenges in their workplace that AI *might* help solve.
* **Module 2: Tool Deep Dive and Hands-On - Process Analysis with Orange Data Mining** (Approx. 2 hours 15 mins)
  + Comprehensive introduction to Orange Data Mining and its visual workflow.
  + Loading and exploring manufacturing datasets.
  + Building and interpreting simple models for process analysis (Decision Trees to identify factors affecting yield/quality, Clustering to group similar operational states).
  + **Hands-on Exercise 1 (Process Optimization):** Using a realistic manufacturing dataset, participants will use Orange to identify key variables influencing a target outcome (as detailed in the previous turn's exercise plan).
  + Discussion of exercise results and real-world implications.
* **Module 3: Tool Deep Dive and Hands-On - Visual Quality Control with Teachable Machine** (Approx. 1 hour 30 mins)
  + Review of Teachable Machine for image classification.
  + Best practices for collecting image data for manufacturing defects (lighting, angles, sample size).
  + Training and testing models for specific defect types.
  + Discussing limitations and potential integration points (e.g., with simple scripting or automation tools).
  + **Hands-on Exercise 2 (Basic Defect Detection):** Participants train a model to distinguish good parts from defective ones using provided or self-captured images (as detailed in the previous turn's exercise plan).
  + Review of exercise outcomes and discussion on applying this in their context.
* **Module 4: Leveraging Existing Infrastructure: Power Automate/Apps with AI Builder** (Approx. 60 mins)
  + Introduction to the Microsoft Power Platform and AI Builder.
  + Demonstrating AI Builder capabilities relevant to manufacturing (e.g., Form Processing for digitizing inspection forms, Prediction models for simple forecasts or classifications).
  + Showing how to connect AI Builder models to Power Automate flows to automate tasks based on AI insights (e.g., triggering an alert when a potential issue is predicted).
  + Case study examples of manufacturers using Power Platform and AI Builder.
* **Module 5: Planning Your AI Pilot Project** (Approx. 60 mins)
  + A structured approach to planning small-scale AI pilots:
    - Defining the problem clearly.
    - Identifying required data and assessing data availability/quality.
    - Selecting the appropriate tool(s).
    - Defining success metrics (what does a "win" look like?).
    - Starting small and iterating.
  + Workshop: Participants begin outlining a potential AI pilot project based on the challenges identified in Module 1.
* **Module 6: Measuring and Communicating ROI** (Approx. 30 mins)
  + Why measuring ROI is crucial for scaling AI initiatives.
  + Simple methods for calculating ROI in manufacturing contexts (e.g., cost savings from reduced downtime, increased yield, improved quality, labor efficiency).
  + Articulating the value of AI pilots to stakeholders.
* **Module 7: Q&A and Continued Learning** (Approx. 30 mins)
  + Addressing participant questions.
  + Providing resources for deeper dives into each tool and AI project management.
  + Discussing how this operational training feeds into strategic AI thinking ("Future-Proof Your Factory").

**Tools and Resources:**

* Presentation slides.
* Internet access.
* Computers for each participant with Orange Data Mining installed.
* Access to Teachable Machine website.
* Access to Microsoft Power Automate/Apps and AI Builder (trial accounts or guidance on using existing licenses).
* Realistic, pre-cleaned manufacturing datasets for Orange exercises.
* Diverse image sets of good/defective parts for Teachable Machine exercise.
* Examples of forms for AI Builder Form Processing demo.
* Templates for outlining AI pilot projects.
* Handout with tool summaries, key concepts, ROI examples, and links to advanced resources.

**Assessment Strategy:**

* Active participation in discussions and exercises.
* Completion and interpretation of hands-on exercises.
* Participation in the AI pilot project outlining activity.
* Q&A engagement.

**Tab 3**

## Training Plan: AI-Driven Predictive Maintenance Primer

This training package focuses specifically on using AI to predict equipment failures, a critical application for reducing downtime and maintenance costs in manufacturing.

**Target Audience:** Maintenance managers, reliability engineers, maintenance technicians, plant engineers, and data analysts involved in equipment monitoring and maintenance. Assumes a basic understanding of manufacturing equipment and maintenance practices, and ideally some familiarity with fundamental AI concepts (e.g., from "AI Kickstart").

**Course Duration:** Half-day to Full-day (approx. 4-6 hours, depending on depth and hands-on time)

**Learning Objectives:**

* **Key Learning Outcome 1:** Understand the principles of predictive maintenance using AI, differentiating it from reactive and preventive maintenance.
* **Key Learning Outcome 2:** Explore AI tools suitable for analyzing sensor data (vibration, temperature, pressure, etc.) and historical maintenance records to predict equipment failures.
* **Key Learning Outcome 3:** Outline a basic strategy for implementing an AI-based Predictive Maintenance (PdM) pilot project, including data collection considerations and potential challenges.

**Course Modules/Agenda:**

* **Module 1: Introduction to Predictive Maintenance (PdM)** (Approx. 45 mins)
  + The evolution of maintenance strategies (reactive, preventive, predictive, prescriptive).
  + The value proposition of PdM in manufacturing (reduced downtime, lower maintenance costs, increased asset lifespan, improved safety).
  + Key data sources for PdM (sensor data, maintenance logs, operating conditions).
  + How AI enables PdM by identifying complex patterns in data that indicate impending failure.
* **Module 2: AI Concepts for PdM** (Approx. 60 mins)
  + Framing PdM as an AI problem (classification: failure vs. no failure; regression: predicting time to failure).
  + Relevant AI techniques in simple terms:
    - Classification models (e.g., identifying if a machine is in a "high risk" state).
    - Regression models (e.g., estimating remaining useful life - RUL).
    - Anomaly detection (identifying unusual sensor readings).
  + The importance of historical data (failure records, sensor readings leading up to failure).
* **Module 3: Exploring AI Tools for PdM Data** (Approx. 90-120 mins)
  + Focus on tools capable of handling time-series and sensor data:
    - **Orange Data Mining:** Demonstrating how to load and explore time-series data. Building simple models (e.g., using Tree or Forests to predict failure probability based on sensor readings). *Note: Orange is good for introduction, but may have limitations for complex time-series analysis.*
    - **Python with Libraries (Pandas, Scikit-learn - Introduction):**
      * Briefly introduce the power of Python for data manipulation (Pandas) and building more sophisticated predictive models (Scikit-learn).
      * Demonstrate (code-along or pre-recorded demo) a very basic example: loading sensor data, visualizing trends, and perhaps running a simple classification model (like Logistic Regression) on a simplified PdM dataset. *Emphasis here is on showing the capability and structure, not in-depth coding.*
    - **Microsoft Power Automate/Apps with AI Builder (Prediction Model):** Showing how AI Builder's prediction model can be trained on historical data to predict a binary outcome (e.g., "Failure in next X days/hours") and how this can be integrated into an alert system via Power Automate.
  + Discussion on the strengths and weaknesses of each tool for PdM.
* **Module 4: Planning Your PdM Pilot Project** (Approx. 60 mins)
  + Choosing the right equipment for a pilot (criticality, available data, accessibility).
  + Identifying necessary data points and ensuring data quality.
  + Structuring the data for AI analysis.
  + Defining the prediction target (e.g., predicting a specific failure mode, predicting failure within a time window).
  + Setting up data collection and integration (manual export vs. automated data streams).
  + Defining success metrics for the pilot (e.g., number of predicted failures, reduction in unscheduled downtime).
  + Activity: Participants outline a potential AI-driven PdM pilot for a piece of equipment in their facility.
* **Module 5: Challenges and Scaling PdM** (Approx. 30 mins)
  + Common challenges in implementing PdM (data availability, data quality, integration with existing systems, organizational change).
  + Strategies for overcoming challenges.
  + Thinking about scaling a successful pilot to other equipment.
* **Module 6: Q&A and Next Steps** (Approx. 15 mins)
  + Addressing participant questions.
  + Providing resources for deeper learning in PdM, time-series analysis, and relevant tools.
  + Connecting the PdM primer to the broader AI strategy discussed in "Future-Proof Your Factory."

**Tools and Resources:**

* Presentation slides.
* Internet access.
* Computers for each participant.
* Orange Data Mining installed.
* Access to a Python environment (e.g., Anaconda distribution, Google Colab) for demonstration, or pre-recorded demos.
* Access to Microsoft Power Automate/Apps and AI Builder (trial accounts or guidance on existing licenses).
* Sample datasets of sensor data and maintenance records (simulated or anonymized real-world data).
* Basic Python scripts for demonstration (if doing live coding/demo).
* Templates for outlining PdM pilot projects.
* Handout with key PdM concepts, tool applicability, and links to resources.

**Assessment Strategy:**

* Active participation in discussions and activities.
* Engagement with tool demonstrations and guided exercises.
* Participation in the PdM pilot outlining activity.
* Q&A engagement.

These three training plans offer a structured approach to introducing and applying low-cost/free AI tools within a manufacturing context, building from fundamental understanding to more specific operational and maintenance applications. They can serve as standalone courses or components of a larger program like "Future-Proof Your Factory: Practical AI for Manufacturing Leaders."