# Prompt Engineering Case Study Portfolio

## 📂 Use Case: Simplifying Complex Technical Documentation into Plain English

This project showcases how prompt engineering can enhance the clarity of AI-generated outputs. The goal is to make dense technical language more accessible to non-technical users, especially in scientific or healthcare industries.

## 🧩 Context

As a technical writer with 18 years of experience, I explored the potential of AI to simplify specialized documentation. The task involved rewriting a paragraph from a mass spectrometer manual to a user-friendly format using AI prompt tuning.

## ⚙️ Task

Simplify a technical paragraph about a mass spectrometer into plain English while retaining technical accuracy.

## 📝 Original Technical Text

“The system utilizes electrospray ionization (ESI) to transfer ions from the liquid phase into the gas phase. Ionized analytes are directed into the quadrupole for mass filtering prior to entering the collision cell, where fragmentation occurs to support compound identification in MS/MS analysis mode.”

## 🔴 Before Prompt Tuning

Prompt:  
“Summarize this technical paragraph.”

Output:  
“The system uses electrospray ionization to transfer ions into the gas phase and sends them through a quadrupole for mass filtering. Then they go to a collision cell for fragmentation and identification in MS/MS mode.”

* Issues:
* Uses jargon: “quadrupole,” “fragmentation,” “MS/MS mode”
* Not user-friendly or simplified
* Too literal

## 🟢 After Prompt Tuning

Prompt:  
“Rewrite this technical explanation in simple terms so a non-technical user can understand what the mass spectrometer does, using a friendly and clear tone. Avoid jargon unless absolutely necessary, and explain any technical terms briefly.”

Output:  
“The system turns tiny particles in a liquid into gas so they can be studied. It first filters the particles based on their weight, then breaks them into smaller pieces to help identify what they are made of. This helps scientists understand the sample more clearly.”

* Improvements:
* Simpler vocabulary
* Concepts broken down into steps
* Explained without losing the essence
* Friendly tone suitable for general users

## 🧠 Reflection

This prompt tuning exercise illustrates how refining prompts to include tone, clarity, and audience targeting can transform technical outputs. It mirrors my experience in simplifying engineering content for broader audiences and highlights how prompt engineering is a natural extension of my technical writing skills.

## 📂 Use Case: Generating FAQs from Technical Documentation

## 🧩 Context

This case study demonstrates how AI can assist in automatically generating Frequently Asked Questions (FAQs) from existing technical documentation. This helps reduce manual effort while improving user self-service options.

## ⚙️ Task

Generate an FAQ from a product installation guide. The goal is to provide clear, helpful answers to common user questions.

## 📝 Original Technical Text

“Before starting the installation, ensure that the system is powered off and all cables are disconnected. The installation area must be free of dust, moisture, and direct sunlight. Use an antistatic wrist strap during the procedure. Connect the device using the provided power adapter and check for the green LED light to confirm successful installation.”

## 🔴 Before Prompt Tuning

Prompt:  
“Create an FAQ from this paragraph.”

Output:  
Q: What is the installation process?  
A: Follow all the installation steps as described.

* Issues:
* Vague and unhelpful answer
* Lacks structure and detail
* Fails to extract relevant user-focused questions

## 🟢 After Prompt Tuning

Prompt:  
“Extract 3 FAQs from the following installation guide paragraph. Frame the questions from the perspective of a first-time user and ensure the answers are concise, helpful, and avoid unnecessary jargon.”

Output:  
Q1: What should I do before starting the installation?  
A1: Make sure the system is powered off and all cables are disconnected.  
  
Q2: What conditions are needed for a safe installation area?  
A2: The area should be clean, dry, and not exposed to direct sunlight.  
  
Q3: How do I know the device is installed correctly?  
A3: Connect the power adapter and check for a green LED light.

* Improvements:
* Clear, user-centered questions
* Practical and accurate answers
* Tone aligned with end-user expectations

## 🧠 Reflection

This example highlights how prompt refinement—especially guiding tone, structure, and user intent—improves AI output quality. It also demonstrates the alignment between prompt engineering and my skills in FAQ and help content development.