

Bachelor's/ Master's/ Semester Thesis

System Integration and Automation of an Enrichment Device for Point-of-Care Diagnostics

Keywords: System automation, 3D Printing, Python, Process Engineering

Project Description

In 2020, around 26% of the world's population still had no access to safely treated drinking water, with over 770 million people lacking basic access to drinking water. This leads to over 1.2 million deaths per year.

Fast and uncomplicated detection of pathogens - e.g. with the help of biosensors - is an important component in reducing the number of victims. In order to achieve better detection limits and to be able to measure large sample volumes, the water samples must first be concentrated.

The aim of the work is to integrate and subsequently automate an existing, multi-stage enrichment system.

Profile

- Field of study: Chemical engineering, mechanical engineering, industrial biotechnology or similar
- Interest in process engineering/automation

Ideal, but not required:

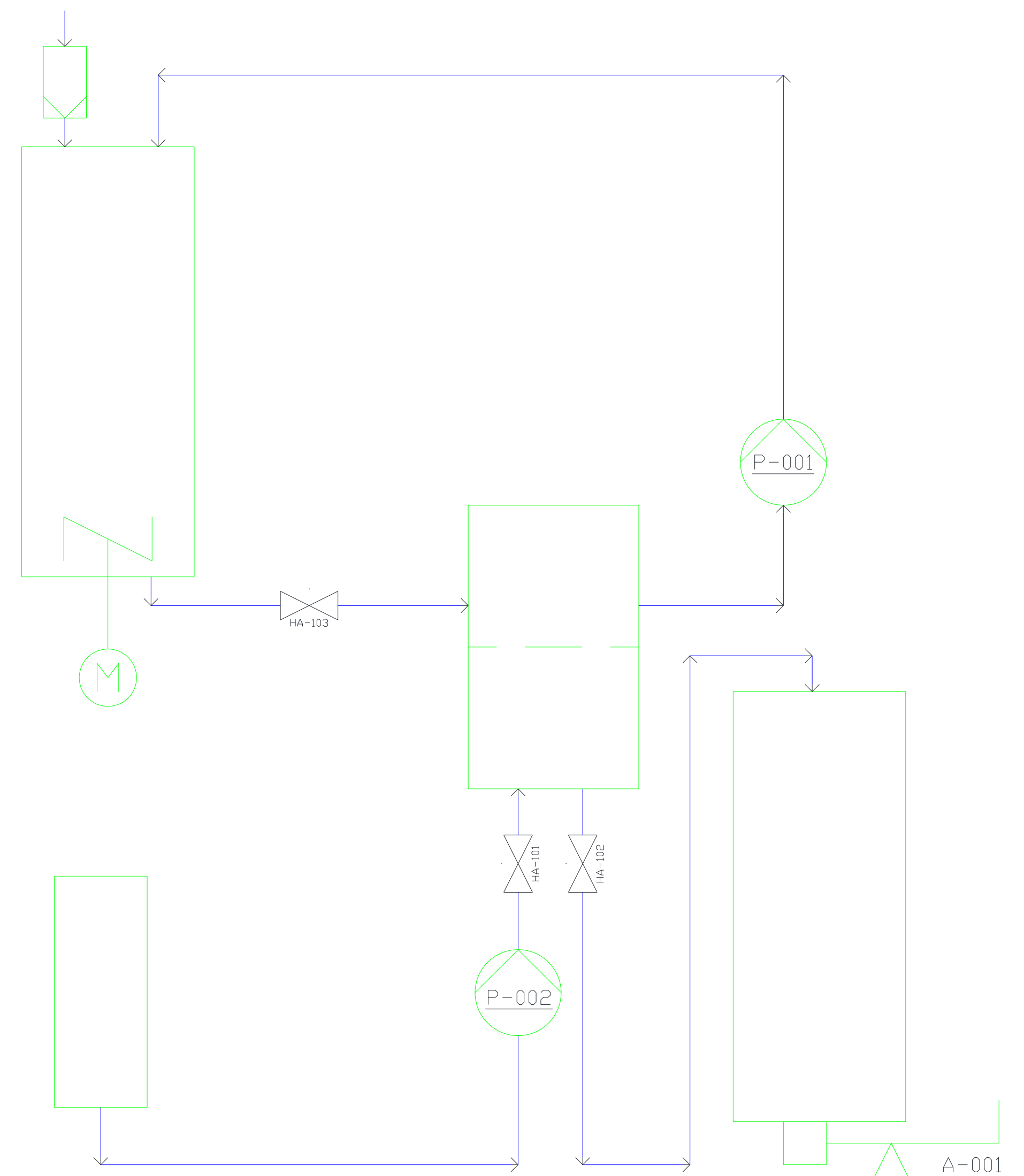
- Previous knowledge of Python/C++ or similar programming languages
- Experience with Arduino/RaspberryPi or similar

This is an *hands-on* thesis. Home office is only possible during certain project phases..

Working Packages

1. Description of the existing system
2. Creating a functional specification overview
3. Material research and sourcing
4. Design and manufacturing of the integrated system
5. Automate controls of the system components
6. Implement complex methods

This work can be divided into two BT/MT/ST.



P&ID of the current setup.

To create functional specifications and the design, the pump performance and pressure curves of the existing system must be analyzed.

Sufficiently large components are then procured and combined into a handy module (e.g. inside a Pelican case) for system integration.

Automation tasks relate to the control of solenoid valves, pumps and level measurement and, based on this, the implementation of methods that enable automated program execution (at the push of a button).