



CARINTHIA UNIVERSITY OF APPLIED  
SCIENCES

DEGREE PROGRAM: SYSTEMS DESIGN MASTER'S

LECTURE: DATA ACQUISITION AND  
TRANSMISSION

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# FEASIBILITY REPORT

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Student:	Metin Oktay YILMAZ
ID:	2210528013
Lecturer #1:	Wolfgang GRANIG
Lecturer #2:	Udo HAFNER
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# Introduction

3D printers have taken over the world over the last decade and they have found use in industry, as well as in homes. The convenience of producing plastic parts at homes gathered attention of many hobbyists and makers. In industry, the increasing production speed of 3D printers has made them suitable for rapid-prototyping, saving immense amount of time and money. Civil engineers and architects also found use cases for 3D printers. For example, Mayorship of Istanbul has built its own 3D printed local service buildings within a week with a fraction of cost and build complexity.

Hotend temperature must be kept stable as fluctuations in hotend temperature would cause quality issues on the product, e.g. uneven surface finish and/or material deposition, or nozzle clog. Therefore, the frequency at which the temperature is measured plays an important role. Also, since the sensor is placed at the carriage, its weight plays an important role in position control. However, a PTC thermistor is never of high mass, therefore this study will assume that the mass of the carriage will remain relatively same.

# Goals

In this feasibility study, the focus will be on an FDM printer's hotend temperature measurement with a PTC thermistor. The goal is to firstly calculate the necessary measurement frequency, then prove whether it is possible to sense the temperature at this required frequency, of the component in which the raw material would melt without compromising component safety nor end-product quality, whilst remaining within the project budget. To reach these goals, requirements on the next page must be fulfilled.

# Limitations

The component to which the sensor will be mounted is chosen to be *"Hotend heaterblock E3D"* [1]

The following table describes the requirements:
