

## **F22.037: Evaluation of Compression Strength in 3D Printed Thermoplastics**

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### **Overview**

The objective of this research is to evaluate the compressive strength of samples made using a fusion deposition modeling (FDM) 3D printer and various thermoplastics and to compare their compressive properties. To date, there has been very little research carried out to evaluate the compressive strength of thermoplastics, despite the fact that their compressive strength is not equal to their tensile strength, and despite many 3D printed parts being loaded in compression during use.

### **What the student will DO and LEARN**

The student will learn how to use a 3D printer and manufacture material compression samples following ASTM standards, how to run a comprehensive testing program, and how to analyze and interpret the acquired experimental data. The student will also learn how to use material testing equipment available in my lab and will gain an understanding of mechanical testing procedures, along with experience collecting data, graphing, and interpreting stress-strain curves. The student will conduct a literature search on the state of the art in characterizing thermoplastics used in 3D printing and possible contribute to a research paper aimed at reporting the findings of this study.

### **Additional benefits**

The student will develop connections with the manufacturers of the tested thermoplastics and will gain experience in additive manufacturing processes which have become widely accepted in at many engineering and manufacturing companies. The student will interact with other students in my group and will have the opportunity to learn about other topics of research going on in my group.

### **Additional qualifications**

Self-motivated, well organized, keeping accurate records, good time management.

### **Time commitment**

6 hrs/week for 30 weeks