

Senior Design Project Description

Company Name	Systems Engineering	Date Submitted	07/24/2020
Project Title	Utilization of Experimental 3D Printing for Optimization of Rapid Prototyping (UNCC_3DRAPID)	Planned Starting Semester	Fall 2020

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical		Electrical	
Computer		Systems	5
Other ()			

Project Overview and Requirements:

This is a continuing series of department projects that utilize a 3D printing environment and emerging transportation modes that optimize the rapid prototyping procedure. In manufacturing field the productivity can be achieved by transforming product/object from raw material, as fast as possible with least cost and resource. Rapid prototyping (RP) can achieve this target effectively. RP techniques are capable of producing any complex geometries or internal cavities easily and efficiently. (Kumar et al., 2017).

Utilizing multiple 3D printers, students will investigate RP techniques in an effort to improve the productivity with less cost, time, wastes etc., while maintaining high quality of the product. After a set of performance criteria are identified, alternative designs of subassemblies are experimented with respect to those criteria. From the data collected after the experiments, DOE and optimization techniques are applied to search for optimal designs and schedules for RP.

Expected Deliverables/Results:

Deliverables include:

- Technical report that delineate the optimization procedure of RP.
- Organized data sets from experiments.
- Example assembly as a result of implementing the optimization procedure.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- SEGR 4141 (completed or planned to take in fall)



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- SEGR 3103 (fall)

References

Kumar, L., Haleem, A. Tanveer, Q., Javid, M., Shuaib, M., and Vineet, K. (2017) Rapid Manufacturing: Classification and Development, IJERS, 4(3), 29-40.