Incorporating 3D Printing into Introductory Engineering Courses

Nicholas Schantz[1], Forrest Ables[2]
Redahegn Sileshi[3], JB Sharma[4], Al Walters[5], and Hoang Pham[6]

[1,2] Undergraduate Researcher and Digital Fabrication Lab
[3]Assistant Professor of Engineering: redahegn.sileshi@ung.edu
[4]Emeritus Professor of Physics
[5]Associate Professor of Physics
[6]Assistant Professor of Physics

University of North Georgia, Oakwood, Georgia 30566

Abstract

Integration of hands-on activities, and design projects into course curriculum have been shown to significantly enhance and deepen understanding of concepts in the course. Three-dimensional (3D) printer has been a subject of many academic and industrial research projects. Many higher education institutions across the United States and the world are increasingly incorporating 3D printing technology into their curriculum. 3D printing is a manufacturing method in which solid 3D objects are printed layer by layer from raw materials.

The Physics Department in collaboration with the Art Department in the University of North Georgia (UNG) Gainesville Campus opened a Digital Fabrication Lab located in Dunlap Mathis Building. The goals are to assist faculty in using 3D printing technology and to develop the curriculum. The lab is currently equipped with *Afinia H800+, Makerbot Replicator 2 and 5th Generation, Hyrel 3D, FormLabs Form 2, Lulzbot Taz 5 3D* printer types and 3D scanners. Currently Physics, Pre-engineering, and Art students have been direct beneficiaries of the Digital Fabrication Lab. Students from these departments are able to develop and print models personally designed for class projects, design groups, research or personal use. 3D printing technology helped students to successfully correlate and implement various engineering concepts that they learnt in class through hands-on activities. The Lab is open to anyone on campus to use and test the 3D printing technology.