

# DDGT-130: INTRODUCTION TO 3D PRINTING

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## Effective Term

Fall 2018

## BOT Approval

12/14/2017

## SECTION A - Course Data Elements

### CB04 Credit Status

Credit - Degree Applicable

### Discipline

#### Minimum Qualifications

#### And/Or

Drafting/CADD (Computer Aided Drafting/Design) (Any Degree and Professional Experience)

### Subject Code

DDGT - Digital Design Graphics Technology

### Course Number

130

### Department

Digital Design Graphics Technology (DDGT)

### Division

Career Education and Workforce Development (CEWD)

### Full Course Title

Introduction to 3D Printing

### Short Title

Introduction to 3D Printing

### CB03 TOP Code

0953.00 - \*Drafting Technology

### CB08 Basic Skills Status

NBS - Not Basic Skills

### CB09 SAM Code

C - Clearly Occupational

### Rationale

New course to meet industry standards.

## SECTION B - Course Description

### Catalog Course Description

This course focuses on 3D Modeling and 3D Printing for the beginner and those currently in industry. This course will cover the study of additive manufacturing as it pertains to 3D Printing. Topics covered include 3D Parametric Modeling, 3D Printing applications, and the advantages and limitations of 3D printing technology. Students will learn how to create three-dimensional parts and assemblies using the current version of the Autodesk Fusion 360 software specifically for 3D Printing. This course also provides the opportunity for students to earn the Autodesk Certificate of Training and to prepare for the Autodesk Certified User exam.

## SECTION C - Conditions on Enrollment

### Open Entry/Open Exit

No

### Repeatability

Not Repeatable

**Grading Options**

Letter Grade or Pass/No Pass

**Allow Audit**

Yes

**Requisites****SECTION D - Course Standards****Is this course variable unit?**

No

**Units**

3.00

**Lecture Hours**

36.00

**Lab Hours**

54.00

**Outside of Class Hours**

72

**Total Contact Hours**

90

**Total Student Hours**

162

**Distance Education Approval****Is this course offered through Distance Education?**

Yes

**Online Delivery Methods**

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

**SECTION E - Course Content****Student Learning Outcomes**

**Upon satisfactory completion of the course, students will be able to:**

1. Obtain Autodesk Certificate of Training.
2. Implement technical skills in the creation of 3D parts and assemblies utilizing the Autodesk Fusion 360 software.

**Course Objectives**

**Upon satisfactory completion of the course, students will be able to:**

1. Explain current and emerging 3D Printing applications in a variety of industries.
2. Describe the advantages and limitations of various 3D Printing technologies.
3. Identify opportunities to apply 3D Printing technology for time and cost savings.
4. Discuss the economic implications of 3D Printing.
5. Effectively use the latest release of the Autodesk Fusion 360 software program in a three-dimensional workspace.
6. Perform various geometric constructions.

7. Construct and edit two-dimensional and three-dimensional CAD entities.
8. Construct multi-view drawings utilizing orthographic projection.
9. Place and edit detail drawing annotations.
10. Print hard copies of detail drawings.
11. Design and 3D Print objects containing moving parts without assembly.

### Course Content

1. 3D Printing
  - a. Applications
  - b. Industries
  - c. Materials
  - d. Cost Analysis
  - e. Advantages
  - f. Limitations
2. Fusion 360 Fundamentals
  - a. User Interface
  - b. Creating the First Feature
  - c. Creating Sketched Geometry
  - d. Additional Sketching Tools
  - e. Sketched Secondary Features
  - f. Pick and Place Features
  - g. Construction Features
  - h. Equations and Parameters
  - i. Additional Features and Operations
  - j. Design and Display Manipulation
  - k. Single Path Sweeps
  - l. Loft Features
  - m. Feature Duplication Tools
  - n. Distributed Design
  - o. Component Design Tools
  - p. Multi-Body Design
  - q. Sculpting Geometry
  - r. Editing Sculpted Geometry
  - s. Drawing Basics
  - t. Detailing Drawings
  - u. Static Analysis Using the Simulation Environment
3. 3D Printing Design Considerations
  - a. Materials
  - b. Structural Integrity
  - c. Expenses
  - d. Tolerances and Clearances
  - e. Scaling

### Methods of Instruction

#### Methods of Instruction

Types	Examples of learning activities
Activity	Class assignments.
Lab	Class assignments.
Lecture	Instructor lectures on Autodesk approved courseware.
Observation and Demonstration	Instructor provides computer demonstrations of best practices utilizing the class software for given assignments.
Projects	Students will 3D Print their own designs of various parts and assemblies.
Other	Class lectures and demonstrations are recorded and posted online as a student resource.

**Instructor-Initiated Online Contact Types**

Announcements/Bulletin Boards  
 Chat Rooms  
 Discussion Boards  
 E-mail Communication  
 Telephone Conversations  
 Video or Teleconferencing

**Student-Initiated Online Contact Types**

Chat Rooms  
 Discussions  
 Group Work

**Course design is accessible**

Yes

**Methods of Evaluation****Methods of Evaluation**

Types	Examples of classroom assessments
Quizzes	Written exams and quizzes will be given to test student knowledge on software and technical skills. Exams and quizzes will contain short answer, multiple choice, and true or false.
Projects	Research Projects - Students will research 3D Printing applications and technologies. Student will pick one new application (within last 6 months) and present findings to the class. Projects - Students will 3D Print their own designs of various parts and assemblies.
Oral Presentations	Students will research 3D Printing applications and technologies. Student will pick one new application (within last 6 months) and present findings to the class.
Work Assessments	Students may have lab time available during class to work on their homework.
Homework	Homework can be found on the assignment list handed out on the first day of class or on the department website. Homework assignments will be submitted either digitally or printed. Homework assignments will demonstrate the student's ability to successfully utilize the software and demonstrate the student's skill set.
Lab Activities	3D Printing of various parts and assemblies.
Exams/Tests	Final Exam will be based on student's final project.

**Assignments****Reading Assignments**

Students will read and answer questions from the Ascent courseware on Autodesk Fusion 360.

**Writing Assignments**

Written reports on new 3D Printing technologies and how it will impact current technology, industry, and related fields.

**Other Assignments**

Students will 3D Print their own designs of various parts and assemblies.

Possible examples of projects may include: the 3D Printing of a single part like a logo, small assembly like salt and pepper shakers, or a complex assembly like a light cover.

Students will also research current 3D Printing applications and present to the class.

**SECTION F - Textbooks and Instructional Materials****Material Type**

Textbook

**Author**

Ascent

**Title**

Autodesk Fusion 360 - Introduction to Parametric Modeling

**Edition/Version**

Newest

**Publisher**

Ascent

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**Material Type**

Other required materials/supplies

**Description**

Software #1:

Title: Autodesk Fusion 360

Publisher: Autodesk

Edition: Newest

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**Proposed General Education/Transfer Agreement****Do you wish to propose this course for a UC Transferable Course Agreement (UC-TCA)?**

No

**Course Codes (Admin Only)****ASSIST Update**

No

**CB00 State ID**

CCC000589907

**CB10 Cooperative Work Experience Status**

N - Is Not Part of a Cooperative Work Experience Education Program

**CB11 Course Classification Status**

Y - Credit Course

**CB13 Special Class Status**

N - The Course is Not an Approved Special Class

**CB23 Funding Agency Category**

Y - Not Applicable (Funding Not Used)

**CB24 Program Course Status**

Program Applicable

**Allow Pass/No Pass**

Yes

**Only Pass/No Pass**

No