

COURSE SYLLABUS

COM 303: 3D Printing and Modeling (4 units)

Course Description

This course introduces the student to the wonderful world of 3D printing. Since its introduction, 3D printing is being used for more and more innovative solutions, from prototyping and production of new products to reproducing human organs. This class will cover production of quality 3D models and the proper procedure for printing them correctly.

General Course Information

Number of Units/Weeks	10 Weeks
#Hours Lecture/#Hours Laboratory/#Hours HW	40/00/80
Prerequisite(s)	None
Co-requisites (s)	None
Course Developer(s)	Douglas Mooney MBA
Date Approved / Last Review	Pending /6/05/2014

Learning Outcomes

On successful completion of this course, the student will be able to:

- Model 3D objects for 3D print
- Use multiple 3D software applications
- Import and export 3D files and formats
- Troubleshoot and problem solve 3D printer file errors
- Troubleshoot and problem solve 3D printer hardware errors
- Maintain and service 3D printers
- Print 3D objects
- Explain opportunities available in the 3D printing marketplace

Instructional Methods Employed in this Course

- Lecture
- Hands-on exercises and labs
- Research
- Practical application of theory and skills in authentic projects

Information Resources for this Course



Textbook

France, A. K. (2013). *Make: 3D printing: The essential guide to 3D printers*. Sebastopol, CA : Maker Media, Inc. ISBN 978-1-457-18293-8.

**Other Materials**

One 4 gig or larger flash drive is required to back-up student files

**Drawing tools**

Pencil and paper are needed to sketch concept designs and take notes.
Note: Advanced drawing skills are not required

**Web Site Readings**

TBA

Table/Topics & Assignments**Types of Assignments:**

Lecture -

Considered Lecture Hours

Classroom Discussion -

Considered Lecture Hours

In Class Critique -

Considered Lecture Hours

Delivering Oral Presentations -

Considered Lecture Hours

In Class (IC) Exercise -

Considered Lecture Hours

Reading -

Considered HW, work done outside of class

WebClass lesson (non-online courses) -

Considered HW, work done outside of class

Lab Work -

Considered Lab Hours

Quiz, Midterm or Final -

Considered Lecture Hours

Week 1						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 1A	Introduction to 3D printing concepts	0.5	0			
LEC 1B	Introduction to 3D applications	0.5	0			
IC EX 1A	Working with primitive objects	1	0			

	Modify, scale, rotate, and move Choose object to print from Thingiverse					
IC EX 1B	Begin Project One: 3D print with Thingiverse (Evaluated by printed Thingiverse object with spec sheet)	1	0		50	Week 3
IC EX 1C	Sign up for Tinkercad and Sketchup Experiment in both applications	1	0			
HW 1A	Continue to experiment in Tinkercad (Evaluated by Project Two)			3		
HW 1B	Continue to experiment in Sketchup (Evaluated by Project Two)			3		
HW 1C	Create models (Evaluated per spec. sheet)			3	50	Week 2
Total Week 1		4	0	9	100	
Week 2						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 2A	Demo Project Two using Primitive objects only (Tinkercad)	1	0			
LEC 2B	Using quick print Using support structures and rafts Printing without supports and rafts	1	0			
IC EX 2A	Work on Project One in Thingiverse	2	0			

HW 2A	Research object for Project Two			3		
HW 2B	Create model in Tinkercad (Evaluated per spec sheet)			6	50	Week 3
Total Week 2		4	0	9	50	
Week 3						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 3A	Introduce Maya 3D application	0.5	0			
LEC 3B	Demo for Project Two, exporting appropriate file formats (.obj and .stl)	1	0			
LEC 3C	Using Primitive objects	0.5	0			
IC EX 3A	Finish printing Project One from Thingiverse per spec. sheet	2	0			
HW 3A	Continue Project Two work in Tinkercad (Evaluated by object in progress per spec. sheet)			9		Week 4
Total Week 3		4	0	9		
Week 4						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 4A	Manipulating vertices, faces, and edges	1.5	0			
LEC 4B	Mid-term quiz prep	0.5	0			
IC EX 4A	Start Printing Project Two, Tinkercad (Evaluated by Project Two)	2	0		100	Week 5
HW 4A	Work in Maya: Manipulating vertices, faces,			6		

	and edges (Evaluated by Project Three)					
HW 4B	Model per spec. sheet			3	50	Week 5
Total Week 4		4	0	9	150	
Week 5						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 5A	Extruding faces and Boolean operations in Maya	1	0			
IC EX 5A	Continue Project Two in Tinkercad	1	0			Due end of class
IC EX 5B	Begin Project Three in Maya (Evaluated by Project Three)	1	0		100	End of class Week 7
EXAM 5A	Mid-term	1	0		50	End of class Week 5
HW 5A	Work in Maya: Extruding faces and performing Boolean operations (Evaluated by Project Three)			6		
HW 5B	Sketches (Evaluated by spec. sheets)			3	50	Week 6
Total Week 5		4	0	9	200	
Week 6						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 6A	Textures in Maya Review Primitives	1	0			
IC EX 6A	Continue working on Project Three	3	0			
HW 6A	Sketches of Project Four Turn in 15 thumbnails (Evaluated by Project Four)			9	50	Beginni ng of class Week 8

	Work in Maya: Textures turn in five per spec sheet (Evaluated by spec. sheet)					
Total Week 6		4	0	9	50	
Week 7						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 7A	Sculpt tool in Maya	1	0			
IC EX 7A	Finish Project Three Maya	3	0			
HW 7A	Textures in Maya per spec. sheet (Evaluated by spec. sheet)			4	50	Beginni ng of class Week 8
HW 7B	Work in Maya: Sculpt Tool Model per spec. sheet (Evaluated by spec. sheet)			5	50	Beginni ng of class Week 8
Total Week 7		4	0	9	100	
Week 8						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 8A	Modeling a simple character in Maya	2	0			
IC EX 8A	Start Printing Project Four (Evaluated by Project Four)	2	0		100	
HW 8A	Work in Maya: Character modeling per spec. sheet (Evaluated by spec. sheet)			9	50	Beginni ng of class Week 10
Total Week 8		4	0	9	150	
Week 9						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due

LEC 9A	Advanced techniques in Maya	1	0			
IC EX 9A	Continue printing Project Four	3	0			
HW 9A	Written report on 3D printing applications and processes (Evaluated by rubric for written report)			9	100	Beginning of class Week 10
Total Week 9		4	0	9	100	
Week 10						
Type	Topic/Description	LEC Hours	LAB Hours	HW Hours	Point Value	Due
LEC 10A	Selling 3D objects on the web	1				
EXAM 10A	Final exam	3			100	End of class Week 10
Total Week 10		4	0	0	100	

Course Hours Summary

Week	Topic	LEC Hours	LAB Hours	HW Hours
1	Introduction to 3D printing concepts and applications; Thingiverse; Tinkercad and Sketchup	4	0	9
2	Demo Tinkercad with primitive objects; using Quick print; working with structures and rafts; printing without structures and rafts	4	0	9
3	Maya 3D application; introduce Project Two, Tinkercad and Sketchup	4	0	9
4	Advanced techniques in Maya intro.; Manipulating vertices, faces, and edges	4	0	9
5	Mid-term; Extruding faces and Boolean operations	4	0	9
6	Textures in Maya; review primitives	4	0	9
7	Sculpt tool in Maya	4	0	9
8	Modeling a simple character	4	0	9
9	Advanced techniques in Maya	4	0	9
10	Final; selling 3D objects on the web	4	0	0
Total		40	0	81

Table/Point Breakdown

Assignment	Possible Points	Percent of Grade
Exercises	850	85%
Midterm Exam	50	5%
Final exam	100	10%
	1000	100%

Your Grades for this Course

Your final grade for this course will be based on an assessment by the Instructor of your performance on a number of course activities, which may include objective tests, classroom exercises, laboratory demonstrations, project papers, or other types of activities. The chart below indicates in what activities you will engage, how many possible points can be earned for each activity, and the percentage of your final grade that will be accounted for by each activity.

Students in this course should be graded following Coleman University assessment practices and policies. A point system is used in the University to indicate student performance on various required activities or projects. For this course, it is recommended that points be distributed as follows:

Coleman University Grade Assignment Policy:

Percent	Letter Grade	Grade Points
94-100	A	4
90-93	A-	3.67
87-89	B+	3.33
84-86	B	3
80-83	B-	2.67
77-79	C+	2.33
74-76	C	2
70-73	C-	1.67
67-69	D+	1.33
64-66	D	1
60-63	D-	0.67
N/A	INC	0
N/A	W	0
60 or above	CR	0
59 or below	NC	0
N/A	I	0

N/A	W	0
N/A	AU	0
N/A	TR	0
N/A	WV	0

Legend	
CR = Credit	NC = No Credit
I = Incomplete	W = Course Withdrawal
AU = Audit	TR = Transfer Credit
WV = Waiver	

Academic Accommodation / Adjustment Policy:

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA), Coleman University offers accommodations to students with documented physical, psychological, and/or cognitive disabilities. Coleman University will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to offer equal educational opportunities to qualified disabled individuals.

To qualify for an academic accommodation under ADA, the student must provide adequate documentation of a disability. Students seeking academic accommodations should contact the campus ADA Coordinator at 858-966-3953 or via email at ada@coleman.edu. The ADA Coordinator will review the documentation provided and verify ADA coverage. Students covered under ADA must meet with the ADA Coordinator at the beginning of every term to determine the appropriate academic accommodations. Failing to meet with the ADA Coordinator at the beginning of every term may impact the availability of accommodations.

After the academic accommodations have been determined, the students' instructors will be notified by the ADA Coordinator. If any problems or concerns regarding the provision of accommodations occur, the student must inform the ADA Coordinator. If the student feels accommodation is not being made appropriately, the student may follow the published Student Grievance Procedures.