Introduction to Modeling for 3D Printing

CAD 190

Instructor: Alex Sanchez (ph 925-8716)
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Office Hours:
Mon/Wed 1:00 - 1:30 and 3:45-4:30
Tues/Thur 12:00-1:30

COURSE DESCRIPTION: The purpose of the course is to introduce students to 3D-printing software. Students will learn how to make 3D models using Sketchup and AutoCad. The 3D models will be converted to build files and printed using the lab 3D printers. You should schedule at least two hours per week (outside of class time) in the lab to complete assignments.

TEXT: the following references are recommended but not required:

3D Printing with Sketchup  Marcus Ritland
3D Printing 2nd Edition  Christopher Barnatt
Functional Design for 3D Printing 2nd edition  Clifford Smyth

ATTENDANCE: Students are responsible for any missed classes. Unexcused absences will lower your grade 1% per unexcused absence (to a maximum of 10%).

GRADING: Students are graded on the basis of tests and 3D modeling assignments.

Modeling/printing assignments ............... 60%
Mid-term and Final .............................. 40%

Students cannot use electronic equipment during quizzes and tests.

Letter grades

100% or higher  = A+
91%-99%  = A
81%-90%  = B
71%-80%  = C
61%-70%  = D
Below 60%  = F

LIBRARY USE: A list of books and periodicals will be provided during the first week of class.

MAIN COURSE OBJECTIVES:
1. Introduce students to 3D modeling and 3D printing software

2. Learn how to create, edit and print 3D models

3. Learn efficient, organized approaches to 3D modeling and editing.

**REQUIRED MATERIALS:** You will need a ring binder and storage media for your files (flash memory devices).

*Students with disabilities should notify me of special needs at the beginning of the semester.*

**Computer Lab Responsibility:**

*Please be advised that use of computer labs on UNM properties is governed by “Policy 2500: Acceptable Computer Use” which can be found at [http://policy.unm.edu/university-policies/2000/2500.html](http://policy.unm.edu/university-policies/2000/2500.html).*

*Food and drink are also prohibited in any computer lab on campus. Anyone violating these policies is subject to possible suspension and loss of computer lab privileges.*

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**Introduction to Modeling for 3D Printing**

**Course schedule**

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**Week 1**

3D printing overview, history and leading applications

Introduction to Sketchup for 3D printing

**Week 2**

3D printing technology categories and online sources for 3D models

Using existing models

Basic navigation and modeling using Sketchup

**Week 3**

FDM printers and printer software

Printing process using the FFF/FDM printers

Sketchup modeling and exporting STL files
Week 4
Using 3D scanners and scanned data
Sketchup plugins for 3D printing

Week 5
Online 3D printing services
Introduction to 3D modeling using Autocad
Basic solid modeling commands and procedures

Week 6
Editing Autocad models and exporting STL files

Week 7
Validating and repairing STL files using Netfabb, Meshlab and Meshmixer

Mid-term review

Week 8
Introduction to Simplify 3D slicer software
Slicer key settings

Mid-term

Week 9
Designing functional 3D printed parts
Printing calibration models

Week 10
Introduction to 3D modeling in AutoCAD
Solid modeling using AutoCAD

Week 11
Solid modeling in AutoCAD
Surface modeling using AutoCAD

Week 12
3D printing and sustainable design
Solid model editing

**Week 13**
Modeling interlocking parts using AutoCAD

**Week 14**
Modeling gears and other moving parts

**Week 15**
Modeling functional parts

**Final Review**

**Week 16**
3D printing tips and traps, Final exam