San José State University  
Aviation and Technology Department  
Tech 146 3D Printing and Applications, Fall 2018

Course and Contact Information

Instructor: Ross Benz  
Lecturer: Mark Tudman

Office Location: E 103

Contact: ross.benz@sjsu.edu or 510-396-6303

Office Hours: T 19:15 – 20:00

Class Days/Time: T 16:30 – 19:15

Classroom: E101 and E103

Prerequisites: Tech 20A, Tech 25, Tech 140/5

Course Format
The course relies on lecture materials presented in class and students are strongly encouraged to attend.

Course Materials
Copies of the course materials including the syllabus, lecture materials, and homework solutions will be available on CANVAS.

Course Description
Presentation of equipment, processes, and materials used in 3D printing. Applications for a variety of markets and industry in accelerating for product introduction, improving manufacturing operations and efficiency. Hands-on experience from CAD to realization of a product.

Course Learning Outcomes
Upon successful completion of this course, students will be able to:
1. Describe technologies used in development of 3D printing processes.
2. Identify typical equipment used in 3D printing
3. Select equipment and materials for processes
4. Describe the benefits of 3D printing and advantages/disadvantages vs. traditional manufacturing
5. Design and fabricate a 3D mechanical object using a 3D printer

Recommended Text/Readings

Textbook
The 3D Printing Handbook by Ben Redwood, Filemon Schoffer, Brian Garret  

Other
ISBN: 978-0470016138
Course Requirements and Assignments
Homework will generally be assigned weekly and is due the following week.

Final Examination or Evaluation
The final exam will be comprehensive, covering material presented in class and exercises in the lab.

Grading Information
Course grade will be based on homework assignments, midterm, project, and final exam.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>30%</td>
</tr>
<tr>
<td>Final</td>
<td>30%</td>
</tr>
</tbody>
</table>

Determination of Grades
There will be no curving of grades. Final grades will be assigned as follows:

- A  >94
- A-  90-93
- B+  87-89
- B   83-85
- B-  80-82
- C+  77-79
- C   73-75
- C-  70-72
- D+  67-69
- D   63-65
- D-  60-62
- F   <60

Examinations
One 75-minute exam (midterm) and one 2-1/4 hour final examination.

Class Protocol
Class participation and attendance are strongly encouraged. Use of cell-phones is discouraged. Computers and tablet are allowed for taking lecture notes or CAD use.

University Policies
Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/
<table>
<thead>
<tr>
<th>Week#</th>
<th>Lecture Topic(s)</th>
</tr>
</thead>
</table>
| 1.    | Lecture: Course administration and introduction to 3D printing/AM  
Lab: Introduction to FFF |
| 2.    | Lecture: Using FFF/FDM  
Lab: Nameplates (Intro to support/infill/bed adhesion) |
| 3.    | Lecture: History, Market, Technologies, Why  
Lab: Print-time management |
| 4.    | Lecture: 3D printing equipment and processes  
Lab: Material characterization and print optimization |
| 5.    | Tour: 3D printing equipment demo (SLA/MJF/FFF/FDM/MJ) |
| 6.    | Lecture: Typical materials in 3D printing/AM  
Lab: Alternate materials test prints |
| 7.    | Lecture: 3D print costing & comparison to traditional manufacturing  
Lab: Alternate materials cont. |
| 8.    | Midterm Review  
Lab: Open Lab |
| 9.    | Midterm |
| 10.   | Costing Presentations (Group) |
| 11.   | Tour: AM Production and Contract Manufacturing |
| 12.   | Project Assignment & Concept approval |
| 13.   | Open Lab/Tour |
| 14.   | Open Lab/Guest Lecture |
| 15.   | Project Presentations |
| 16.   | Project Presentations and Final Review |
| 17.   | Final Exam |