

The Application of Critical Thinking to the 3D Printing Process	
PKGSC 4990 015: Fall 2014	Harris A. Smith Building
Lecture: TBD	Lab: TBD

Instructors:

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Course Description:

The course explores rapid prototyping limitations as well as a contemporary societal issue, challenging students to think creatively and critically to resolve compounding issues within a development workflow. The course will provide a foundation in rapid prototyping and background knowledge on literature pertaining to the class project, enabling students to reason through physical and digital limitations to reach a creative, design-oriented goal.

Clemson Thinks² (Critical Thinking):

This course is part of the Clemson University's Clemson Thinks² seminar series. It is designed to actively engage students in critical thinking by explicitly discussing the role of critical thinking in product development and prototyping via the 3D printing process, as well as the importance of critical thinking in a field of applied science. Our goal is to help students:

1. Discover the assumptions that influence the way we think and act
2. Determine whether those assumptions are accurate
3. Perceive assumptions and resulting actions from different viewpoints
4. Take informed action

To assess growth in critical thinking skills, students will take the California Critical Thinking Skills Test (CCTST) at the beginning of the course and again at the end. While your scores on the skills tests will not affect your grade, you will be required to complete them as an assignment. You will need to bring your laptop and please make sure your browser and java are up-to-date.

Students will be required to work within the group to highlight their understanding of the 3D printing process and how it can be utilized to create solutions while making recommendations for improving the process's capabilities based on the application of critical thinking concepts and skills. The final product of the semester (Phase V) will provide students with a critical thinking portfolio artifact. As a group, students will have developed a product satisfying a societal need or demand, displaying their mastery of critical thinking concepts in application to the 3D printing process.

Student Learning Outcomes:

1. Analyze the 3D printing process.
2. Assess the 3D printing process for variability and error in printing.
3. Develop and construct solutions to increase the consistence and capabilities of the 3D printing process.
4. Determine the limitations of a 3D printed part.
5. Identify examples where a 3D printed part is able to satisfy a societal need or demand.
6. Apply the knowledge of process and part limitations to the development of a product.
7. Collect and interpret data from focus groups to improve product development

Required Resources:

High-Speed Internet connection
Adobe Creative Cloud
Solidworks 2013 (see CCIT)
eBook via Packagingschool.clesmsn.edu

Course Schedule and Grading:

Phase I development and presentation 10 points

Objective: Background research on the social issue, product to be designed and rapid prototyping technology

Time: 2 Weeks

Phase II development and presentation 20 points

Objective: Intro to design methods, first prototype and 3D printing troubleshooting

Time: 3 Weeks

Phase III development and presentation 20 points

Objective: Second design run on modified process

Time: 3 Weeks

Phase IV development and presentation 25 points

Objective: Consumer testing, edits and final design

Time: 4 Weeks

Phase V development and presentation 25 points

Objective: Portfolio and final artifact creation

Time: 3 Weeks

Course Total: 100 points

[90% - 100% is A, 80% - 89.9% is B, 70% - 79.9% is C, 60% - 69.9% is D, below 60% is F]

Attendance Policies: Attendance is mandatory

Academic Integrity Statement: “As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a ‘high seminary of learning.’ Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.”

Student Disabilities Statement: Students with disabilities who need accommodations should make an appointment with Dr. Arlene Stewart, Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Student Disability Services is located in Suite 239 Academic Success Building (656-6848; sds-l@clemson.edu). Please be aware that accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.

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protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Mr. Jerry Knighton is the Clemson University Title IX Coordinator. He also is the Director of Access and Equity. His office is located at 111 Holtzendorff Hall, 864.656.3181 (voice) or 864.565.0899 (TDD).