Course Information

Catalog Description: In this course, students will develop an appreciation for the Art of 3D design. Students will discover for themselves the potential and limitations of 3D printing through a build intensive design project. This course is designed for anyone who ever wanted to prototype an invention, create a work of art, customize a product or just make something. Course team projects will be focused on 3D design of UAS or UAS related components, using solids modeling tools. 3D printing is a method of creation that requires basic computer skills.

Prerequisite(s):

Corequisite(s):

Credits: 3

Hours: 3

Required Text(s):

- Pentak, S., Roth, R., & Lauer, D. A. (2012). *Design basics: 3D* (8th ed.). Cengage Learning. ISBN: 13: 978-1133310426

Supplemental Materials:

Instructor Information

Instructor's Name:

Contact Information:

Office Hours:

Program Goals

1. Equip students with comprehensive knowledge of unmanned systems, including their standards, regulations, and operational frameworks, preparing them for FAA Part 107 certification and other regulatory requirements.
2. Develop proficiency in using geographic information systems (GIS) and remote sensing technologies, enabling students to analyze and interpret spatial data for applications in environmental monitoring, urban planning, and emergency response.
3. Foster a strong understanding of safety protocols, risk management strategies, and security measures in unmanned aviation to ensure compliance with industry standards and promote operational excellence.
4. Provide hands-on training in maintaining, repairing, and optimizing unmanned aircraft systems (UAS) to extend operational life and enhance performance in various industry settings.
5. Introduce students to advanced robotics, programming, and cutting-edge technologies, including infrared thermography and digital photography, to expand their expertise in innovative applications of unmanned systems.
6. Equip students with the skills and knowledge to contribute to the development and operation of innovative unmanned aerial transportation systems, addressing future urban and regional mobility challenges.

Class Core Competencies

The following core competencies are embedded in this curriculum:

- Communicate effectively in both speech and writing.
- Apply appropriate mathematical and statistical concepts and operations to interpret data to solve problems.
- Use scientific method of inquiry, through the acquisition of scientific knowledge.
- Use computer systems or other appropriate forms of technology to achieve educational and personal goals.
- Address an information need by locating, evaluating, and effectively using information.

Class Learning Assessment

Student Learning Outcomes	Suggested Means of Assessment
Appreciate and communicate clearly what makes 3D printing unique from other traditional methods of manufacturing, its current benefits and the limitations.	Research paper
Perform all steps necessary to 3D print a simple, custom object.	Lab work & reporting
Be able to open, view, manipulate and edit three dimensional object files to create new three-dimensional object files from scratch.	Lab work, homework
Prepare and optimize those files for 3D printing.	Lab work
Successfully fabricate the file design on a 3D printer using appropriate material and method selections.	Individual project
Design a functional UAS component.	Team project

Grading System

Letter Grade	Percentage Range
A	90 to 100 percent
B Plus (B+)	87 to 89.9 percent
B	80 to 86.9 percent
C Plus (C+)	77 to 79.9 percent
C	70 to 76.9 percent
D	60 to 69.9 percent
F	Below 60 percent

College Information

Disability Services
Disability Services Webpage

Statement and Policy on Cheating, Plagiarism, and Academic Conduct
Academic Conduct Policy (Policy 304) [PDF]

Students are required to perform all the work specified by the instructor and are responsible for the content and integrity of all academic work submitted. A violation of academic integrity will occur if a student: (1) knowingly represents work of others as one's own, (2) uses or obtains unauthorized assistance in any academic work, (3) gives fraudulent assistance to another student, or (4) furnishes false information or other misuse of college documents.

Unauthorized use of Artificial Intelligence (AI) is prohibited unless the instructor explicitly permits it in the syllabus or assignments. If tools such as ChatGPT are permitted by an instructor to be used for an assignment, they should be used with caution and with proper citation. In all such cases, you may only use the specific tools identified as acceptable and you must adhere to the College's standards for attribution, validation, and transparency.

In cases of suspected violation of academic integrity, the incident is to be reported to the Office of Academics. A student found guilty of violating the rule of academic integrity by the Vice President of Academics will be considered to have failed in personal obligation to the College; such failure will be subject to disciplinary action by the College. Unless otherwise notified, the instructor will allow students who are pending disciplinary action to attend class.

Tutoring and Testing at the Instructional Support Center (ISC)

- Instructional Support Center (ISC) Webpage

WCCC Library Services

- WCCC Library Website

Citation Styles and Formatting

Work submitted for any Warren County Community College course must conform to the required formatting and citation style that are specified by the instructor. The Library and Instructional Support Center can assist students with formatting and citations for assignments and papers.

WCCC Attendance Expectations

The College expects students to attend and participate in all classes. This involves sharing discussions and lectures in class, as well as interacting with other students. Grades are based on the quality of work students complete in meeting the requirements

for a particular course, as stated in the course syllabus and catalog description. Attendance, among other factors, may be an additional criterion for assigning grades. Students should realize that they are responsible for all class meetings and that work missed because of absences may affect their grades. Attendance in online classes is determined by the completion of assignments/ tests. Students who have not completed any assignments or tests will be considered non-attending and receive an NF grade in online classes.

Class Attendance Expectations

Topical Outline

1. Introduction to 3D design
2. 3D design ideas & approaches
3. 3D design elements
4. Principles of 3D design
5. Material
6. SolidWorks/Autodesk Fusion 360
7. Structure
8. Function
9. Figuration
10. Forming & fabrication
11. Project design teams
12. Feedback in groups
13. Fabricating UAS components
14. Testing fabricated UAS components
15. Report writing

Grading Methods

Assignment	Points/Percentage

Assignment	Points/Percentage

Class Itinerary

Week / Unit	Topic	Readings/Assignments