Modeling & Prototyping:

ID-216 | Fall 2025

Tuesday/Friday 10:00 -11:20 A.M. | Weston 140
Professor Chase Philpotts | cwp5@njit.edu
OFFICE HOURS: | Monday 9:00 AM-10:00 AM and by appointment (online)

Course Description:

Introduction to the drafting skills, techniques and methods needed to communicate a design for fabrication as well as the materials, tools and techniques to make full-size working prototypes. The drafting component of the course will cover orthographic, isometric, line weight, dimensioning and specifications. Building from the drafting component of the course, the prototypes component will - through work in the fabrication labs - introduce the student to the most common fabrication techniques, tools and methods used to build appearance and working prototypes in various materials.

Overview:

Our focus in this class will be two-fold:

1. Based on the course description, use Computer Aided Design (CAD) tools to effectively (and accurately) communicate ideas and forms that are applicable to industrial scale
2. Learn a variety of fast and simple physical prototyping techniques

The semester will include a mixture of physical, hands-on activities and computer activities. While there are numerous softwares available for industrial design that share a common technique of “solid modeling” (CATIA, Solidworks, Inventor, etc.). We will use the software Autodesk Fusion 360 for a few reasons: (1) it is cloud-based, and as you are learning, this feature is helpful for sharing files as a class (2) It has the easiest methods for organic and free-form modeling that will make creating your ideas easier (3) there are well integrated additions such as structural analysis and computer aided manufacturing (CAM) that will help you in using CNC machines and, (4) Its free for students.

Our class will begin with CAD, and as physical prototyping advances, we will continue to switch and merge the physical and virtual.

Learning Objectives:

- Understand the differences between CAD software and modeling techniques
- Learn a variety of methods for quickly developing forms and prototyping before mass production
- Learn how to parametrically design and draw in CAD

Schedule

Week | Date	Topic Outline
1 | Sept 2 Sept 5	**Introductions, Software, Tours**
2 | Sept 9 Sept 12	**Solid Modeling**
3 | Sept 16 Sept 19	**Parametric Modeling**
4 | Sept 23 Sept 26	**Drawing**
5 | Sept 30 Oct. 3	**Organic Modeling**
6 | Oct 7 Oct 10	**Generative Design / Topology**
7 | Oct 14 Oct 17	**Foamboard and Mockup techniques**
8 | Oct 21 Oct 24	**Metal and Woodworking**
9 | Oct 28 Oct 31	**Clay Tools**
10 | Nov 4 Nov 7	**Clay/Casting**
11 | Nov 11 Nov 14	**Casting**
12 | Nov 18 Nov 21	**Plastics**
13 | ~~Nov 25 (Thurs Sched)~~ Nov 26 (Friday Sched) **Nov 29 No Class** (Thanksgiving Schedule)	**3D Printing**
14 | Dec 2 Dec 4	**Casting**
15 | Dec 9 **Last Class**	**Final Project Due**

Course Topics

Exercises: Multiple exercises will be done in class and as homework. All exercises will be submitted on canvas by each student (in the case of group assignments, the group submission in canvas must be used). Assignments started in class must be completed and submitted as homework.

Submission of Work: Per the School of Art & Design rules, all work must be uploaded to Kepler at the end of the year. A grade of **F** is given until this requirement is satisfied. Please note, this was considered incomplete in the past, but the Dean of Students has made it clear that "incomplete" cannot be used for this.

Changes: Quizzes and Exercises may change as the semester progresses. Students are responsible for checking the updated syllabus in Canvas when modifications are made.

Grading

10% Participation - Answering questions, asking questions, in-class

10% Semester-wide portfolio

50% Exercises

30% Final Project

GradeScale

A Superior
B+ Excellent
B Very Good
C+ Good
C Acceptable
D Minimum
F Inadequate
AU Audit
I Incomplete. Grade deferred--given in rare instances to students who would normally have completed the course work but who could not do so because of special circumstances. If this grade is not removed during the next regular semester, a grade of F will result.
W Withdrawn
S Satisfactory
U Unsatisfactory

Late Work:

Late work is accepted with a half letter-grade reduction for every 12 hours after the deadline. Please note this applies for all submissions after the deadline (even 1 minute late will be half a letter-grade, so you can use the next 12 hours to improve your submission). In the case of a presentation or quiz, this policy does not apply and make-up presentations are not accepted.

This policy will be held as-is without exceptions. No one should feel others in the class receive special treatment, or that they are being unfairly treated. Maintaining this clear guideline is one way to help foster that environment. The only exceptions to the late work policy occur when the Dean of Students (note: not the dean of the college), provides a medical/excused absence letter. However, in the interest of unexpected circumstances, there is a one-time-use 'get out of late card'-- 24 hour extension usable for one project submission (which cannot be applied to presentations meant to be done in front of the class).

Readings

Readings will be provided and no books are required for purchase.

Plagiarism

Plagiarism refers to text, visual, and intellectual property. Not citing work, misleading during a presentation or submission on where the idea came from, or using words from a paper without quotations will be reported to the dean of students.

Generative AI

The usage of artificial intelligence (AI) is permitted in this course and no citation is necessary. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

Lates

Arrival to class on time, and remaining for the duration of class, is mandatory. Attendance is taken at the beginning of class. If a student is late they must notify the professor at the class break (1.5 hours after the start) and have their name recorded as late, or immediately at the end of class (for 1.5 hour classes). Not doing this will count as an absence and will affect the grade. For a 3 hour class, arrival later than 1.5 hours into class is recorded as absent. For a 1.5 hour class, arrival after 30 minutes is absent.

Remember, the college rules are provided below. Importantly, you have 3 "free" absences in which you do not have to worry about your grade.

University/College Rules

Academic integrity and honesty are of paramount importance in this class. The NJIT "University Code on Academic Integrity" will be upheld and any violation can, and will be, brought to the immediate attention of the Dean of Students by either a faculty member or student.

Regular attendance is expected. When possible, please give advance notice of your absence. NJIT requires attendance for ALL students. After 3 recorded absences, your grade will be lowered by ONE (1) letter grade for each additional absence, if you are not carrying a medical, school or religious related excuse. This means that any student who would have received an "A" will now receive a "B", a "B+" reverts to a "C+", etc. No excuses will be accepted without a written note from the Dean or a doctor. Students with particular needs and foreseen absences should present them to their instructor within the first week of class. Attendance for student athletes: No student athlete may miss any regularly scheduled classes for any practice activities. This means students can neither miss nor leave class early (or arrive late) to attend a practice. While student athletes may miss class when participating in intercollegiate competition, it is the responsibility of the student athlete to proactively inform the instructor well in advance to make appropriate arrangements to complete or make up any assignments or exams in a timely fashion.

Students with disabilities should see me at the start of the semester to discuss any needs. I strongly support students with accommodations to ensure OARS communicates them to me at the start of the semester, regardless if the student initially does not want to use those accommodations.

The syllabus is an outline for the class, and subject to change. Students are required to regularly check changes of the syllabus.

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"*