

CGT123 ANIMATION FOUNDATIONS

Instructor: (TBA)

Office Hrs: Office Location (TBA)
Online (TBA)

Contact: [email](#)
[Zoom](#)
[Discord](#)
[Brightspace](#)

Class: Schedule TBA – Lecture, Lab, Screening
3 Credits

1. COURSE DESCRIPTION

In this course, students are introduced to the core concepts and principles of animated motion. The course includes an overview of animation history and the evolution of animation technology. Principles of animation production are explored through practical exercises executed in a range of animation software types. These exercises will familiarize students with different approaches to creating animated motion, with a focus on keyframed digital animation.

2. PREREQUISITES

There are no pre-requisites for this course.

3. LEARNING OUTCOMES

Outcome	Assessment Evidence
1. Identify the sequence of major milestones in the history of animation technology, style and industry.	1, 8, 9
2. Demonstrate fundamental animation skills and principles including anticipation, squash & stretch, timing, easing and motion arcs.	2, 3, 4, 7, 8
3. Create animated images of objects and characters in digital animation software that communicate believable motion.	3, 4, 5, 6, 7
4. Arrange and manipulate geometric objects and systems in digital animation software, creating a range of defined outputs including still images and image sequences suitable for animation workflows.	3, 5, 6, 7

4. RESOURCES

COURSE TEXTS

There is no required textbook for this course. Selected readings, examples and demonstrations will be provided from the following:

- Eisenstein, S. (1986). *Eisenstein on Disney* (J. Leyda, Ed.; A. Y. Upchurch, Trans.). Seagull Books.
- Furniss, M. (2016). *A New History of Animation: 460 illustrations*. Thames & Hudson.
- Gilland, J. (2009). *Elemental magic: The art of special effects animation*. Focal Press.
- Russett, R., & Starr, C. (1988). *Experimental Animation: Origins of a New Art*. Da Capo Press.
- Taberham, P. (2018). *Lessons in perception: The Avant-Garde filmmaker as practical psychologist*. Berghahn.
- Thomas, F., Johnston, O., & Thomas, F. (1995). *The Illusion of Life: Disney Animation* (1st Hyperion ed). Hyperion.
- Wells, Paul. (2013). *Understanding Animation*. Taylor and Francis.
<http://public.eblib.com/choice/publicfullrecord.aspx?p=1562841>
- Williams, R. (2001). *The Animator's Survival kit*. Faber.

SOFTWARE

CGT Students have access to the required software in all Labs, as well as through educational licensing arrangements. Students from other departments should discuss access with the course instructor:

- Adobe Creative Cloud (Photoshop, AfterEffects, Premiere, Audition and others)
- Autodesk (Maya, Sketchbook and others)

HARDWARE

Some of the assignments in this course may require additional equipment, such as cameras, camera stands, light boxes etc. Typically, these will be provided by the instructor or made available as needed for course assignments.

BRIGHTSPACE

All course content will be distributed on Brightspace. All submissions from students will be submitted via Brightspace, (except for journal reviews which will be in-person). All assessment details, project briefs and due dates for submissions will be posted managed on brightspace. All grades will be lodged and returned to students on Brightspace. Any updates to course conditions, assessments, due dates, etc will be announced on – you guessed it.

5. COURSE ASSESSMENT

Assessment rubrics can be accessed for each assessment on Brightspace. Official delivery dates and conditions will be managed via the Brightspace calendar*

As detailed below, assessment in this course includes:

- 1 quiz
- 6 short animation assignments
- 2 reviews of a learning journal

- A grade for course engagement

	Title	Description	Points Due *	
1	Animation History Quiz	A short multiple-choice quiz confirming students have captured the key developments in animation technology, craft and industry in the 20 th Century.	5	Wk 4
2	Leap!	In this assessment, students design and create an articulated paper character and then execute an animation of that character performing a jump, demonstrating multiple techniques and principles of animation. Images are sequenced in editing software and rendered to video.	10	Wk 5
3	Boing Boing Boing - The Bouncing Ball 3 Ways	In this animation exercise, students animate a bouncing ball, demonstrating the principles of keyframed animation, but with a twist - the bouncing ball is created using three different animation techniques; hand drawn, 2D digital and 3D digital, revealing the underlying principles of animating motion.	10	Wk 9
4	Strike a Pose	In this assessment, students demonstrate intermediate skills in keyposed animation by constructing a basic exaggerated physical motion. The action is planned with drawn poses (keypose and breakdown), then sequenced and timed in 2D animation or editing software.	10	Wk 11
5	An Interdimensional Vacation	In this short assignment, students demonstrate familiarity with virtual 3D space by taking a series of 'travel photos' - simple renderings of different perspectives in a provided 3D scene. A provided model is attached to a path, and motion along the path is crafted by adding keyframes and manipulating curves.	10	Wk 14
6	Do You Wanna Build a Snowman?	Using geometric primitives, a basic model is created in 3D by scaling, rotating and positioning objects. The model and scene is completed by selecting suitable materials for the objects and a background, then exporting an image of the model.	10	Wk 14
7	Do You Wanna Build a Posed-Man?	In this assignment, students re-create their previous keypose animation (Assessment 3) using a pre-built animation rig. The timing and poses that were previously developed are refined and executed in 3D animation software, and secondary motion is added. Curves can be adjusted to improve interpolation.	10	Wk 14
8	My Animation Journey	Throughout the semester, students gather their lecture notes, sketches and development work in a journal (any format). These	20	Wk 6 Wk 13

	journals are reviewed and discussed at mid-semester and late semester to guide progress in the animation major.		
9	Engagement	Through a mixture of self-report, observation and tracking, a grade is awarded for engagement in class activities, online discussions, critique sessions, screenings and other events.	All
			100

6. COURSE GRADING

Letter Grade	Numerical Range	GPA Weight
A	90-100	4
B	80-89	3
C	70-79	2
D	60-69	1
E/F	<60	0

Note: Partial final grades are rounded up.

7. COURSE SCHEDULE

Please also refer to the official Purdue [Academic Calendar](#) in effect for this semester, which may impact timing of modules. Please refer to Brightspace for final scheduling.

Each week, there will be a lecture/lab session, where new topics are introduced and discussed, technical demonstrations are offered and guided work on assignments will take place.

Additionally, there is an animation screening each week corresponding to the topics scheduled.

Wk	Topic/Lecture	Project Based Activities	Screening
1	Animation – The Illusion of Life Course Overview, meet the animation faculty Types of Animation – genre, technique, purpose and technology How animation works – perception and the Phi phenomenon Keypose vs straight ahead animation Overview of the 12 Principles of Animation	‘Movements that are Drawn’ – Collaborative animation exercise (Icebreaker)	Faculty Favorites
Module 1 - A Short History of Animation			
2	Pre-cinema Animation Flipbooks, phenakistoscope, zoetrope The <i>Theatre Optique</i> – how animation invented film and the cinema Trick film, Gertie the Dinosaur and early stop motion The first feature length animation Art on Film - abstract animation, absolute film	A1 - Design, construction, animation setup	Animation History 1: The Birth of an Artform
3	From Comic Strips to Cartoons The birth of the studio system Fleisher Innovations Disney, cartoons and the discovery of the 12 principles of animation Cartoon animation technology - cellulose nitrate, lightbox, pegbar, field guides, multiplane camera, x-sheets, cellulose nitrate, paper ink and paint Animation as an industry - specialisation as a technology of animation	A1 - Anticipation and the key movements in the jump animation	Animation History 2: Cartoons, Characters and Innovators
4	From Analogue to Digital Animated Propaganda 20th Century Stop motion Global post-war animation Early computer animation Early 3D animation	A1 - Importing, editing and adding audio	Animation History 3: From Analogue to Digital to Virtual

Module 2 – Animation Principles and Techniques

5	The 12 Principles – an overview Why these 12? Application to 3D animation software Straight Ahead Animation Direct animation - film and digital Stop motion animation - puppets, clay, replacement animation, pixilation	A1 – Critique and discussion on the physics of anticipation and action	Straight ahead and more
6	Time and Space Pacing action The difference between pacing and timing Using digital image platforms for animation Animation production concepts - screen size and ratio, layers vs onion skin Time, the timeline, framerates	A2 - Frame to frame digital animation Journal Reviews	Animated Music Videos
7	Compositing and 2D motion The concepts of compositing - origins in photography Masking, opacity, alpha channels, bit depth Keyframes and interpolation - transform, translate, keying values Easing and manipulating curves and Keyframes Nested compositions Export and rendering considerations	A2 - The bouncing ball - easing and bezier curves on the timeline	2D animation shorts
8	Motion Arcs Arcs in nature and physics Biological arcs - human motion Arcs for planning motion Arcs and motion paths in digital animation 3D bouncing ball walkthrough	A2 - 3D bouncing ball, compositing the 3 balls together for export	Student choice 1
9	Key-posed animation Conceptual approach to keyposed animaiton Contact/extreme Breakdown poses In-betweens and interpolation Spline animation Believable vs realistic motion Posing anticipation for believable motion - force correspondence Posing and exaggeration for appeal	A3 – Pose breakdowns and workflow	Anime wheel of fortune

Module 3 – 3D Computer Graphics and Animation

10	3D Space and Animation Production $(x,y,z + t)$ - the unreality of multi-dimensional, mechanical Cartesian and Euclidian space Viewports and the virtual camera - views vs optics An overview of the 3D animation production pipeline	A4 - An interdimensional Vacation	Independent 3D animation shorts
11	3D objects and systems Polygons and surfaces - the building blocks of the universe (for now) Irrational geometry - do holes even exist? Engineering vs positioning vs sculpting in 3D space How to peel an orange - maps and object based coordinate systems Who's in charge here? - animation hierarchies Let there be light... But what kind? Its Alive! - playback, playblast and rendering a timeline	A5 - Do You Wanna Build a Snowman?	Student Choice 2
12	What is animation software, and what does it do? An overview of software options for animation - industry use, CGT use, alternatives, filetypes, interaction differences, modular and integrated workflows 2D animation and compositing 3D animation Procedural animation and simulation Editing Audio	A6 – Do You Wanna Build a Posed-Man?	3D studio shorts
13	The Future of Animation Animation for industry Animation for games Animation for VR Ubiquitous VFX	A4, A5, A6 work and critiques as required Journal Reviews	VR animation showcase
14	No Lecture	A4, A5, A6 work and critiques as required	Feature Film

8. POLICIES

Note: Policies will be added in the implementation semester based on the Purdue Syllabus Template in effect.