COURSE OUTLINE		
TERM: Spring 2027	**COURSE NO:** DIGI 141	
INSTRUCTOR:	**COURSE TITLE:** Visual Effects Animation II	
OFFICE: **LOCAL:** **E-MAIL:** @capilanou.ca	**SECTION NO(S):**	**CREDITS:** 3.0
OFFICE HOURS:		
COURSE WEBSITE:		

Capilano University is named after Chief Joe Capilano (1854–1910), an important leader of the Sḵwx̱wú7mesh (Squamish) Nation of the Coast Salish Peoples. We respectfully acknowledge that our campuses are located on the unceded territories of the səlilwətaɬ (Tsleil-Waututh), shíshálh (Sechelt), Sḵwx̱wú7mesh (Squamish), and xʷməθkʷəy̓əm (Musqueam) Nations.

COURSE FORMAT
This class is an in-person class. Classes are four hours per week for a 15-week semester, which includes an end of term project. There are no exams scheduled for this course.

COURSE PREREQUISITES
DIGI 131

CALENDAR DESCRIPTION
In this course, students will continue to develop skills in key-frame animation, while beginning to explore the process of crafting and refining procedural simulations. Greater emphasis will be placed on implementing expressions and scripts into projects, with the goal of expediting workflow. Simulation based classes will involve working with particle, rigid body, fluid dynamics, fracture dynamics and cloth, building upon many of the strategies and lessons learned in manipulating scenes, hierarchy and keyframe animation.

COURSE NOTE
DIGI 141 is equivalent to VFX 131. Duplicate credit will not be granted for this course and VFX 131.

REQUIRED TEXTS AND/OR RESOURCES
All resource material will be provided by the instructor/s.

Byrne, Bill. *The Visual Effects Arsenal: VFX Solutions for the Independent Filmmake*r, USA: Focal, 2009. Autodesk Maya Press. Learning Autodesk Maya Special Effects, USA: Sybex, 2009.

COURSE STUDENT LEARNING OUTCOMES
On successful completion of this course, students will be able to do the following:

- Plan, organize and create animated effects shots using complex interactions;
- Design and create realistic natural phenomena using 3D simulation software;
- Animate objects, materials and simulations in believable ways;
- Analyze and determine creative, reliable solutions for creating professional quality effects;
- Integrate layered visual effects and simulations into a shot;
- Perform animation tasks efficiently, in a specific time period;
- Utilize formulas, scripting and equations to control complex animation tasks;
- Analyze production requirements to determine creative and timely approaches to shot creation;
- Manage a motion capture stage and the processes involved in integrating live action with CGI characters.

COURSE CONTENT

This content will be delivered in the form of lectures, screenings and in class exercises as well as assignments. All course materials will be on elearn and the content will be delivered in-person.

WEEK	TOPICS	READINGS and ACTIVITIES
Week 1	• Simulation frameworks • Dynamics and motion states • Gravity and forces • Collisions • Rigid body dynamics • Constraints • Caching and baking	
Week 2	• Generating and managing particle systems • Initial states • Managing particle attributes • Bounce and friction • Spawning particles from particles • Death events • Particle fields • Caching and rendering particles • Particle instancing	• Assignment 1: Particle System
Week 3	• Particle frameworks part two • Practical simulations • Environmental elements • Particle AOVs • Cloth as a particle system • Cloth elements in VFX simulation • Cloth in set dressing, plant objects, and clothing	
Week 4	• Introduction to destruction • Analyzing destruction shots • Scale, speed, and mass • Force and impact staging • Mixed simulation techniques • AOVs and render layers • Staging sequences • Keyframing and materials • Shatter and stress patterns	

	• Caching elements • Debris for particle and fluid effects • Asset isolation with multiple renderers	
Week 5	• Introduction to fluid dynamics • Voxel simulations • Node graphs and generation • Lighting, shading, and rendering • Smoke simulations • Fields and fluid motion • Dissipation • Collisions • Turbulence and noise • Emitters • Animating attributes • Density and velocity • Voxel size and detail • Caching	• Assignment 2: Fluid Dynamics
Week 6	• Fluid dynamics continued • Flames • Explosions • Fuel and temperature • Pressure • Forces • Caching • Rendering	
Week 7	• Generating fluids from deformation objects • Mixing fluids and particles • Separating elements for rendering and compositing	
Week 8	• Motion capture and digital humans	Assignment 3: Motion Capture
Week 9	• Motion capture continued • Crowds • Preparing motion for crowd ingest • Generating hordes • Cohesion, separation, and alignment • Types of crowds • Randomization	
Week 10	• Visual effects case study - research and evaluation • Research and development of techniques and ideas • Previsualization and shot breakdowns • Planning a visual effects project from idea to completion • Project management: milestones and deliverables • Effects task breakdown: choosing simple solutions • Gears, pistons, pulleys, whirligigs, and doodads	
Week 11	• Using formulas to create effective visual effects shots • MASH networks and heads-up displays	

	• Working with hard surface objects for rigging and integration • Emulating, rendering, and integrating common effects: candles, smoke, steam, mist, glows	
Week 12-15	• Project development and reviews • Final presentations: group short and individual movies of integrated work • Includes rig turnarounds, pose tests, R&D test renders/ playblasts, notes, screenshots, and integrations used in the project	Assignment 4: Term Project

EVALUATION PROFILE

Participation	10%
Assignment 1 - Particle System	20%
Assignment 2 - Fluid Dynamics	20%
Assignment 3 - Motion Capture	20%
Assignment 4 - Term Project	30%
Total:	100%

Assignment Descriptions

All assessments will be completed and/or submitted online.

- Assignments – MS Teams
- Final Assignments – copy to class folder on the Bosanas
- Work in progress – upload your video files to SyncSketch for weekly feedback and/or drawovers

All assignments will be included in the calculation of your final grade. Failure to submit assignments may result in failing the course.

Participation

Participation is evaluated based on regular attendance in classes and labs, active engagement in discussions and projects, demonstrated understanding of assigned readings and coursework, and the frequency and quality of relevant comments, questions, and observations.

GRADING PROFILE

A+ = 90-100	B+ = 77-79	C+ = 67-69	D = 50-59
A = 85-89	B = 73-76	C = 63-66	F = 0-49
A- = 80-84	B- = 70-72	C- = 60-62	

Incomplete Grades

Grades of Incomplete "I" are assigned only in exceptional circumstances when a student requests extra time to complete their coursework. Such agreements are made only at the request of the student, who is responsible to determine from the instructor the outstanding requirements of the course.

Late Assignments
All assignments must be delivered at the place and time specified by the instructor. Late assignments will only be accepted if prior approval for a late submission date has been given by the instructor.

Missed Exams/Quizzes/Labs etc.
If you anticipate missing an exam/quiz/or lab, please consult with your instructor prior to the scheduled date, so that alternate arrangements can be considered. Accommodation can be made to honour community needs and traditional practices.

Attendance
Students are expected to a□end all classes and associated activities. Attendance is taken at the start of each class. Students who miss more than 20% of the course will not receive credit. Students are responsible for all material and assignments, even if absent. If circumstances affect attendance or coursework, email the instructor in advance to discuss possible adjustments. Instructors are not required to repeat missed material.

English Usage
Students are expected to proofread all written work for any grammatical, spelling and stylistic errors. Instructors may deduct marks for incorrect grammar and spelling in written assignments.

Electronic Devices
Students may use personal electronic devices during class for note taking only.

On-line Communication
Please be sure to check your official Capilano University email regularly as all official communication will be sent via this email address only. Additionally, you should be logging on to eLearn/teams 3 to 4 times per week for class updates and/or to engage in learning activities.

UNIVERSITY OPERATIONAL DETAILS

Tools for Success
Many services are available to support student success for Capilano University students. A central navigation point for all services can be found at: https://www.capilanou.ca/student-services/

Capilano University Security: download the CapU Safe Alert App

Policy Statement (S2009-06)
Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Academic Integrity, Academic Probation and other educational issues. These and other policies are available on the University website.

Academic Integrity (S2017-05)

Any instance of academic dishonesty or breach of the standards of academic integrity is serious and students will be held accountable for their actions, whether acting alone or in a group. See policy and procedures S2017-05 Academic Integrity for more information: https://www.capilanou.ca/about-capu/governance/policies/

Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances, are prohibited and will be handled in accordance with the Student Academic Integrity Procedures.

Academic dishonesty is any act that breaches one or more of the principles of academic integrity. Acts of academic dishonesty may include but are not limited to the following types:

Cheating: Using or providing unauthorized aids, assistance or materials while preparing or completing assessments, or when completing practical work (in clinical, practicum, or lab settings), including but not limited to the following:

- Copying or attempting to copy the work of another during an assessment;
- Communicating work to another student during an examination;
- Using unauthorized aids, notes, or electronic devices or means during an examination;
- Unauthorized possession of an assessment or answer key; and/or,
- Submitting of a substantially similar assessment by two or more students, except in the case where such submission is specifically authorized by the instructor.

Fraud: Creation or use of falsified documents.

Misuse or misrepresentation of sources: Presenting source material in such a way as to distort its original purpose or implication(s); misattributing words, ideas, etc. to someone other than the original source; misrepresenting or manipulating research findings or data; and/or suppressing aspects of findings or data in order to present conclusions in a light other than the research, taken as a whole, would support.

Plagiarism: Presenting or submitting, as one's own work, the research, words, ideas, artistic imagery, arguments, calculations, illustrations, or diagrams of another person or persons without explicit or accurate citation or credit.

Self-Plagiarism: Submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted without permission of the instructors.

Prohibited Conduct: The following are examples of other conduct specifically prohibited:

- Taking unauthorized possession of the work of another student (for example, intercepting and removing such work from a photocopier or printer, or collecting the graded work of another student from a stack of papers);
- Falsifying one's own and/or other students' attendance in a course;
- Impersonating or allowing the impersonation of an individual;
- Modifying a graded assessment then submitting it for re-grading; or,

- Assisting or attempting to assist another person to commit any breach of academic integrity.

Sexual Violence and Misconduct
All Members of the University Community have the right to work, teach and study in an environment that is free from all forms of sexual violence and misconduct. Policy B401 defines sexual assault as follows:

> Sexual assault is any form of sexual contact that occurs without ongoing and freely given consent, including the threat of sexual contact without consent. Sexual assault can be committed by a stranger, someone known to the survivor or an intimate partner.

Safety and security at the University are a priority and any form of sexual violence and misconduct will not be tolerated or condoned. The University expects all Students and Members of the University Community to abide by all laws and University policies, including B.401 Sexual Violence Policy and B.401.1 Sexual Violence Procedure (found on Policy page https://www.capilanou.ca/about-capu/governance/policies/)

Emergencies: Students are expected to familiarise themselves with the emergency policies where appropriate and the emergency procedures posted on the wall of the classroom.

DEPARTMENT OR PROGRAM OPERATIONAL DETAILS

Continuation Policy
Students must successfully complete the required and elected 2D Animation (ANIM), 3D Animation (DIGI) or VFX course credits in one term before continuing to the next term.

Punctuality
Punctuality is essential. Students more than 15 minutes late for class will be marked absent.

Professional Behaviour
Students must demonstrate a professional attitude and behaviour toward work, other students, guests, and instructors. Each student should demonstrate reliability, respect for and co-operation with colleagues. A willingness to work calmly and courteously under difficult conditions as well as a determination to achieve first-class work while meeting deadlines is necessary in this course. Students must show respect for equipment and facilities.

Class Recordings
Class sessions may be recorded for use within this course only. Recordings may not be shared, reproduced, or uploaded outside the class. If recordings are to be used for any other purpose, students who are identifiable will be notified and their consent requested in advance.

Online Community and Communication Tools

All class content will be available through the course on https://elearn.capu.ca. All direct student communication will be done via Capilano email/teams.

Software	Link
eLearn	https://elearn.capu.ca/
myCapU	www.capilanou.ca/mycapu/
Zoom	www.zoom.com/
Microsoft Teams	teams.microsoft.com