

The Animation Workshop, VIA University College

Houdini & Simulation 2021

Creative Simulation Technologies

12th April to 2nd July 2021

Learn how to create beautiful simulations! Dive into Houdini, TouchDesigner, Unity and coding in this exciting new course, taught by specialists from the VFX industry!

Course program

Week 1	12 - 16 April	Intro, Overview & Software
Week 2	19 - 23 April	Research, Planning & Problem Solving
Week 3	26 - 30 April	Houdini
Week 4	3 - 7 May	Houdini
Week 5	10 - 14 May	TouchDesigner
Week 6	17 - 21 May	Coding
Week 7	24 - 28 May	Game Engine
Week 8	31 May – 4 June	Houdini & Game Engine Integration
Week 9	7 - 11 June	Coding
Week 10	14 - 18 June	Project Work
Week 11	21 - 25 June	Project Work
Week 12	28 June – 2 July	Finalization & Marketing



The Animation Workshop
VIA University College

Houdini & Simulation 2021 – detailed program

Summary

Through the Houdini & Simulation course, participants will master the craft of computer simulation in various forms. Participants will study and implement graphical, physics-based solvers as well as real-time simulations. The foundation of the course is based on Houdini, and additional software training includes Touch Designer, basic programming, and the game engine Unity. With the study of these four elements - Houdini, TouchDesigner, coding, and Unity – an artist has complete technical and artistic freedom with simulation; at the heart and edge of computer technology. On completion, students will showcase highly specialized knowledge of node-based procedural workflows. Projects will take the form of well-presented simulations in tandem with case studies targeted toward bringing new ideas into Europe's diverse art and technology markets (film/games/animation/sciences).

Modules

Week 1 - Introduction, Overview, Software introductions and theory

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director. For many years Andrew has been recognized by industry as an FX TD and trainer. Movie credits/studios include *Mummy 3*, *Aliens in the Attic*, *Invictus*, *Thor*, *Sucker Punch*, *Transformers 3*, *Jack the Giant Slayer*, and *Ender's Game* at studios such as Digital Domain, Rhythm and Hues, and Animal Logic. He's conducted many seminars around the world and written articles, authored a Houdini book, and also conducts formal training at dedicated institutions such as The Animation Workshop, VIA UC and FXPHD.

The first week of the course will consist of basic orientation activities and personal introductions. The software used for the course will be introduced in a tour and demonstration sense. Lectures consist of broad reaching theory of simulation technologies as well as basic introductions to the varied software used in the course.

Week 2 – Research, Planning & Problem solving

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

This week will serve to get the ball rolling for future lectures as well as project work. Student tasks will consist of project idea generation, research, and planning. Students will research existing solutions and precedents for solving the simulation task. Also research into the science, art, and role of such simulations and phenomenon should be undertaken. The final group screening at the end of the week will showcase project ideas for approval to the instructor.

Week 3 - Houdini lectures and classwork

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

Primarily a lecture week covering fundamentals on 3D geometry, forming the foundation for many projects. Houdini is used as the core 3D program and this is used to generate many types of geometry using the SOPs context. Basic lessons will



The Animation Workshop
VIA University College

loosely correlate with student project needs; while ensuring geometry fundamentals are taught as the primary focus.

Week 4 - Houdini lectures and classwork

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

A lecture week with a focus on dynamics simulation in Houdini. Theory and application of complex physics based solvers is explored with examples and lectures. A variety of different simulations such as rigid bodies, fluids, and crowd should be introduced. This lecture week gives necessary knowledge to complete non-real time, highly accurate simulations for projects.

Week 5 - TouchDesigner lectures and classwork

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

This week covers real-time simulation technology and theory using TouchDesigner software. Students already have a basis from their Houdini studies as TouchDesigner is Houdini's real-time cousin. Lectures should be divided into introductory and in-depth categories by the instructor so that students notably without real-time/interactive components to their projects can optionally continue project work instead of undergo lectures.

Week 6 - Coding lectures and classwork

Expected teacher: Jeronimo Maggi, IT/AR. FX Technical Director at Method Studios. Pipeline TD. Houdini instructor at FXPHD.

The first of two weeks dedicated to taking more manual control over a simulation via coding. This could take the form of a custom IO between a type of data and the simulation package, or create an optimized workflow within a program/engine. The first week focuses on coding basics in a variety of languages such as Python, and C++. Students who need a minimal amount of coding for their projects can opt out of the more advanced lectures to continue project work.

Week 7 – Game engine – lectures and classwork

Expected teacher: Adam Funari, US. Terrain and Technical Artist at Offworld Industries.

The industry standard game engine Unity or Unreal is introduced and explored. This will give students the ability to tailor their projects in an accelerated user interactive environment. Lectures should be divided into introductory and in-depth categories by the instructor so that students notably without the needs of a game engine in their projects can optionally continue project work instead of undergo lectures.



The Animation Workshop
VIA University College

Week 8 – Houdini & Game engine integration – lectures and classwork

Expected teacher: Adam Funari, US. Terrain and Technical Artist at Offworld Industries.

As a continuation of the game engine week, this week will shift focus to integration. Houdini will be used for procedural asset generation for accelerated environments as well as tool building with the Houdini Engine. Students without strong game-engine needs in their projects can optionally focus on project work while opting out of lectures.

Week 9 - Coding lectures and classwork

Expected teacher: Jeronimo Maggi, IT/AR. FX Technical Director at Method Studios. Pipeline TD. Houdini instructor at FXPHD.

The second week of coding involves project application in its raw form or in one of the other applications such as Houdini, TouchDesigner, or the game engine Unity. The instructor will guide the students in setting milestones throughout the week complemented by lectures specific to project needs.

Week 10 – Project work

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

This week is solely dedicated to project work. Students will use their previously gained knowledge of simulation software to carry out their project objectives. Strict milestones for development will be adhered to with an emphasis on global completion.

Week 11 – Project work

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

This week is solely dedicated to project work. Students will use their previously gained knowledge of simulation software to carry out their project objectives. Strict milestones for development will be adhered to with an emphasis on simulation tweaking and finalization.

Week 12 - Finalization and marketing, applications

Teacher: Andrew Lowell, US. Houdini FX Trainer / Technical Director.

The final week of the course should focus on showcasing and marketing work as opposed to the creation of new assets. A case study will be assembled as complementary and supporting explanations of the work undertaken for prospective employers. Research into companies of interest is also undertaken.



The Animation Workshop
VIA University College

Format of teaching

We do not have any teachers on staff at The Animation Workshop, VIA University College. Instead, we employ professional artists from studios to teach for a limited number of weeks.

The daily schedule of the online edition of the course is broken down into 3 separate stages

9:00 - 11:00 Lecture and learning

Demonstration, concept, lecture and learning. This segment of the day is best done when everyone is present and fresh. Lectures will be delivered with a combination of screen sharing and video/audio sharing. Lectures can be recorded for review from students.

11:00 – 14:30 Offline project work (includes lunch break)

This offline work needs to be done with stipulations for both students and instructors.

1. Goals set beforehand. Before the start of project-work the instructor will set very clear goals for both themselves as well as students. If students learned a new technique, then the students would need to review, try, and demonstrate the technique. If they are working on a project, the instructor needs to set a simple and doable goal to move the project forward.
2. Instructor help-example creation. Offline work needs to be for instructors as well as students. It's common to give demonstrations to either a single student or small groups of students working on a similar issue or skill. Based on the current state of the class and projects, the offline work segment is a time for instructors to assemble short and simple examples to further project work or lectures. Screen recording is also a possibility so that students can review an extended help session offline.
3. Instructor review of offline student efforts. To ensure productive offline work, a group review and brief check-in of student progress, or a "round" would be performed after offline work sessions.

14:30 – 16:00 Group review and help session

After the offline period, the instructor will do a quick "round." This would be a brief screen shared session with each student to see what their efforts produced. This is followed by a help session. This is a time for the instructor to pass off and demonstrate individual help files and workflows that they produced during the offline work session. During this time individual screen-guided help can also be provided. All students will be required to participate as they could need similar help at different stages. There's also a need to be exposed to the problem solving process by instructor and student. In this way the students learn and grow from each other's work.

Course instructional method

- Lectures, demonstrations, walk-throughs from instructors/industry practitioners, hands-on work, guided mentorship through notable stages of individualized projects.
- Biweekly milestone review. Weekly group critique.
- All modules will include lectures and extensive hands-on experience.

Class hours

Normal class hours are 9:00 to 16:00.



The Animation Workshop
VIA University College