**City University of Hong Kong**
**Course Syllabus**

**offered by School of Creative Media**
**with effect from Semester A 2017 /18**

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## Part I Course Overview

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| **Course Title:** | Procedural Animation |
| **Course Code**: | SM5320 |
| **Course Duration:** | One semester |
| **Credit Units**: | 3 |
| **Level**: | P5 |
| **Medium of Instruction:** | English |
| **Medium of Assessment:** | English |
| **Prerequisites**: *(Course Code and Title)* | Nil |
| **Precursors**: *(Course Code and Title)* | Nil |
| **Equivalent Courses**: *(Course Code and Title)* | Nil |
| **Exclusive Courses**: *(Course Code and Title)* | Nil |

## Part II Course Details

### 1. Abstract

This course aims to introduce the idea of procedural animation. Procedural Animation focuses on simulation methods of animating. Natural phenomena like clouds, waves, crowd behaviour, trees blowing in the wind, and the physics of moving masses in space are nearly impossible to animate unless you use computing power in a bottom up procedural approach. Students will practice the theory by using some selected programming tools or software package.

### 2. Course Intended Learning Outcomes (CILOs)

*(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)*

| No. | CILOs | Weighting (if applicable) | Discovery-enriched curriculum related learning outcomes (please tick where appropriate) | | |
|---|---|---|---|---|---|
| | | | *A1* | *A2* | *A3* |
| 1. | Analyze existing procedural animations, and identify the mathematics and theory behind those works | 40% | ✓ | ✓ | |
| 2. | Identify the potentials and limitations of procedural animation | 20% | ✓ | ✓ | |
| 3. | Create different procedural animation effects through selected software tools with personal style and signature. | 20% | ✓ | ✓ | ✓ |
| 4.^ | Associate, combine and integrate knowledge from different disciplines (e.g. mathematics, sciences, visual study etc.) into course assignments<br><br>Integrate the knowledge of mathematics (Turtle Geometry, L-System, Celluar Automate) and the knowledge of physics (Rigid Body Dynamics) for the purpose of creating computation-driven animation with good atheistic result. | 20% | ✓ | ✓ | ✓ |
| | | 100% | | | |

^ Negotiated Learning Outcome (NLO) explicitly articulating the elements of Discovery oriented learning.

*A1: Attitude*
*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

*A2: Ability*
*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.*

A3: *Accomplishments*
*Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

## 3. Teaching and Learning Activities (TLAs)

*(TLAs designed to facilitate students' achievement of the CILOs.)*

| TLA | Brief Description | CILO No. | | | | | | Hours/week (if applicable) |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | |
| Lectures | Animation theory, and some mathematical apparatus behind procedural animation, will be covered during the lectures. In-class discussions will be conducted to allow students to have hands-on practice in applying the theory and mathematical apparatus for creating short animations. | ✓ | | | ✓ | | | |
| Tutorials | On some selected weeks, tutorials will be given to show the students the potentials and limitations of procedural animation. We will present some master work of famous procedural animators. We will give students hands-on practice to mimic and extend the animation idea within those master works. | | ✓ | | ✓ | | | |
| Workshops | workshops will be given every week to help the students to create procedural animation using selected tools. | | | ✓ | ✓ | | | |

## 4. Assessment Tasks/Activities (ATs)

*(ATs are designed to assess how well the students achieve the CILOs.)*

| Assessment Tasks/Activities | CILO No. | | | | | | Weighting* | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Continuous Assessment: 100% | | | | | | | | |
| **Short assignments**: short assignments will be given to test the students' ability in analyzing and identifying the theory of procedural animation. | ✓ | | | | | | 40% | |
| **In-class discussion**: during the tutorials, students are required to present their understanding on the potentials and limitations of procedural animation. | | ✓ | | ✓ | | | 20% | |
| **Assignments**: students are required to work on several individual assignments, which can demonstrate their ability to create procedural animation using selected tools. | | | ✓ | ✓ | | | 40% | |
| Examination: 0% (duration: , if applicable) | | | | | | | | |
| ** The weightings should add up to 100%.* | | | | | | | 100% | |

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)*

| Assessment Task | Criterion | Excellent (A+, A, A-) | Good (B+, B, B-) | Fair (C+, C, C-) | Marginal (D) | Failure (F) |
|---|---|---|---|---|---|---|
| 1. Animation Assignment | Students should demonstrate ability to utilize primary and secondary sources, execute creative ideas and projects. | – Work has strong affective quality and the articulation of personal styles and signature<br>– Excellent appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium<br>– Work raises questions and instill insights about the process of conception, creative strategization and production<br>– Innovative exploration by combining knowledge from different disciplines (e.g. mathematics, psychology, physics, anthropology, etc.) to create an inter-disciplinary project<br>– Efficient adjustment of plans and strategies in response to resources (time, space, equipment, etc) available with constructive adjustment | – Strong appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium<br>– Ability to create project/ work that demonstrate the processes of thinking and creative exploration<br>– Proper adjustment of plans and strategies in response to resources (time, space, equipment, etc) available and constructive feedback/ suggestions | – Basic appreciation and/or application of the aesthetic and expressive qualities of the medium<br>– Limited ability to create project/ work that demonstrate the processes of thinking and creative exploration<br>– Adjustment of plans and strategies in response to resources (time, space, equipment, etc) available | – Marginal appreciation of the aesthetic and expressive qualities of the medium<br>– Marginal ability to create project/ work that demonstrate the processes of thinking and creative exploration<br>– Limited adjustment of plans and strategies in response to resources (time, space, equipment, etc) available | – No appreciation of the aesthetics and expressive qualities of the medium<br>– Fail to create project/ work that demonstrate the processes of thinking and creative exploration<br>– Minimal adjustment of plans and strategies in response to resources (time, space, equipment, etc) available |

| Assessment Task | Criterion | Excellent (A+, A, A-) | Good (B+, B, B-) | Fair (C+, C, C-) | Marginal (D) | Failure (F) |
|---|---|---|---|---|---|---|
| 2. In-Class Discussion | Students' participation and performance in discussions, debates and other class activities and tutorials… Students have to show their pre-class preparation. | – Active in-class participation, positive listening, strong ability to stimulate class discussion and comment on other points<br>– In-depth pre-class preparation and familiarity with peer reports and other materials<br>– Interpret others' views with an open mind and ready to negotiate<br>– Readiness to share personal insight via analysis and synthesis with informed views<br>– Constructively critical, thus facilitating the discovery of new issues | – Active in-class participation, positive listening, ability to initiate class discussion and comment on other points<br>– Adequate pre-class preparation and familiarity with peer reports and other materials<br>– Interpret opinions effectively | – Attentive in in-class participation, listening with comprehension, but only infrequently contributing<br>– Adequate pre-class preparation but little familiarity with peer reports and other materials<br>– Fair ability in interpreting opinions | – Unmotivated to participate in class discussion or comment on other people's views<br>– Little pre-class preparation and familiarity with peer reports and other materials<br>– Poor ability in interpreting opinions | – Unwilling to participate in class discussion and comment on other points, even when requested by the teacher<br>– No pre-class preparation and familiarity with peer reports and other materials<br>– Minimal ability in interpreting opinions |

**Note: All A+/A/A- grade assignment should comply with the highest performance of Discovery-oriented learning.**

**Part III Other Information** (more details can be provided separately in the teaching plan)

## 1. Keyword Syllabus

*(An indication of the key topics of the course.)*

Key-framed animation and procedural animation, randomness, recursive and iteration, audio-driven animation, fractals images and geometry, noise, L-system, particles, rigid body dynamics, cellular automata, wave and oceans, behavioral animation, flocking and virtual crowds

## 2. Reading List

### 2.1 Compulsory Readings

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

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|---|---|
| 1. | Cunningham, W. "The Magic of Houdini", Thomson Course Technology Press, 2005. |
| 2. | SideFX official website http:// www.sidefx.com |

### 2.2 Additional Readings

*(Additional references for students to learn to expand their knowledge about the subject.)*

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|---|---|
| 1. | Rosen, D. "An Indie Approach to Procedural Animation" GDC Conference 2014 |
| 2. | Abelson and diSessa, "Turtle Geometry", MIT Press, 1980. |