SM4123: PROCEDURAL ANIMATION

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Procedural Animation

Subject Code
SM - School of Creative Media
Course Number
4123

Academic Unit
School of Creative Media (SM)

College/School
School of Creative Media (SM)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

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 behavior, 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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Analyze existing procedural animations, and identify the mathematics and theory behind those works		x	x	x
2	Identify the potentials and limitations of procedural animation		x	x	x
3	Create different procedural animation effects through selected software tools		x	x	x
4	Associate, combine and integrate knowledge from different disciplines (e.g. mathematics, sciences, literature etc.) into course assignments. Integrate the knowledge of mathematics (Turtle Geometry, L-System, Celluar Automate) and knowledge of physics (Rigid Body Dynamics) into creating computation-driven animation with good aesthetic result.		x	x	x

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 real-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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	The theory, and some mathematics behind procedural animation, will be covered during the lectures. In-class discussions will be conducted to allow students to have hands-on practice in analying.	1, 2, 3, 4	3hrs/wk

2	Tutorials	On some selected weeks, tutorials will be given to show the students the potentials and limitations of procedural animation. Case-studies approach will mainly be employed. Students will have hands-on practice in selected procedural animation software.	1, 2, 3, 4	1hr/wk
3	Workshops	Workshops will be given every week to help the students to create procedural animation using selected tools.	1, 2, 3, 4	1hr/wk

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Short assignments: short assignments will be given to test the students' ability in analyzing and identifying the theory of procedural animation.	1	40	
2	In-class discussion: during the tutorials, students are required to present their understanding on the potentials and limitations of procedural animation.	2, 4	20	
3	Assignments: students are required to work on several individual assignments, which can demonstrate their ability to create procedural animation using selected tools.	3, 4	40	

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)

Assessment Task

1. Animation Assignment

Criterion

Students should demonstrate ability to utilize primary and secondary sources, execute creative ideas and projects. The threshold of 'discovery' lies in a student's proactively turning theory into praxis, to transform course material into self-owned authorship.

Excellent (A+, A, A-)

- Work has strong affective quality and the articulation of personal styles and signature
- Excellent appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium
- Work raises questions and instill insights about the process of conception, creative strategization and production
- Innovative exploration by combining knowledge from different disciplines (e.g. mathematics, psychology, physics, anthropology, etc.) to create an inter-disciplinary project
- Efficient adjustment of plans and strategies in response to resources (time, space, equipment, etc) available with constructive adjustment

Good (B+, B, B-)

- Strong appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium
- Ability to create project/ work that demonstrate the processes of thinking and creative exploration
- Proper adjustment of plans and strategies in response to resources (time, space, equipment, etc) available and constructive feedback/ suggestions

Fair (C+, C, C-)

- Basic appreciation and/or application of the aesthetic and expressive qualities of the medium
- Limited ability to create project/ work that demonstrate the processes of thinking and creative exploration
- Adjustment of plans and strategies in response to resources (time, space, equipment, etc) available

Marginal (D)

- Marginal appreciation of the aesthetic and expressive qualities of the medium
- Marginal ability to create project/ work that demonstrate the processes of thinking and creative exploration
- Limited adjustment of plans and strategies in response to resources (time, space, equipment, etc) available

Failure (F)

- No appreciation of the aesthetics and expressive qualities of the medium
- Fail to create project/ work that demonstrate the processes of thinking and creative exploration
- Minimal adjustment of plans and strategies in response to resources (time, space, equipment, etc) available

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Assessment Task

2. In-Class Discussion

Criterion

This assessment task reviews students' participation and performance in discussions, debates and peer critique during the tutorial sessions. The evidence of 'negotiation', the sign of discovery, lies in students' pre-class preparation and interpersonal sensitivity to his/her peer members.

Excellent (A+, A, A-)

- Active in-class participation, positive listening, strong ability to stimulate class discussion and comment on other points
- In-depth pre-class preparation and familiarity with peer reports and other materials
- Interpret others' views with an open mind and ready to negotiate
- Readiness to share personal insight via analysis and synthesis with informed views
- Constructively critical, thus facilitating the discovery of new issues

Good (B+, B, B-)

- Active in-class participation, positive listening, ability to initiate class discussion and comment on other points
- Adequate pre-class preparation and familiarity with peer reports and other materials
- Interpret opinions effectively

Fair (C+, C, C-)

- Attentive in in-class participation, listening with comprehension, but only infrequently contributing
- Adequate pre-class preparation but little familiarity with peer reports and other materials
- Fair ability in interpreting opinions

Marginal (D)

- Unmotivated to participate in class discussion or comment on other people’s views
- Little pre-class preparation and familiarity with peer reports and other materials
- Poor ability in interpreting opinions

Failure (F)

- Unwilling to participate in class discussion and comment on other points, even when requested by the teacher
- No pre-class preparation and familiarity with peer reports and other materials
- Minimal ability in interpreting opinions

Additional Information for AR

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

Part III Other Information

Keyword Syllabus

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

Reading List

Compulsory Readings

	Title
1	Cunningham, W. “The Magic of Houdini”, Thomson Course Technology Press, 2005.

Additional Readings

	Title
1	David Ebert, “Texturing and Modeling: A Procedural Approach”, Academic Press, 2014.
2	Abelson and diSessa, “Turtle Geometry”, MIT Press, 1980.