Extended Syllabus
(Fall 2023 Semester)

Course Title	Creative Algorithms	Course Number	AAT3008
Credit	3	Enrollment Eligibility	
Class Time	Tue/Thu 10:30-11:45		

Instructor's Photo	Name: KIM, Jusub	Homepage: https://www.creative-computing.org/
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	Office: X405 Office Hours: Tue/Wed/Thu 14:00~16:00	

I. Course Overview

1. Description

This course introduces students to a variety of computer algorithms for making creative applications. This course comprises two parts. In the first part, wide range of creative algorithms will be introduced in five themes: Repetition, Parameterization, Transform, Visualization, and Simulation. Specific topics include Generative Design, Recursion, L-System, Slit-scanning, Trans-Coding, Data Visualization, Particle System, Genetic Algorithms, Cellular Automata, etc. The second part of the course focuses on machine learning algorithms for making creative applications. Students will learn fundamental computational processes of various machine learning algorithms such as k-NN, Decision Tree, Neural Networks, SVM, Linear/polynomial Regression, etc. Through hands-on workshops, they will learn how to apply the various algorithms for creative applications in practice. In the course, Processing is used for coding exercises.

2. Prerequisites

Students must have taken 'AAT2004 Intro to Creative Computing' course or an equivalent.

3. Course Format (%)

Lecture	Discussion	Experiment /Practicum	Field study	Presentations	Other
50%	%	50%	%	%	%

4. Evaluation (%)

TOTAL

Eight Individual Projects	Two Team Projects	One Final Project
50%	25%	25%

EVALUATION OF EACH PROJECT

CREATIVITY	CODE QUALITY	OUTPUT QUALITY	REVIEW MANNER	REVIEW QUALITY
20%	20%	20%	20%	20%

II. Course Objectives

On the completion of the course, you should be able to

1. understand computational processes of wide range of creative algorithms including machine learning
2. apply the creative algorithms and write a working code for a creative application.
3. collaborate with other students to solve various creative coding problems.

III. Course Format

This course will be comprised of an introductory session, eleven main lessons, and a final project. Each main lesson will be comprised of a lecture, a workshop, and a mini project. You will conduct total 11 creative projects throughout the course.

IV. Course Requirements and Grading Criteria

1. Ten Mini Projects
   - In the first class of each of the ten main lesson weeks, you (or your team) will be given a mini project assignment (8 individual and 2 team projects).
   - In the second class (perspective review class) of each of 8 individual project weeks, you will be assigned to a small peer group, where you will present your work and get peer reviews. Individual project grades will be solely based on the peer evaluations.
   - In the second class of 2 team project weeks, your team will present the work and the instructor will evaluate it. But peer evaluations on collaboration attitude will be also used for determining each individual student's grade.

2. The Final Project
   - The final project consists of idea pitch, critique, and final presentation.
   - During the mid-term exam period, there will be a report assignment that reviews at least 3 creative works.
   - Around the final exam week, you will have to do final project idea pitch. Idea pitch is to help you develop the idea, not to judge the creativity of your idea. So, it will be evaluated as S/U. there will be final project group critique sessions and the final presentation.

3. Deadlines & Late submission policy
   - You (or your team) must finish the mini project and submit it before you come to the perspective review class of the week.
   - You have to finish peer evaluation before the perspective review class ends.
   - Note that no late submissions will be accepted.
   - Note that the final project consists of three parts: midterm-report, idea pitch, and final presentation. Missing each of them will give you 20% penalty toward your final project grade.

4. Team formation
   - Your perspective review or team-project team will be changed every week. This is to help you increase collaboration skills and to mitigate the fairness problem resulting from bad team formation.

V. Course Policies

As a student, you are responsible for upholding the code of academic integrity of Sogang University for this course. You must be aware of the consequences of cheating, fabrication, and plagiarism.

VI. Materials and References

Required Textbook: None

References:

1. Form+Code in Design, Art, and Architecture by Casey Reas and Chandler McWilliams, Princeton Architectural Press, 2010
2. The Nature of Code by Daniel Shiffman, 2012
3. Rebecca Fiebrink, Machine Learning for Musicians and Artists course at www.Kadenze.com

VII. Course Schedule (* Subject to change)

Week 1	Learning Objectives	To understand the fundamentals of code and algorithm
	Topics	Introduction to the Course, Introduction to Algorithm, Code and the Arts,

		Administrivia
	Class Work (Methods)	Lecture
	Materials (Recommended Readings)	
	Assignments	
Week 2	Learning Objectives	To understand the relationship between form and code
	Topics	Controlling form, Producing Form, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	
	Assignments	Problems to solve will be announced in class.
Week 3	Learning Objectives	Understanding the algorithms of Repetition
	Topics	Pattern, Recursion, Embedded Iteration, Recursive Tree, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	
	Assignments	Problems to solve will be announced in class.
Week 4	Learning Objectives	Understanding the algorithms of Transform
	Topics	Geometric Transform, Numerical Transform, Transcoding, Image averaging, Collage Engineering, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	
	Assignments	Problems to solve will be announced in class.
Week 5	Learning Objectives	Understanding the algorithms of Parameterization
	Topics	Composition System, Variables, Control, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	
	Assignments	Problems to solve will be announced in class.
Week 6	Learning Objectives	Understanding the algorithms of Visualization
	Topics	Time Series, Networks, Dynamic Maps, Navigation, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	
	Assignments	Problems to solve will be announced in class. (Team Project)
Week 7	Learning Objectives	
	Topics	Midterm Exam Period
	Class Work (Methods)	
	Materials (Recommended Readings)	
	Assignments	
Week 8	Learning Objectives	Understanding the algorithms of Simulations
	Topics	Artificial Intelligence, Genetic Algorithms, Cellular Automata, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials	

	(Recommended Readings)	
	Assignments	Problems to solve will be announced in class.
Week 9	Learning Objectives	To Understand what machine learning is, and what is good for.
	Topics	Nearest Neighbor, Decision Stump, Wekinator
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	Session 1 & 2 from Kadenze.com
	Assignments	Problems to solve will be announced in class.
Week 10	Learning Objectives	To Understand computation processes of various regression algorithms
	Topics	Linear/polynomial Regression, Neural Network Regression
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	Session 3 from Kadeze.com
	Assignments	Problems to solve will be announced in class.
Week 11	Learning Objectives	To Understand computation processes of various classification algorithms
	Topics	K-NN, Decision Tree, Support Vector Machine, AdaBoost, Bayes
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	Session 4 from Kadeze.com
	Assignments	Problems to solve will be announced in class.
Week 12	Learning Objectives	To Understand how to generate useful inputs (features) for machine learning
	Topics	Feature Vectors for audio, video, sensors, etc.
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	Session 5 from Kadeze.com
	Assignments	Problems to solve will be announced in class.
Week 13	Learning Objectives	To Understand how to train changes in data over time (e.g., speech recognition)
	Topics	Dynamic time warping
	Class Work (Methods)	Lecture, Workshop, Collaborative Problem Solving
	Materials (Recommended Readings)	Session 6 from Kadeze.com
	Assignments	Problems to solve will be announced in class.
Week 14	Learning Objectives	
	Topics	Final Project Critiques
	Class Work (Methods)	
	Materials (Recommended Readings)	
	Assignments	
Week 15	Learning Objectives	
	Topics	Final Project Presentations
	Class Work (Methods)	
	Materials (Recommended Readings)	
	Assignments	

VIII. Special Accommodations

Please contact the instructor if you have any disability.

IX. Aid for the Challenged Students

Please contact the instructor if you have any disability.