

City University of Hong Kong

**Information on a Course
offered by School of Creative Media
with effect from Semester A in 2007 / 2008**

This form is for completion by the *Course Co-ordinator*. The information provided on this form will be deemed to be the official record of the details of the course. It has multipurpose use: for the University's database, and for publishing in various University publications including the Blackboard, and documents for students and others as necessary.

Please refer to the *Explanatory Notes* attached to this Form on the various items of information required.

Part I

Course Title: Machines, A.I. & Complex Systems

Course Code: _____

Course Duration: One semester

No. of Credit Units: 3

Level: 4

Prerequisites: (Course Code and Title) SM2220 Generative Art & Literature

Precursors: (Course Code and Title) _____

Equivalent Courses: (Course Code and Title) _____

Exclusive Courses: (Course Code and Title) _____

Part II

1. Course Aims:

This course follows up on the idea of generative arts and procedures in SM2220 to place the focus of investigation more on complex constraint-based systems. One key area of studies is the interaction between computing, science, and the arts. How can creative work, on the one hand, and current research in computing and other sciences, on the other, interact with one another? Artists are currently exploring ways in which insights from the sciences of complexity, systems theories, consciousness research, robotics, neurobiology, and other scientific areas can open new horizons for creative exploration. Art is from this perspective understood as a laboratory activity geared towards experimentation and research. In surveying and re-defining what a "machine" is, the

course examines the input of biology, especially evolution, and also partially covers the contents of the AI and A-Life. The presentation of material will emphasize the close connection of theory and practice. The set agenda would ultimately seek to shed light on the nature and meaning of digitality and what a digital system requires.

2. Course Intended Learning Outcomes (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)

Upon successful completion of this course, students should be able to:

| No. | CILOs | Weighing (if applicable) |
|-----|----------------------------------------------------------------------------------------|--------------------------|
| 1. | Account for the input of biology in digital art | |
| 2. | Describe and compare the different definitions and models of a machine | |
| 3. | Discern the basic issues involved in AI, A-Life | |
| 4. | Propose and design an art work that has emergent or self-organizing quality | |
| 5. | Execute an artwork with emergent or self-organizing quality via code-based programming | |

3. Teaching and Learning Activities (TLAs)

(designed to facilitate students' achievement of the CILOs)

| ILO No | TLAs | Hours/weeks (if applicable) |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| CILO 1 to CILO 3 | -Lectures with audio-visual illustration -Summary /notes essay of assigned reading -Reaction essay with examples drawn from students' own research -class presentation | |
| CILO 4 | -Proposal writing: with concept statement, creative briefs and reference list -in-class presentation and critique | |
| CILO 5 | -technical workshop on required programming language -creation of art work with theoretical text | |

4. Assessment Tasks/Activities

(designed to assess how well the students achieve the CILOs)

| ILO No | Type of assessment tasks/activities | Weighting (if applicable) | Remarks |
|----------|----------------------------------------------------------------------------------------------------|---------------------------|---------|
| CILO 1-3 | -Summary notes/essay for assigned readings -Reaction paper -class presentation | | |
| CILO 4 | -Written proposal with oral presentation | | |
| CILO 3 | -Creative work presentation with oral presentation -Theoretical text to accompany finished work | | |
| CILO 1-5 | Participation in class discussion and contribution to classmates' critique sessions | | |

5. Grading of Student Achievement: Refer to Grading of Courses in the Academic Regulations and to the Explanatory Notes.

100% coursework and in-class participation
Grading pattern: Standard (A+AA-...F)

Part III

Keyword Syllabus:

Information arts; information theory: entropy, noise, feedback, control; machine intelligence, perspectives on computational model, Turing machine, algorithmic art; technoetic (technology and consciousness) research, evolution and complexity, genetics, game of life, autopoiesis, self-creation, self-organization, changing concept of the body, emergence, emergent properties, emergence in art theories, generative constraints, machine as organism, cellular automata, theories of mind, structuralism, chaos, robotics, synthetic A.I., life-like A.I., learning, networks

Recommended Reading:

Text(s):

Ascott, Roy.(ed) 1999: *Reframing consciousness*. Intellect Books, Exeter.

Canguilhem, George 1992: "Machine and Organism," in *Incorporations*, ed. Jonathan Crary et al. Zone. Pp. 45-67.

Cilliers, Paul 1998: "Self-organization in Complex Systems," in *Complexity and Postmodernism: Understanding Complex Systems*. Routledge, London & New York.

Clark, Andy; and Josefa Toribio (eds.) 1998: *Machine Intelligence: perspectives on the computational model*. Garland Publishing, New York and London.

Goodwin, Brian; and Ricard Sole 2000: *Signs of Life: How Complexity Pervades Biology*. Basic Books, New York.

Herken, Rolf (ed.) 1988: *The Universal Turing Machine*. Oxford University Press, Oxford.

Johnson, Steven 2001: *Emergence: the Connected Lives of Ants, Brains, Cities and Software*. London: Penguin Books.

Pierce, John Robinson 1980: *An introduction to information theory : symbols, signals & noise*. Dover Publications, New York.

Rush, Michael 1999: *New media in late 20th-century art* Thames & Hudson, London.

Sommerer, Christa; and Laurent Mignonneau (eds.) 1998: *Art@science*. Springer, New York.

Turing, A.M. 1950: "Computing Machinery and Intelligence," at <http://www.loebner.net/Prizef/TuringArticle.html> (October 23, 2003)

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Date: 20th March,2006