City University of Hong Kong

Information on a Course
offered by School of Creative Media
with effect from Semester A in 2012/2013

Part I

Course Title: Philosophy and History of Computation

Course Code: SM4142

Course Duration: One semester

No. of Credit Units: 3

Level: 4

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

1. Course Aims:

This course aims to give art students a strong understanding of the concept of computation from a historical perspective, and its potential use as an artistic medium. The core ideas of this course pertain to the theory of formal languages, computation, and information. Students will be introduced to the work of Turing, Chomsky, Von Neumann, among others. The rise of cybernetics as a research program and its influence on artistic creation will play a key role. In particular, the cybernetics movement remains an important example of interdisciplinary research that extends the idea of computation into biology, anthropology, sociology, psychology, and other areas. Interdisciplinarity remains a core feature of this course. Philosophical issues raised by the influence of computational ideas on linguistics, cognitive psychology, artificial intelligence/life, and virtual reality will be considered. Instructors may choose to focus on a specific topic, such as for instance natural language processing, text generation, artificial life techniques, etc. But the core focus of the course should be twofold: (a) to present the conceptual fundamentals of computation/information; (b) to motivate students to reflect on the main features of computation as an artistic medium.
2. **Course Intended Learning Outcomes (CILOs)**

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

<table>
<thead>
<tr>
<th>No.</th>
<th>CILOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Describe in detail the meaning of computation, its historical development, and the philosophical debates that have developed around it, and create artworks that reflect this understanding.</td>
</tr>
<tr>
<td>2.</td>
<td>Theorize the different paradigms of computation, especially in light of the existence of different kinds of programming languages, and to produce artworks that explore the possibilities of one (or more) programming language paradigms.</td>
</tr>
<tr>
<td>3.</td>
<td>Describe theoretical work that applies computation across different disciplines, and produce artistic projects that demonstrate the creative possibilities of these ideas.</td>
</tr>
<tr>
<td>4.</td>
<td>Theorize the main characteristics of computational art as a distinct paradigm.</td>
</tr>
<tr>
<td>*5.</td>
<td>Transform basic technical competence and historical understanding into a unique style or personal signature</td>
</tr>
</tbody>
</table>

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

3. **Teaching and Learning Activities (TLAs)**

*(designed to facilitate students’ achievement of the CILOs)*

<table>
<thead>
<tr>
<th>TLAs</th>
<th>ILO No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparison and contrast of programming languages that illustrate different programming paradigms (eg., java and prolog).</td>
<td>1, 2</td>
</tr>
<tr>
<td>Brainstorming sessions, discussions, and presentations where students reflect on the question of whether computation is an artistic medium.</td>
<td>2, 3, 4, 5</td>
</tr>
<tr>
<td>Lectures and in-class debates about the work of key figures in the development of computation</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>In-class programming exercises that explore the possibilities and limitations of different formal languages.</td>
<td>2</td>
</tr>
</tbody>
</table>

4. **Assessment Tasks/Activities**

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

<table>
<thead>
<tr>
<th>Type of assessment tasks/activities</th>
<th>ILO No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of an interactive artwork (in such areas as: generative or interactive literature, autonomous agents, etc.) with a programming language seldom used by artists.</td>
<td>1, 2, 3, 4, 5</td>
<td></td>
</tr>
<tr>
<td>Production of a detailed research report explaining the evolution of computational concepts and/or technologies.</td>
<td>1, 2, 3, 4</td>
<td></td>
</tr>
<tr>
<td>In-class presentation and critique of the student’s ongoing work, with a strong emphasis on the programming techniques used to produce the work.</td>
<td>1, 2, 3, 4</td>
<td></td>
</tr>
<tr>
<td>Essay or in-class presentation describing whether computation can be considered a medium of expression, how, and why (or why not), with concrete references to the history of computational technologies.</td>
<td>1, 4</td>
<td></td>
</tr>
</tbody>
</table>
5. **Grading of Student Achievement:** Refer to Grading o Courses in the Academic Regulations.

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

A. **Interactive Artwork**

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.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
<th>Grade Definitions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.3</td>
<td>Excellent</td>
<td>– Work has strong affective quality and the articulation of personal styles and signature&lt;br&gt;– Excellent appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium&lt;br&gt;– Work raises questions and instills insights about the process of conception, creative strategization and production&lt;br&gt;– Innovative exploration by combining knowledge from different disciplines (e.g. mathematics, psychology, physics, anthropology, etc.) to create an interdisciplinary project&lt;br&gt;– Efficient adjustment of plans and strategies in response to resources (time, space, equipment, etc) available with constructive adjustment</td>
</tr>
<tr>
<td>A</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B+</td>
<td>3.3</td>
<td>Good</td>
<td>– Strong appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium&lt;br&gt;– Ability to create project/ work that demonstrate the processes of thinking and creative exploration&lt;br&gt;– Proper adjustment of plans and strategies in response to resources (time, space, equipment, etc) available and constructive feedback/suggestions</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-</td>
<td>2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C+</td>
<td>2.3</td>
<td>Adequate</td>
<td>– Basic appreciation and/or application of the aesthetic and expressive qualities of the medium&lt;br&gt;– Limited ability to create project/ work that demonstrate the processes of thinking and creative exploration&lt;br&gt;– Adjustment of plans and strategies in response to resources (time, space, equipment, etc) available</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Marginal</td>
<td>– Marginal appreciation of the aesthetic and expressive qualities of the medium&lt;br&gt;– Marginal ability to create project/ work that demonstrate the processes of thinking and creative exploration&lt;br&gt;– Limited adjustment of plans and strategies in response to resources (time, space, equipment, etc) available</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>Failure</td>
<td>– No appreciation of the aesthetics and expressive qualities of the medium&lt;br&gt;– Fail to create project/ work that demonstrate the processes of thinking and creative exploration&lt;br&gt;– Minimal adjustment of plans and strategies in response to resources (time, space, equipment, etc) available</td>
</tr>
</tbody>
</table>

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

Students should demonstrate ability to apply knowledge and skills to undertake independent research, build up argument and analysis. The threshold of ‘discovery’ lies in a student’s proactively turning theory into praxis, to transform course material into self-owned authorship.

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</table>
| A+           | 4.3         | Excellent         | – Excellent grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field  
– Rich content, exceptional ability to integrate various resources into primary and secondary levels based on demand;  
– Design and conduct research which is firmly built on thorough knowledge of existing theoretical frameworks  
– Evaluative judgments about existing research and demonstrate application of strong critical thinking skills  
– Strong ability to approach a text or a theme using a variety of theories and analytical tools  
– Strong organization of research findings with effective organization and procedural clarity at the same time demonstrating the importance of the process  
– Insightful suggestion of how the research findings may lead to future research |
| A            | 4.0         | Excellent         | – Firm grasp of materials, ability to explain key concepts and assumptions  
– Adequate content, strong ability to integrate various resources into primary and secondary levels based on demand;  
– Design and conduct research which is built on thorough knowledge of existing theoretical frameworks  
– Appropriate judgments about existing research and demonstrate application of critical thinking skills  
– Ability to approach a text or a theme using a variety of theories and analytical tools |
| A-           | 3.7         | Good              | – Comprehensive grasp of materials, able to explain key concepts  
– Adequate content, fair ability to integrate various resources into primary and secondary levels based on demand  
– Design and conduct research which is built on knowledge of theoretical frameworks  
– Appropriate judgments about existing research  
– Weak ability to approach a text or a theme using a variety of theories and analytical tools |
| B+           | 3.3         | Adequate          | – Loose grasp of materials, cannot explain key concepts  
– Weak content, with primary and secondary levels  
– Design and conduct research which is appropriate for the research objective  
– Marginal judgments about existing research  
– Poor ability to approach a text or a theme using a variety of theories and analytical tools |
### C. Class Participation and Performance

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.

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</table>
| A+           | 4.3         | Excellent         | – 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 |
| A            | 4.0         | Good              | – 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 |
| A-           | 3.7         | Good              | – Attentive 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 |
| B+           | 3.3         | Adequate          | – 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 |
| B            | 3.0         | Marginal          | – 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 |
| B-           | 2.7         | Marginal          | – Unmotivated to participate in class discussion or 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 |
| C+           | 2.3         | Adequate          | – 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 |
| C            | 2.0         | Adequate          | – Attentive 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 |
| C-           | 1.7         | Adequate          | – 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 |

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

This assessment will grade on content and fluency of presentation. Students should show their co-operation to conduct a well-organized presentation with their own argument and evidence from readings and notes. The threshold of ‘discovery’ lied in a student’s self initiatives to conduct additional research and to personalize theories for her/his personal daily experience.

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</table>
| A+           | 4.3         | Excellent         | – Rich, informative content, excellent grasp of the material with in-depth and extensive knowledge of the subject matter  
– Rigorous organization, coherent structure, and systematic exposition with a strong sense of narrative  
– Superior presentation skills: distinct pronunciation, fluent expression and appropriate diction, exact time-management  
– Critical analysis with insightful comments opening up new issues, or suggesting the ability to theorize |
| A            | 4.0         |                   |             |
| A-           | 3.7         |                   |             |
| B+           | 3.3         | Good              | – Adequate content with firm grasp of the material that informs the audience on a subject matter  
– Reasonable organization, balanced structure and composition  
– Good verbal communication: comprehensible pronunciation, fluent expression and diction, fair time-management |
| B            | 3.0         |                   |             |
| B-           | 2.7         |                   |             |
| C+           | 2.3         | Adequate          | – Adequate content with comprehensive grasp of the material demonstrating basic knowledge of the subject matter  
– Fair organization, weak structure and composition  
– Fair presentation skills: acceptable pronunciation, expression and diction, fair time-management |
| C            | 2.0         |                   |             |
| C-           | 1.7         |                   |             |
| D            | 1.0         | Marginal          | – Weak content, loose grasp of the general ideas with some knowledge of the subject matter  
– Poor organization, structure and composition  
– Poor presentation skills: marginal pronunciation, expression and diction, poor time-management |
| F            | 0.0         | Failure           | – Inadequate content, fail to identify the general ideas with knowledge of the subject matter  
– No organization, structure or/and composition  
– Poor presentation skills: marginal pronunciation, expression and diction, minimal time-management |

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

Students should demonstrate ability to utilize primary and secondary sources, build up argument and analysis. The threshold of ‘discovery’ lied in a student’s self initiatives to conduct additional research and to personalize theories for her/his personal daily experience.

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<tr>
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<th>Grade Definitions</th>
<th>Description</th>
</tr>
</thead>
</table>
| A+           | 4.3         | Excellent         | – Excellent grasp of research material, able to explain key concepts, assumptions and debates  
|              | 4.0         |                   | – Rigorous organization, coherent structure, distinct thesis, properly argued with strong narrative  
|              | 3.7         |                   | – Insightful interpretation of the subject matter with distinct themes and thesis  
|              |             |                   | – Critical analysis with insightful comments opening up new issues, or suggesting the ability to theorize  
|              |             |                   | – Ability to approach a text or a theme using a variety of theories and analytical tools  
|              |             |                   | – Strong bibliography suggesting breadth and depth of coverage and informed insights |
| B+           | 3.3         | Good              | – Firm grasp of materials, able to explain key concepts and assumptions  
|              | 3.0         |                   | – Reasonable organization, balanced structure, adequate content, sufficient ability to integrate various resources based on demand  
|              | 2.7         |                   | – Clear ideas which keep to the point, clear-cut subject, ability to interpret opinions independently  
|              |             |                   | – Organized bibliography which can be utilized in accordance with the topic |
| C+           | 2.3         | Adequate          | – Comprehensive grasp of materials, able to explain key concepts  
|              | 2.0         |                   | – Fair organization, weak structure, adequate content, fair ability to integrate various resources based on demand  
|              | 1.7         |                   | – Relevant points to the subject matter, fair ability to interpret opinions  
|              |             |                   | – Unorganized bibliography which can be utilized in accordance with the topic |
| D            | 1.0         | Marginal          | – Loose grasp of materials, cannot explain key concepts  
|              |             |                   | – Poor organization and structure, weak content, limited use of resources  
|              |             |                   | – Relevant points to the subject matter, marginal ability to interpret opinions  
|              |             |                   | – Insufficient and/or unorganized bibliography |
| F            | 0.0         | Failure           | – Poor grasp of materials  
|              |             |                   | – No organization and structure, inadequate content, no/irrelevant use of resources  
|              |             |                   | – Irrelevant points to the subject matter, minimal ability to interpret opinions  
|              |             |                   | – Irrelevant bibliography |

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

Keyword Syllabus

Information Theory; Formal Language; Computation; Programming languages; Cybernetics; Computational and networked Art; Artificial Intelligence and Artificial Life; Virtual Reality.

References:


Feynman, Richard P. Lectures on Computation (Reading, Mass.: Addison-Wesley, 1996.)


