City University of Hong Kong

Information on Gateway Education Course
toffered by Department of Electronic Engineering
with effect from Semester A in 2014/2015

Part I

Course Title: From Ancient Wisdom to Modern Science
Course Code: GE2318
Course Duration: 13 weeks

Proposed Area: (Please insert “1” for the single primary area, and “2” for the secondary area if applicable. Students will only earn credit units from the primary area.)

☐ Arts and Humanities
☐ Study of Societies, Social and Business Organisations
1 Science and Technology

No. of Credit Units: 3
Level: B2

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

1. Abstract

New sciences are not developed at random or from scratch, but instead rooted in ancient time. This course is to open up students’ mind to welcome the ancient wisdom (including Ying Yang, I-Ching, Chaos, Fractals, etc.) and to guide the students to
witness how this piece of knowledge can light up the modern sciences, thereby helping to improve their cognitive skills. Through the lectures, students will be able to grasp the major concepts of the ancient wisdom and understand the core ideas in some selected modern scientific fields (such as chaotic theory, fractals, biological DNA and information coding). By participating in the designated activities, students will be able to experience the close relationship among the long-lasting ancient knowledge, the modern sciences, and their daily-life activities.

2. Course Aims

This course aims to enhance the appreciation of close relationship between the ancient wisdom and the advancements of contemporary science, such as mathematics, chaos, fractals, biological genetics and even social sciences. It also serves as an introductory course to life philosophy that could enrich students’ personal development.

3. 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>
<th>Weighting (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Describe the major concepts of some selected ancient wisdom, including Ying Yang, I-Ching, Chaos and Fractals</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Describe the major concepts in some selected modern scientific topics, including chaotic theory, fractals, biological DNA and information coding</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Identify the relationship between the ancient wisdom and modern sciences</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Describe daily-life phenomena from a scientific perspective</td>
<td></td>
</tr>
</tbody>
</table>

Please explain the alignment of CILOs to the GE Programme Intended Learning Outcomes (PILOs) under Part A of the Annex to this Form.

4. Teaching and Learning Activities (TLAs)

*(designed to facilitate students’ achievement of the CILOs - Some TLAs may address more than one CILO.)*

Please be sure to consider how the TLAs align with the desired characteristics of GE courses (c.f. explanatory note 10).

<table>
<thead>
<tr>
<th>TLAs</th>
<th>CILO No.</th>
<th>Hours/week (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1-4</td>
<td>Total 24 hours</td>
</tr>
<tr>
<td>Small group learning activities</td>
<td>1-4</td>
<td>Total 3 hours</td>
</tr>
<tr>
<td>Self-learning activities</td>
<td>1-4</td>
<td>Total 6 hours</td>
</tr>
<tr>
<td>Projects</td>
<td>3-4</td>
<td>Total 6 hours</td>
</tr>
</tbody>
</table>

Remarks:

1. A lecture is a large-class activity involving the whole class. The information of a particular topic is to be delivered by the instructor.
2. Possible small group learning activities include problem Q&A, in-class exercises, case study discussion.
3. Possible self-learning activities include: self-reading, self-study of the software demo, self-organized discussion for project activities.
4. Projects are designed to let students apply their knowledge on designated tasks. After completing the tasks, students are required to submit the report, and also give the demonstration/presentation if appropriate.

5. **Assessment Tasks/Activities**
   (designed to assess how well the students achieve the CILOs –Some assessment tasks/activities may address more than one CILO.)

<table>
<thead>
<tr>
<th>Type of Activities</th>
<th>Assessment Tasks / CILO No.</th>
<th>Weighting (if applicable)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class activities and discussions</td>
<td>1, 2, 3, 4</td>
<td></td>
<td>Students are required to discuss on selected topics in related to the areas described in the course. A summary is to be reported at the end of discussion. The assessment is based on students’ activeness in the discussion and the contents of the summary.</td>
</tr>
<tr>
<td>Reading assignments and Reflective reports</td>
<td>1, 2, 3, 4</td>
<td></td>
<td>Students are required to complete written assignments in related to the areas described in the course. Basic skills for data collection and report writing will be taught to help students in achieving the tasks.</td>
</tr>
<tr>
<td>Projects and reports</td>
<td>3, 4</td>
<td></td>
<td>Students will work on assignments for selected topics. This is to provide opportunity for students to apply their creative and critical thinking skills, and also to demonstrate their ability to interpret information and data. After completion, students are required to submit their reports showing their understanding on the topics and/or their work.</td>
</tr>
</tbody>
</table>

Remark 1: The weighting of assessment tasks will be provided in the first lecture.
Remark 2: To pass the course, students are required to achieve at least 35% in the continuous assessment.

6. **Grading of Student Achievement:** Refer to Grading of Courses in the Academic Regulations.

There is no final examination for this course and the grading is based on the AT/A as given in Sect. 5.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
<th>Grade Definitions</th>
<th>Description of Student Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.3</td>
<td>Excellent</td>
<td>Able to recognize and explain most of the concepts of the topics; Able to demonstrate original thinking in the discussion and provide a comprehensive analysis of the topics with critical view points; Able to effectively deliver the learnt concepts and results verbally and write excellent reports; Demonstration of an active and leading role in TLAs</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>Grade</td>
<td>Average</td>
<td>Status</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>B+</td>
<td>3.3</td>
<td>Good</td>
<td>Able to recognize most of the concepts of the topics; Able to demonstrate original thinking in the discussion and provide detailed analysis of the topics; Able to clearly deliver the learnt concepts and results verbally and in written form; Demonstration of an active role in TLAs.</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>Good</td>
<td>Able to recognize most of the concepts of the topics; Able to demonstrate original thinking in the discussion and provide detailed analysis of the topics; Able to clearly deliver the learnt concepts and results verbally and in written form; Demonstration of an active role in TLAs.</td>
</tr>
<tr>
<td>B-</td>
<td>2.7</td>
<td>Good</td>
<td>Able to recognize most of the concepts of the topics; Able to demonstrate original thinking in the discussion and provide detailed analysis of the topics; Able to clearly deliver the learnt concepts and results verbally and in written form; Demonstration of an active role in TLAs.</td>
</tr>
<tr>
<td>C+</td>
<td>2.3</td>
<td>Adequate</td>
<td>Able to recognize some key concepts of the topics; able to provide some simple but accurate explanation on the topics; able to deliver most of the learnt concepts and results correctly in oral and written form; Demonstration of participation in TLAs</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>Adequate</td>
<td>Able to recognize some key concepts of the topics; able to provide some simple but accurate explanation on the topics; able to deliver most of the learnt concepts and results correctly in oral and written form; Demonstration of participation in TLAs</td>
</tr>
<tr>
<td>C-</td>
<td>1.7</td>
<td>Adequate</td>
<td>Able to recognize some key concepts of the topics; able to provide some simple but accurate explanation on the topics; able to deliver most of the learnt concepts and results correctly in oral and written form; Demonstration of participation in TLAs</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Marginal</td>
<td>Demonstrate limited understanding on the concepts of the topics; able to communicate simple ideas accurately in oral and written form; Demonstration of participation in TLAs but in an inconsistent manner.</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>Failure</td>
<td>Do not show any evidence in recognizing the concept of the topics; Unable to communicate and deliver the results correctly; Fail to demonstrate any participation in TLAs.</td>
</tr>
</tbody>
</table>

Part III

**Keyword Syllabus:**
Please provide information about the tentative weekly schedule under Part B of the Annex to this Form.

1. **I-Ching and DNA**
   Genetics, DNA coding, I Ching, Ying and Yang, information coding

2. **Chaos**
   Chaotic systems, characteristics, attractors, applications

3. **Fractals**
   Bifurcation, similarity, fractal structure, fractal dimensions, applications

**Recommended Reading:**
**Text(s):**
- Texts on I-Ching and DNA
Texts on Chaos

Texts on Fractals

Online Resources:
Freeware for Fractal Drawings
  • Apophysis: http://www.apophysis.org/

Online Reading Materials:
http://en.wikipedia.org/wiki/I_Ching
http://www.hxwz.com/Classics/Philosophers/I_Ching/
http://www.cfcl.com/ching/