Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EIE1D03 (CAR STE Subject)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Artificial Intelligence and Science Fiction</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite/ Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives

1. To inspire student interest in artificial intelligence (AI) by exploring applications of AI and its impact to human beings' life.
2. To stimulate students' critical thinking and imagination through the study of AI.

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

**Category A: Professional/academic knowledge and skills**
1. Understand the benefits and limitations of current AI techniques, its culture and society impacts, philosophical issues, and possible future development.
2. Appreciate basic AI problems and approaches.
3. Appreciate the basic design concepts of AI games and typical AI systems.
4. Explore the applications of AI techniques and humanoid robotics in everyday life, entertainment, industry, and business.

**Category B: Attributes for all-roundedness**
5. Think critically and creatively.
6. Recognize social responsibility and ethics.

Subject Synopsis/Indicative Syllabus

1. **Introduction**
   Definitions of AI, Brief History of AI, State of the Art

2. **Philosophical Issues of AI**
   Human Intelligence, Turing Test, Simulation of Brain, Consciousness, Minds, Free Will, Machine Emotion, Digital Soul, Machine Ethics

3. **Introduction to AI Approaches**
   Knowledge Representation, Problem Solving Paradigms, Machine Learning, Expert Systems and Fuzzy Systems, Artificial Neural Networks, Deep Learning, Evolutionary Computation

4. **AI Games**
   Search Methods, Minimax Search, Deep Blue (Chess Computer) and AlphaGo, State-of-the-Art Game Programs, AI in games

5. **AI Applications**
   Natural Language Processing, Machine Translation, AI in Finance and Investment, AI in Medicine

6. **Robots and Robotics**

7. **Artificial Intelligence in Science Fiction**
   “2001: A Space Odyssey” (1968): HAL 9000, Speech Recognition, Natural Language Processing, Facial Expression Recognition, Art Appreciation, Reasoning, Emotional Behaviors
8. **Future Directions of AI**  
   Embodied Cognition, Automatic Language Acquisition, Hybrid Systems, Bio-robotics, Nanorobotics, Artificial Life, Evolutionary Robotics

9. **Culture and Society Impacts**  
   Culture and Society Impacts of AI, Ethics and Risks of Developing AI Solutions

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Teaching and Learning Method</th>
<th>Intended Subject Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>1, 2, 3, 4, 6</td>
<td>fundamental principles and key concepts of the subject are delivered to students; guidance on further readings is given.</td>
</tr>
<tr>
<td></td>
<td>Tutorials/ Demos</td>
<td>1, 2, 3, 4, 5</td>
<td>supplementary to lectures and are conducted with a smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
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<tr>
<td></td>
<td>Science Fiction Films Viewing</td>
<td>2, 4, 6</td>
<td>Supplementary to lectures; students are asked to identify the AI technologies portrayed and to think critically about the important issues raised in the sci-fi movies.</td>
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</table>
|                               | Assignments                 | 1, 2, 3, 4, 5, 6                 | Assignment 1 will ask each student to carefully read one or more sci-fi books, or watch one or more sci-fi movies chosen by the student and write up a book or movie report to discuss the AI techniques/applications portrayed and the important issues raised in the book(s)/movie(s).  
   Assignment 2 will ask each student to conduct individual survey/research on the applications of AI technologies in a field chosen by the student and write up a survey/review report. |

<table>
<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes</th>
<th>Specific Assessment Methods/Tasks</th>
<th>% Weighting</th>
<th>Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>1. Continuous Assessment</td>
<td>100%</td>
<td>✔ ✔ ✔ ✔ ✔ ✔</td>
<td></td>
</tr>
<tr>
<td>• Assignments (2)</td>
<td>60%</td>
<td>✔ ✔ ✔ ✔ ✔ ✔</td>
<td></td>
</tr>
<tr>
<td>• Test</td>
<td>30%</td>
<td>✔ ✔ ✔</td>
<td></td>
</tr>
<tr>
<td>• Quizzes (2)</td>
<td>10%</td>
<td>✔ ✔ ✔</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>✔ ✔ ✔ ✔ ✔ ✔</td>
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</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

<table>
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<th>Specific Assessment Methods/Tasks</th>
<th>Remark</th>
</tr>
</thead>
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<tr>
<td>Assignments</td>
<td>- Students need to think critically and creatively in writing up two reports.</td>
</tr>
<tr>
<td></td>
<td>- Accuracy, organization, technical content, and the presentation of the reports will be assessed.</td>
</tr>
<tr>
<td>Test</td>
<td>The topics covered in lectures will be tested in the forms of truth/false, multiple-choice questions, and short questions.</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Basic AI concepts and techniques will be tested in two quizzes.</td>
</tr>
</tbody>
</table>

Student Study Effort Expected

Class contact (time-tabled):

- Lecture 26 Hours
- Tutorials/Seminars/Demos 13 Hours
- Other student study effort:
  - Self-learning (review of materials, intensive reading of science fiction books, watching science fiction movies, preparation for test) 35 Hours
  - Assignments 32 Hours

Total student study effort: 106 Hours

Reading List and References

References:
10. Selected science fiction books and movies.
11. Selected publications from relevant journals.

Last Updated July 2016

Prepared by Dr Z. Chi