

Subject Description Form

Subject Code	EIE1D03 (CAR STE Subject)
Subject Title	Artificial Intelligence and Science Fiction
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	<ol style="list-style-type: none"> 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 Subject Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><u>Category A: Professional/academic knowledge and skills</u></p> <ol style="list-style-type: none"> 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. <p><u>Category B: Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> 5. Think critically and creatively. 6. Recognize social responsibility and ethics.
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> 1. <u>Introduction</u> Definitions of AI, Brief History of AI, State of the Art 2. <u>Philosophical Issues of AI</u> Human Intelligence, Turing Test, Simulation of Brain, Consciousness, Minds, Free Will, Machine Emotion, Digital Soul, Machine Ethics 3. <u>Introduction to AI Approaches</u> Knowledge Representation, Problem Solving Paradigms, Machine Learning, Expert Systems and Fuzzy Systems, Artificial Neural Networks, Deep Learning, Evolutionary Computation 4. <u>AI Games</u> Search Methods, Minimax Search, Deep Blue (Chess Computer) and AlphaGo, State-of-the-Art Game Programs, AI in games 5. <u>AI Applications</u> Natural Language Processing, Machine Translation, AI in Finance and Investment, AI in Medicine 6. <u>Robots and Robotics</u> Three Laws of Robotics, Embodiment, Humanoid Robotics, Entertainment Robots, Industrial Applications, Robotic Technology in Everyday Life 7. <u>Artificial Intelligence in Science Fiction</u> "I, Robot" (2004), "The Terminator" (1984, 1991, 2003, 2009), and "Robocop" (1987, 1990, 1993): Cyborg, Hybrid of Man and Machine, Morality, Free Will, Empathy, Moral and Ethical Issues "2001: A Space Odyssey" (1968): HAL 9000, Speech Recognition, Natural Language Processing, Facial Expression Recognition, Art Appreciation, Reasoning, Emotional Behaviors

	<p>“A.I. Artificial Intelligence” (2001): Humanoids, Thoughts and Emotions</p> <p>8. <u>Future Directions of AI</u> Embodied Cognition, Automatic Language Acquisition, Hybrid Systems, Bio-robotics, Nanorobotics, Artificial Life, Evolutionary Robotics</p> <p>9. <u>Culture and Society Impacts</u> Culture and Society Impacts of AI, Ethics and Risks of Developing AI Solutions</p>																				
<p>Teaching/Learning Methodology</p>	<table border="1"> <thead> <tr> <th data-bbox="472 427 695 584">Teaching and Learning Method</th> <th data-bbox="695 427 884 584">Intended Subject Learning Outcome</th> <th data-bbox="884 427 1390 584">Remarks</th> </tr> </thead> <tbody> <tr> <td data-bbox="472 584 695 719">Lecture</td> <td data-bbox="695 584 884 719">1, 2, 3, 4, 6</td> <td data-bbox="884 584 1390 719">fundamental principles and key concepts of the subject are delivered to students; guidance on further readings is given.</td> </tr> <tr> <td data-bbox="472 719 695 987">Tutorials/ Demos</td> <td data-bbox="695 719 884 987">1, 2, 3, 4, 5</td> <td data-bbox="884 719 1390 987">supplementary to lectures; 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; Demonstrations on some AI applications will be shown</td> </tr> <tr> <td data-bbox="472 987 695 1167">Science Fiction Films Viewing</td> <td data-bbox="695 987 884 1167">2, 4,6</td> <td data-bbox="884 987 1390 1167">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> </tr> <tr> <td data-bbox="472 1167 695 1424">Assignment</td> <td data-bbox="695 1167 884 1424">1, 4, 5, 6</td> <td data-bbox="884 1167 1390 1424">Assignment 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).</td> </tr> <tr> <td data-bbox="472 1424 695 1626">Presentation</td> <td data-bbox="695 1424 884 1626">1, 4, 5, 6</td> <td data-bbox="884 1424 1390 1626">Students are required to search information on one particular example of AI application and give presentation to discuss the culture and society impacts of this AI application, as well as the ethics and risks of developing this AI.</td> </tr> </tbody> </table>			Teaching and Learning Method	Intended Subject Learning Outcome	Remarks	Lecture	1, 2, 3, 4, 6	fundamental principles and key concepts of the subject are delivered to students; guidance on further readings is given.	Tutorials/ Demos	1, 2, 3, 4, 5	supplementary to lectures; 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; Demonstrations on some AI applications will be shown	Science Fiction Films Viewing	2, 4,6	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.	Assignment	1, 4, 5, 6	Assignment 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).	Presentation	1, 4, 5, 6	Students are required to search information on one particular example of AI application and give presentation to discuss the culture and society impacts of this AI application, as well as the ethics and risks of developing this AI.
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Assessment Methods in Alignment with Intended Subject Learning Outcomes	Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)						
			1	2	3	4	5	6	
	1. Continuous Assessment	100%							
	• Assignment	40%	✓			✓	✓	✓	
	• Test	30%	✓	✓	✓				
	• Quizzes	20%	✓	✓	✓				
	• Presentation	10%	✓			✓	✓	✓	
	Total	100%							
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:								
	Specific Assessment Methods/Tasks	Remark							
Assignment	- Students need to think critically and creatively in writing up a book or movie report. - Accuracy, organization, technical content, and the presentation of the reports will be assessed.								
Test	The topics covered in lectures will be tested in the forms of true/false, multiple-choice questions, and short questions.								
Quizzes	Basic AI concepts and techniques will be tested in quizzes.								
Presentation	Students need to think critically to discuss various aspects on one selected AI application.								
Student Study Effort Expected	Class contact (time-tabled):								
	• Lecture							26 Hours	
	• Tutorials/ Demos/Presentations							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	
	• Assignment and Presentation							32 Hours	
	Total student study effort:								106 Hours
Reading List and References	References:								
	<ol style="list-style-type: none"> 1. Stuart Russell and Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i>, Global Edition, Pearson Education Limited, 2016 2. Henry Brook, <i>Artificial Intelligence</i>, Usborne Publishing Ltd, 2016 3. Jerry Kaplan, <i>Artificial intelligence</i>, New York, NY : Oxford University Press, 2016 4. Kevin Warwick, <i>Artificial Intelligence: The Basics</i>, Routledge, Taylor & Francis Group, 2012. 5. G.F. Luger, <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, 6th ed., Pearson Education, 2009. 								

	<ol style="list-style-type: none"> 6. S. Lucci and D. Kopec, <i>Artificial Intelligence in the 21st Century</i>, Mercury Learning and Information, 2013. 7. P.H. Winston, <i>Artificial Intelligence</i>, 3rd ed., Addison-Wesley, 1992. 8. R. Pfeifer and J. Bongard, <i>How the Body Shapes the Way We Think: a New View of Intelligence</i>, The MIT Press, 2007. 9. M. Negnevitsky, <i>Artificial Intelligence: A Guide to Intelligent Systems</i>, 3rd Edition, Addison-Wesley, 2011. 10. T.M. Georges, <i>Digital Soul: Intelligence Machines and Human Values</i>, Westview Press, 2003. 11. J.S. Hall, <i>Beyond AI: Creating the Conscience of the Machine</i>, Prometheus books, 2007. 12. J.P. Hogan, <i>Mind Matters: Exploring the World of Artificial Intelligence</i>, The Ballantine Publishing Group, 1997. 13. Selected science fiction books and movies. 14. Selected publications from relevant journals.
Last Updated	Aug 2018
Prepared by	Dr Pauli Lai