No.	Course Information
1.	Course Code: UECS2053/UECS2153 Name of Course: Artificial Intelligence
2.	Synopsis: This course introduces basic artificial intelligence concepts, including supervised and unsupervised learning, problem-solving concepts, neural networks, and data science.
3.	Name(s) of academic staff: Dr. Ng Oon-Ee (PhD, BEng(Hons) Mechatronics Engineering)
4.	Trimester / Year offered: T1Y2, T2Y2, T1Y3, T2Y3, T3Y
5.	Credit Value: 3
6.	Pre-requisite / co-requisite (if any): UECS1004/UECS1104 Programming and Problem Solving
7.	Course Classification: Elective
8.	Course Learning Outcomes (CO): Domain & Taxonomy Level1 CO1 - Explain the fundamental concepts of AI systems. C2 CO2 - Analyse complex search problems with appropriate techniques. C4 CO3 - Design AI systems for various selection, recognition and decision-making problems. C6 CO4 - Demonstrate practical AI systems. P3 1Domain and Taxonomy Level – Cognitive (C), Level 1 - 6; Affective (A), Level 1 - 5; Psychomotor (P), Level 1 - 5

9. Mapping of the Course Learning Outcomes to the Programme Outcomes, Teaching Methods and Assessment:

CO	Programme Outcomes (PO)												Teaching Methods2	Assessment3
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8						
CO1	1												L	TE / Q / A / FE
CO2						1							L/ P	TE / Q / A / FE
CO3						1							L/ P	TE / Q / A / FE
CO4		1											L/ P	A / P

*Other Teaching Methods: NIL

*Other Assessment Methods: NIL

2 L = Lecture, T = Tutorial, P = Practical, O = Others

3 Te = Test, Q = Quiz, A = Assignment, P = Practical, Pre = Presentation, CaS = Case Study, FE = Final Exam, O = Others

10.	Transferable Skills (if applicable): (Skills learned in the course of study which can be useful and utilized in other settings)
11.	Distribution of Student Learning Time (SLT):

Course Content Outline	CO	Teaching & Learning Activities						Total SLT
		Guided Learning (F2F)*				Guided Learning (NF2F)*	Independent Learning (NF2F)*	
		L	T	P	O			
Topic 1: Introduction To Artificial Intelligence (AI) What is AI? Definition and comparison of Artificial Intelligence, Machine Learning, and Deep Learning 4 categories of AI – rational logic vs human-like The History of AI AI in the Industry Practical Tools for AI	1,4	6	0	3	0	0	9	18
Topic 2: Supervised Learning Comparison between supervised and unsupervised learning K Nearest Neighbours algorithm Handling training data for appropriate fitting Regularization Gradient Descent Types of regression Measuring error	1,3	9	0	0	0	0	9	18
Topic 3: Problem-Solving Concept Problem Solving in Artificial Intelligence Search Strategies Genetic algorithms	1,2,4	6	0	3	0	0	9	18
Topic 4: Neural Networks Artificial neurons Backpropagation Training neural networks Regularization	1,3,4	6	0	3	0	0	9	18
Topic 5: Unsupervised Learning Comparison between unsupervised and supervised learning Introduction to clustering Dimensionality reduction	1,3	3	0	0	0	0	3	6
Topic 6: Data Science Primer Importance and scale of data Data collection Data enhancement Enterprise applications of data science	1,2,3	3	0	0	0	0	3	6
Total Notational Hours		33	0	9	0	0	42	84

Continuous Assessment	Percentage (%)	F2F	NF2F	TotalSLT
Test / Assignment / Practical	40%	3	21	24

	Final Assessment	Percentage (%)	F2F	NF2F	Total SLT
	Final Examination	60%	2	10	12
	GRAND TOTAL SLT				**120**

* L = Lecture, T = Tutorial, P = Practical, O = Others

* F2F = Face-to-Face, NF2F = Non Face-to-Face

12. Special Requirement or Resources to Deliver the Course (e.g., software, nursery, computer laboratory, simulation room)

Python Anaconda Distribution, Computer Lab

13. Main References:

1. Russel, S. J., & Novig, P., 2010. *Artificial intelligence: A modern approach*. (3rd ed.). Upper Saddle River, N. J.: Prentice Hall.

Additional References:

1. Negnevitsky, M., 2011. *Artificial intelligence: a guide to intelligent systems*. (3rd ed.). Boston:Addison Wesley.

2 Luger, G. F., 2008. *Artificial intelligence: Structures and strategies for complex problem solving.* (6th ed.). Harlow, England: Addison-Wesley.

3 Prateek, J. (2016) Python : Real World Machine Learning : Take your Python Machine learning skills to the next level. Packt Publishing

14. Other Additional Information:

NIL

15. Date of Senate Approval: 9 May 2019

16. Effective Trimester: May 2019

Information on Practical			
Lab	**Activity**		**Contact Hours**
1	**Topic:**	Introduction to Python programming for artificial intelligence	3
	Task:	Learn to setup and use a Jupyter notebook for visualizing data from provided datasets. Based on the provided notebook, analyze and draw conclusions from one of the provided datasets.	
	Resources:	Python Anaconda Distribution	
2	**Topic:**	Finding the best solution using Genetic Algorithms	3
	Task:	Solve the Travelling Salesman Problem using GA, based on provided datasets.	
	Resources:	Python Anaconda Distribution	
3	**Topic:**	Learning patterns using Neural Networks	3
	Task:	Train and compare performance between a random forest and various neural network architectures on a medical dataset.	
	Resources:	Python Anaconda Distribution	