

MS0003 – Introduction to Data Science and Artificial Intelligence

Course Code	MS0003					
Course Title	Introduction to Data Science and Artificial Intelligence					
Pre-requisites	MS1008	Introduction to Computational Thinking				
	CE/CZ1003	Introduction to Computation Thinking				
	BG2211	Introduction to Computational Thinking				
	CH2107	Introduction to Computational Thinking				
	CV1014	Introduction to Computational Thinking				
	MA1008	Introduction to Computational Thinking				
	EE1005	Introduction to Computational Thinking				
	RE1016	Engineering Computation				
Pre-requisite for	MS4671	Introduction to Materials Simulation				
No of AUs	3					
Contact Hours	LECTURES	0	LAMS/TEL (Online Videos and Resources)	13	EXAMPLE CLASSES (Hands-on Sessions and Seminars)	26
Course Aims						
<p>In today's era of Information, 'Data' is the new driving force, provided we know how to extract relevant 'Intelligence'. This course will start with the core principles of Data Science, and will equip you with the basic tool and techniques of data handling, exploratory data analysis, data visualization, data-based inference, and data-focussed communication. The course will also introduce you to the fundamentals of Artificial Intelligence – state space representation, uninformed search, and reinforcement learning.</p> <p>The course will motivate you to work closely with data and make data-driven decisions in your field of study. The course will also touch upon ethical issues in Data Science and Artificial Intelligence, and motivate you to explore the cutting-edge applications in Materials Science related to Big Data, Neural Networks and Deep Learning. Python will be the language of choice to introduce hands-on computational techniques.</p>						
Intended Learning Outcomes (ILO)						
<p>By the end of this course, you (as a student) would be expected to be able to:</p> <ol style="list-style-type: none"> 1. identify and define data-oriented problems and data-driven decisions in real life, 2. discuss and illustrate the problems in terms of data exploration and visualization, 3. apply basic machine learning tools to extract inferential information from the data, 4. compose an engaging "data-story" to communicate the problem and the inference, 5. outline the roles and requirements of artificial intelligence in practical applications, 6. discuss and explain fundamentals of state space search and reinforcement learning. 						
Reading and References						

There is no single textbook for the course. The following books and resources will be used as references and if necessary, notes will be provided.

1. Python Data Science Handbook : Jake VanderPlas : O'Reilly (1st edition)
2. An Introduction to Statistical Learning: James, Witten, Hastie, Tibshirani
3. Artificial Intelligence: A Modern Approach : Russell and Norvig (3rd edition)

Additional resources, if required, will be shared with you in the LAMS/TEL videos and Example Classes.

Course Policies and Student Responsibilities

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The University also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of mental health and wellbeing. These policies and codes concerning students can be found in the following link: <http://www.ntu.edu.sg/SAO/Pages/Policies-concerning-students.aspx>

Academic Integrity

Good academic work depends on honesty and ethical behavior. Quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honor Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student of NTU, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at the University. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, and collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.