

# High Level Design Document

## AI Course

### Course Overview

Topic	Machine Learning Module (Introduction to AI)
Course Schedule	<ul style="list-style-type: none"> <li>▪ Self-paced blended learning course: 5 weeks (total approximately 30 hours)               <ul style="list-style-type: none"> <li>- Self-paced: Weekly Module Presentation &amp; Exercises: 5 weeks (4 hours/week, total 20 hours)</li> <li>- Live weekly online session with Expert: up to 2 hours/session (10 hours)</li> </ul> </li> </ul>
Learning Environment	<ul style="list-style-type: none"> <li>▪ Flexible online learning, self-paced by student</li> <li>▪ Requirements PC:               <ul style="list-style-type: none"> <li>- Recent PC/mac machine</li> <li>- Stable internet connection</li> </ul> </li> </ul>
Learning Objectives	<ul style="list-style-type: none"> <li>▪ Understand the statistical and mathematical foundation of Machine Learning.</li> <li>▪ Understand the basics of python and the libraries used for Machine Learning algorithms.</li> <li>▪ Apply Machine learning algorithms to real data sets using Python.</li> <li>▪ Build Machine learning projects based on the above learning and following the Data Science life cycle.</li> </ul>
Course Prerequisites	<ul style="list-style-type: none"> <li>- Basics of Linear algebra</li> <li>- Basics of the probability theory</li> <li>- Basic calculus</li> <li>- Basic knowledge in programming (such as Python, C++ or Java)</li> </ul>
Audience & Characteristics	<ul style="list-style-type: none"> <li>▪ Target               <ul style="list-style-type: none"> <li>- Youth (age 18~35), interested in pursuing a career in innovation, technology, business analysis/intelligence, product development, cyber security, or similar. This course is also excellent for those considering learning more about AI and not sure where to begin. As an introductory course it will provide the foundational understanding to build on.</li> </ul> </li> <li>▪ Characteristics               <ul style="list-style-type: none"> <li>- Educational background: successfully completed high school level STEM courses or higher education</li> <li>- Level for understanding: possess basic knowledge in programming and statistics</li> <li>- Expectations: expects to obtain necessary knowledge and skills for machine learning as a foundational module for AI</li> </ul> </li> </ul>

### Course Information

- 1- Introduction to Artificial Intelligence through Machine Learning
- 2- Suitable for beginners and non coding experts
- 3- Interaction with an expert instructor to help you achieve high understanding through blended learning, not just static content.
- 4- This is a free course, available to excited learners. Materials and access to learning platform is without cost.

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## Assessment

Criteria	Weight
<b>Quiz</b> <ul style="list-style-type: none"><li>- Quiz at the beginning of the course (just to test starting knowledge, no weight against it)</li><li>- Quiz at the end of the course</li></ul>	50 %
<b>Weekly Practice Exercises</b> <ul style="list-style-type: none"><li>- Weekly exercises relating to the topics covered (10%/exercises)</li></ul>	40%
<b>Participation</b> <ul style="list-style-type: none"><li>- Participation of online sessions is mandatory</li></ul>	10%
<b>Total</b>	<b>100%</b>

## Certification

Qualification	Cut-off Rate
1. Attendance higher than	90 %
2. Total grade for assessment higher than	50 %
<input type="checkbox"/> Certified when both qualifications are met	-

## Course Details

Module	Details	Duration
1	<b>Module 1. Introduction to AI and Machine learning</b>	<b>6H</b>
	<i>Objective: Get introduced to AI, ML and Python</i>	<b>(Total)</b>
	Unit 1. Introduction to AI and its use	1h
	Unit 2. Introduction to Machine learning	1h
	Unit 3. Introduction to Python and Jupyter Setup	1h
	Practice Exercises	1h
	Live Session	2h
2	<b>Module 2. Python libraries for machine learning</b>	<b>6H</b>
	<i>Objective: Learn about the Python libraries used for Machine learning algorithms and visualization</i>	<b>(Total)</b>
	Unit 1. The NumPy Package	1h
	Unit 2. The Pandas Package	1h
	Unit 3. Visualization with Matplotlib and Seaborn	1h
	Practice Exercises	1h
	Live Session	2h
3	<b>Module 3. Statistics and Probabilities</b>	<b>6H</b>
	<i>Objective: a quick revision for the mathematical fundamentals used in machine learning especially Statistics</i>	<b>(Total)</b>
	Unit 1. Discrete probability distributions	1h
	Unit 2. Continuous probability distributions	1h
	Unit 3. Descriptive statistics and Central limit theorem	1h
	Practice Exercises	1h
	Live session	2h
4	<b>Module 4. Machine learning algorithms (Part 1)</b>	<b>6H</b>
	<i>Objective: Get introduced to the Machine learning lifecycle and Be capable of conducting data analysis by using Cluster Analysis and Linear Regression</i>	<b>(Total)</b>
	Unit 1. Data Preprocessing with Scikit-learn	1h
	Unit 2. Unsupervised Learning	1h
	Unit 3. Linear Regression	1h
	Practice Exercises	1h
	Live Session	2h
5	<b>Module 5. Machine learning algorithms (Part 2)</b>	<b>6H</b>
	<i>Objective: Become familiar with common classification algorithms</i>	<b>(Total)</b>
	Unit 1. Logistic regression and its performance metrics	1h
	Unit 2. Naïve Bayes classification	1h
	Unit 3. K-nearest neighbor and support vector machines	1h
	Unit 4. Advanced topics in Machine Learning	1h
	Practice Exercises	1h
Live session	2h	