



VIETNAM NATIONAL UNIVERSITY OF HO CHI MINH CITY  
UNIVERSITY OF NATURAL SCIENCES  
FACULTY OF INFORMATION TECHNOLOGY

**COURSE SYLLABUS**

<b>Course Code:</b>	TH132
<b>Title:</b>	Introduction to Machine Learning
<b>Credits:</b>	3
<b>Workload:</b>	Lecture hours: 2 periods * 15 weeks = 30 periods Laboratory hours: 2 periods * 15 weeks = 30 periods Preparative hours: 2 periods * 15 weeks = 30 periods
<b>Prerequisites:</b>	TH112 – Artificial Intelligence

**Course Objectives:**

Machine learning is one of the key branches of computer science and especially of artificial intelligence. This course will provide students with the basic knowledge and techniques to build a machine learning system.

**Main Text:** N/A

**References:**

- *Artificial Intelligence* (in Vietnamese)  
Do Trung Tuan, The Education Publisher, 1998.
- *Introduction to machine learning*  
Y.Kodratoff, Pitman, 1988.

**Course Outline:**

Chapter 1: Overview about machine learning

1. Introduction
2. Targets of machine learning
3. Human learning and machine learning
4. What is learning?
5. History of machine learning

Chapter 2: Fundamental concepts

1. Knowledge representation
  1. Representation methods
  2. Horn-form clauses
  3. Unification
  4. Resolution and inference
  5. Knuth-Bendix algorithm

2. Complex knowledge representation by clauses

### Chapter 3: Learning in performing process

1. Problem definition
2. Search space
3. Accepting and applying rules
4. Learning by trial-and-error
5. Formal representation of search space
  1. Some definition about generalization
  2. Search space

### Chapter 4: Learning by explanation

1. Learn about why human take action
  1. Algorithm
  2. Concretize abstract things
  3. Solving by cascade explanation
  4. General principles
2. Learn about type and function
  1. Interaction of example and axiom
  2. Realizing learning approach based on attribute cost
3. Matching
  1. Matching principle
  2. Using variable in matching
4. Conclusion

### Chapter 5: Learning by similarity

1. Natural approach
  1. Definition
  2. Recognizing function
  3. Criteria of a good recognizing function
  4. Interaction Algorithm
  5. Creating recognizing function
  6. Generalizing recognizing function
  7. Application
2. Rational approach
  1. Knowledge representation
  2. Generalization algorithm
  3. Using counter example

## Chapter 6 : Clustering technique

1. Measure the rate of information connecting with each specification
2. Applications of data analysis
3. Concept Clustering

## Chapter 7: Learning by neural network training

1. Perception networks
  1. Definition
  2. Model
  3. Learning
2. Multi-layered networks
  1. Structure
  2. Model
  3. Transmitting function
  4. Backward transmitting
3. Associate Memory
  1. Structure
  2. Learn with Hebb rule
  3. Applications

## Chapter 8 : Evolution simulation

1. Basic concepts
2. Optimization problems and genetic algorithms
3. Genetic Algorithm and the problem of choosing parameters
4. GA regression

### **Grading**

Final exam: 60%

Assignments: 40%