

# Syllabus

Course Title: Artificial Intelligence
---------------------------------------

Course Code: 08-02
--------------------

Product Code:
---------------

<b>First Creation</b> (Date - Version No.) : 090502-01
--------------------------------------------------------

* Sample: 070606-01
---------------------

<b>Revision History</b> (Date - Version No.)
----------------------------------------------

1	09-May-02: 090502-01	16	
2	09-May-19: 090519-01	17	
3	09-June-14: 090519-01	18	
4	09-June-19: 090619-01	19	
5	09-June-19: 090619-02	20	
6	25-June-09: 090625-01	21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

<b>Final Version</b> (Date - Version No.) :
---------------------------------------------

Official Approval	Date of Report to PIU

Course Title <Japan-side>	Semester	Day of the week, Period	Credit	Instructor
Artificial Intelligence	8		2	Le Thanh Huong

### Course Description

Artificial intelligence (AI) is a research field that studies how to realize the intelligent problem solving on a computer. AI leans many of its basic ideas from human, but its realization is primarily based on engineering concerns. Although AI has a more than 50 years history, it cannot reach to the final goal, there are many fruitful findings and inventions. The main research topics in AI include planning, reasoning, learning, natural language understanding and generation, computer vision, automatic programming, and so on. This course describes the fundamental knowledge of AI technologies on some of the topics described above.

### Focus and Goal

Focuses:

1. Description of the total image of Artificial Intelligence.
2. Basic concepts of AI.
3. Major techniques of AI.

Goals:

The students must understand the total image and the basic concepts of AI.  
The students must learn major techniques of AI, especially on planning and reasoning.

### Courses which students are recommended to enroll in, but not required to

The students must attend [Data structures and Algorithms] class because AI is based on knowledge representation and problem solving algorithms.

### Schedule <Japan-side>

1st	Theme: Introduction
	Keywords: Foundations of AI, short history of AI, philosophical discussions
2nd	Theme: Agents
	Keywords: Agents and environments, reflex agents, model-based agents, goal-based agents, utility-based agents , learning agents, knowledge-based agents, multi-agent planning
3rd	Theme: Problem solving by searching (1) – Basics of searching
	Keywords: Formulating problems, search tree, breadth-first search, depth-first search, depth-limited search, iterative deepening depth-first search
4th	Theme: Problem solving by searching (2) – A* search
	Keywords: bidirectional search, avoiding repeated states, best-first search, A* search

5th	Theme: Problem solving by searching (3) – Advanced search methods
	Keywords: memory-bounded heuristic search, hill-climbing search, simulated annealing search, genetic algorithms
6th	Theme: Problem solving by searching (4) – alpha-beta pruning
	Keywords: local beam search , game and search, alpha-beta pruning
7th	Theme: Constraint Satisfaction Problems
	Keywords: Constraint, constraint graph, backtracking search, constraint propagation, local search, structure of problems
8th	Theme: Midterm test
	Keywords: Examination for first half lectures and its solution
9th	Theme: Logics and knowledge-based inference (1) – Propositional logic
	Keywords: Logic, propositional logic, forward chaining, backward chaining, resolution
10th	Theme: Logics and knowledge-based inference (2) – First-order logic (1)
	Keywords: First-order logic, syntax and semantics, unification
11th	Theme: Logics and knowledge-based inference (2) – First-order logic (2)
	Keywords: Forward chaining, backward chaining, resolution
12th	Theme: Planning
	Keywords: Planning problem, state-space search, partial-order planning, planning graphs, planning with propositional logic

13th	Theme: Learning (1) - Supervised learning
	Keywords: Inductive learning, decision tree learning
14th	Theme: Learning (2) - Reinforcement learning
	Keywords: Temporal difference learning, Q learning
15th	Theme: Learning (3) - Neural networks
	Keywords: Neuron, units/links/weight/activation, hidden units, perceptrons, multilayer neural networks, kernel machines
Note	

#### Out of class assignment

Homework will be assigned.

#### Grading Criteria and Method of Evaluation

Kind	Percentage	Evaluation Criteria
Examination	70%	Achievement Test
Report	%	
Continuous Assessment	30%	Short tests or quizzes every week (including midterm test)
Others	%	
Note		

#### Educational advice for enrolled students

The students are strongly recommended to build their own images of what is intelligence as algorithms through the observation of daily human cognitions and behaviors.

#### Textbooks

Title	Author	Publisher	ISBN code	Comment
Note				
A hand-out will be provided in every lecture.				

#### Reference books

Title	Author	Publisher	ISBN code	Comment
Artificial Intelligence – A Modern Approach (2 <sup>nd</sup> Ed.)	Stuart Russell and Peter Norvig	Prentice Hall	0-13-080302-2	

Note:				

#### Internet Websites related to the Course

<http://ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6-034Spring-2005/CourseHome/index.htm>  
<http://www.doc.ic.ac.uk/~sgc/teaching/v231/>  
<http://www.cs.uiowa.edu/~tinelli/classes/145/>

#### Contact

Le Thanh Huong@[soict.hust.edu.vn](mailto:soict.hust.edu.vn)

#### Others