

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

1. Thông tin về học phần (General Information)

Tên học phần (Course name): Introduction to Artificial Intelligence

Mã học phần (Course code): INT1341

Số tín chỉ (Number of credits): 3

Loại học phần (Course type): Compulsory

Học phần tiên quyết (Prerequisites):

- Introduction to Computing and Programming

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, black board
- Laboratory:

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lý thuyết (Lectures): 32h
- Bài tập (Exercises): 8h
- Bài tập lớn (Projects): 4h
- Thực hành (Labs): 0h
- Tự học (Individual reading): 1h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.
- Phone number: (024) 33510432

2. Mục tiêu học phần (Objectives)

Về kiến thức (Knowledge):

The goal of this course is to provide an introduction to artificial intelligence with focus on areas that have practical applications. Emphasis will be placed on learning principles, techniques and applications of artificial intelligence, not on mastering specific programming languages or software tools. The students will:

- Gain a historical perspective of AI and its objectives and functions.
- Become familiar with basic principles of AI toward problem solving, knowledge representation, probabilistic inference, and machine learning.

Kỹ năng (Skills):

Upon successful completion of this source, the students will be able to:

- Demonstrate the understanding of AI fundamentals and objectives.
- Understand and implement algorithm for search and problem solving.
- Understand basic knowledge representation and inference methods and how they can be used in AI applications.

- Understand and implement basic machine learning algorithms and apply them in solutions for machine learning applications.

Thái độ, Chuyên cần (Attitude):

Students are required to attend the classes and complete exercises and assignments.

3. Tóm tắt nội dung học phần (Description)

This course introduces students to the basic knowledge representation, search and problem solving, and learning methods of artificial intelligence. The search and problem-solving methods are applicable throughout a large range of industrial, civil, medical, financial, robotic, and information systems. Students will study questions about AI systems such as: how to represent knowledge, how to effectively generate appropriate sequences of actions and how to search among alternatives to find optimal or near-optimal solutions. Students will also explore how to deal with uncertainty in the world and how to learn from data and experience.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1. Introduction

- 1.1. Artificial intelligence definition and concepts
- 1.2. History of AI
- 1.3. Main research and application areas
- 1.4. Achievements and unsolved problems

Chapter 2. Search and problem solving

- 2.1. Solving problems by searching
- 2.2. Problem formulation
- 2.3. Uninformed search
- 2.4. Informed search
- 2.5. Local search
- 2.6. Project and exercises

Chapter 3. Knowledge representation and reasoning

- 3.1. Knowledge based systems
- 3.2. Propositional logic
- 3.3. First-order logic
- 3.4. Inference using FOL
- 3.5. Resolution refutation
- 3.6. Logic reasoning systems
- 3.7. Exercises

Chapter 4. Probabilistic reasoning

- 4.1. Knowledge representation and reasoning under uncertainty
- 4.2. Bayes rule and basics of probability
- 4.3. Bayesian networks
- 4.4. Inference with Bayesian networks
- 4.5. Project and exercises

Chapter 5. Machine learning

- 5.1. Definition and concepts of machine learning
- 5.2. Decision tree learning
- 5.3. Naive Bayes classification
- 5.4. K-nearest neighbor
- 5.5. Other machine learning algorithms

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

[1]. Stuart Russell and Peter Norvig. 2009. *Artificial Intelligence: A Modern Approach* (3rd ed.). Prentice Hall Press, Upper Saddle River, NJ, USA.

5.2. Học liệu tham khảo (Optional Textbooks)

[2]. Thomas M. Mitchell. 1997. *Machine Learning* (1 ed.). McGraw-Hill, Inc., New York, NY, USA.

[3]. A. Ng. *Lecture notes for Machine learning*. <http://cs229.stanford.edu/materials.html>

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần (Grading Policy)

Grading method	Percentage	Group/Individual
- Attendance	10%	Individual
- Exercises	10%	Individual
- Mid-term projects/exam	10%	Group or individual
- Final examination	70%	Individual

Trưởng Bộ môn
(Head of Department)

Giảng viên biên soạn
(Lecturer)

Ngô Xuân Bách

Từ Minh Phương