ACM Data Science Task Force Course Example

Artificial Intelligence
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Knowledge Areas that contain competencies (knowledge, skills, and dispositions) covered in the course

Knowledge Area	Total Number of Contact Hours
Artificial Intelligence	40
Machine Learning	8

Where does the course fit in your undergraduate Data Science curriculum?

Artificial intelligence is one of the backbone courses set up by famous universities at home and abroad, and it is also one of the main research directions of famous universities and research institutions at home and abroad. This course is a professional core course, and most students who take this course are engineering subjects. Learners of this course need to have certain computer knowledge such as data structures and algorithms, mathematical knowledge such as linear algebra, probability theory, and basic knowledge of machine learning.

What is covered in the course?

In this course, we give the basic theory and basic method of artificial intelligence. It contains knowledge representation, machine reasoning techniques, logic refutation principle, searching algorithm of graphs, production system and expert system, machine learning and application of artificial intelligence.

What is the format of the course?

The total hours of this course is 48 hours, including 36 hours of classroom teaching and 12 hours of experiments. This course aims to master the basic concepts and research methods of artificial intelligence and its future development trends, and lay the foundation for future in-depth research in this field.

Based on a systematic review of the development process of artificial intelligence, this course focuses on introducing the core ideas, basic theories, basic methods and some applications of artificial intelligence. Students are required to learn different representation methods of knowledge, understand the advantages and disadvantages of various representation methods, and can choose appropriate methods to express the problem when facing specific problems. The course uses programming language as a tool for algorithm description, and part of the theoretical foundation is reflected in "Mathematical Logic". This course requires learning different reasoning methods based on the classical predicate logic of mathematical logic, and being able to use the principle of resolution It comes down to reasoning. The course ultimately requires students to use different search strategies (such as blind search and heuristic search) to solve problems on the basis of learning inference strategies, and to master the advantages and disadvantages of different search methods.

How are students assessed?

This course is divided into three parts: face-to-face instruction, classwork, and experiment. Total score (100 points) = classwork (20%) + experiment (30%) + final exam (50%).

Course tools and materials

[1] Wang Wansen. "Principles and Applications of Artificial Intelligence", Electronic Industry Press, 2000.

[2] Stuart Russell, Peter Norvig. "Artificial Intelligence: A Modern Approach (3rd Edition)". Prentice Hall, Dec. 11, 2009.

[3] Shiyou Lian, "Introduction to Artificial Intelligence Technology", Xidian University Press, 2007

[4] Other materials teacher will provide in the classroom.

Why do you teach the course this way?

This course is mainly in the form of classroom face-to-face, interspersed with small class discussions, and experiments. Classroom face-to-face teaching is mainly taught by teachers, as the most common form of teaching, can be more comprehensive and systematic transfer of the main knowledge points to everyone. Doing experiments can enhance the practical ability to operate, put the knowledge learned into use, not only on paper, general talk, the understanding of knowledge points more in place, more thorough.

Body of Knowledge coverage

KA	Sub-domain	Competencies Covered	Hours
AI	General, Knowledge representation and reasoning – logic based, Knowledge representation and reasoning – probability based, Planning and search strategies	1. Artificial intelligence overview 2. Knowledge representation 3. Deterministic reasoning 4. Search strategy 5. Uncertainty Reasoning	40
ML	General	1. Perspectives about Machine Leaning 2. Tasks in Machine Learning 3. Paradigms in Machine Learning 4. Models in Machine Learning	8