

Academic Org: Dept of Computer Sci & Engg – Subject: Computer Science

**Course:** CSCI3230      **Course ID:** 002594      **Eff Date:** 2022-07-01      **Crse Status:** Active      **Apprv. Status:** Approved      **【Course Rev】**  
Fundamentals of Artificial Intelligence 人工智能之基本原理

This course introduces the basic concepts and techniques of artificial intelligence. Knowledge representation: predicate logic and inference, semantic networks, scripts and frames, and object-oriented representation. Searching: such as A\*, hill-climbing, minimax and alpha-beta pruning. Planning: the frame problem and the STRIPS formalism, representation schemes and planning strategies. Neural networks: learning algorithms, neural architecture and applications. Natural language processing. Knowledge acquisition and expert systems: properties, techniques and tools of expert systems

本科介紹人工智能之基本概念及技術。知識表示法：謂詞邏輯及推論、語義網絡、目標面向的表示法。檢索：例如A\*、攀山、極大極小及 $\alpha - \beta$ 刪節。計劃：結構問題及STRIPS形式方法、表示方案及計劃策略。神經網絡：學習算法、神經體系結構及應用、自然語言處理。知識收集及專家系統：特性、技術及專家系統工具。

**Grade Descriptor:**

A

EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

有關等級說明的資料，請參閱英文版本。

B

GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

有關等級說明的資料，請參閱英文版本。

C

FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

D

MARGINAL – performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

F

FAILURE – performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

有關等級說明的資料，請參閱英文版本。

**Equivalent Offering:**

**Units:** 3 (Min) / 3 (Max) / 3 (Acad Progress)

**Grading Basis:** Graded

**Repeat for Credit:** N

**Multiple Enroll:** N

**Course Attributes:**

**Topics:**

**COURSE OUTCOMES**

**Learning Outcomes:**

Students will be able to:

1. Use agents to model AI problems;
2. Use search techniques such as A\* to search for optimal solutions for AI problems and to play games;
3. Use various logic to represent knowledge and to do reasoning and build expert systems;
4. Use computer learning techniques to acquire real life knowledge in an appropriate representation model (e.g. decision tree and neural networks);
5. Derive learning rules from first principle;
6. Solve real life problems (e.g.classifications and prediction) by such models;
7. Estimate complexity of AI algorithms and prove theorems by contradiction and other techniques;
8. Use computer vision techniques such edge detection to extract features.

**Course Syllabus:**

This course introduces the basic concepts and techniques of artificial intelligence. Knowledge representation: predicate logic and inference, semantic

networks, scripts and frames, and object-oriented representation. Searching: such as A\*, hill-climbing, minimax and alpha-beta pruning. Planning: the frame problem and the STRIPS formalism, representation schemes and planning strategies. Neural networks: learning algorithms, neural architecture and applications. Natural language processing. Knowledge acquisition and expert systems: properties, techniques and tools of expert systems.

**Assessment Type:**  
Essay test or exam : 55%  
Others : 45%

**Feedback for Evaluation:**

1. Results of assignments and examination;
2. Course evaluation and questionnaire;
3. Reflection of teachers;
4. Question-and-answer sessions during class;
5. Student consultation during office hours or online

**Required Readings:**

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**Recommended Readings:**

1. "Artificial Intelligence- A Modern Approach" Stuart Russell and Peter Norvig, Prentice Hall, 2003(2nd edition). (main)
2. "Artificial Intelligence" George F. Luger,(5th edition), AddisonWesley, 2005
3. "Artificial Intelligence" Patrick Henry Winston, AddisonWesley, 1992.
4. "Artificial Intelligence- A Guide to Intelligent Systems",(2nd Edition) Michael Negnevitsky, Addison Wesley, 2005

**OFFERINGS**

1. CSCI3230 Acad Organization=CSD; Acad Career=UG

**COMPONENTS**

LEC : Size=30; Final Exam=Y; Contact=3  
TUT : Size=30; Final Exam=N; Contact=1

**ENROLMENT REQUIREMENTS**

1. CSCI3230 **Enrollment Requirement Group:**  
Not for students who have taken ESTR3108. Prerequisite: CSCI2100 or 2520 or ESTR2102 or equivalent.

**New Enrollment Requirement(s):**  
Pre-requisite = no change

**CAF**

eLearning hrs for blended cls 0  
No. of micro-modules 0  
Research components (UG) 0%

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