课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	**人工智能（H） Artificial Intelligence (H)**
2.	**授课院系 Originating Department**	计算机科学与工程系 Department of Computer Science and Engineering
3.	**课程编号 Course Code**	CS311
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业核心课 Major Core Courses
6.	**授课学期 Semester**	夏季 Summer
7.	**授课语言 Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	袁博，助理教授，计算机科学与工程系，yuanb@sustech.edu.cn Bo Yuan, Assistant Professor, Department of Computer Science and Engineering, yuanb@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	赵耀，教学实验师，计算机科学与工程系 ，zhaoy6@sustech.edu.cn Yao Zhao, Teaching Technician, Department of Computer Science and Engineering, zhaoy6@sustech.edu.cn
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
	学时数 Credit Hours	32		32		64

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	CS102A 计算机程序设计基础 A Introduction to Computer Programming A CS203 数据结构与算法分析 Data Structures and Algorithm Analysis MA212 概率论与数理统计 Probability and Statistics Comfortable programming in language such as C (or C++) Java or Python, some knowledge of algorithmic concepts such as running times of algorithms; having some rough idea of what NP-hard mean some familiarity with probability (we will go over this from the beginning but we will cover the basics only briefly) not scared of mathematics, some background in discrete mathematics, able to do simple mathematical proofs.
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14.	其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程将介绍人工智能比较重要的若干专题，包括搜索、博弈、约束满足、逻辑、机器学习和自然语言理解。学生在课程中需要完成两至三个编程项目，编程语言可以是 Java 或 Python 或其他，并确保自己的程序可以正确运行。本课程的目的是希望通过理论学习和实验，使得同学们可以掌握人工智能常用模型和算法，并熟练运用到实际问题中，也为后续学习更高级的课程和相关研究打下基础。

Artificial Intelligence (AI) is a big field, and this course is an introduction to AI for undergraduate students. We will try to explore the most important topics of the field, which encompasses search, game, constraint satisfaction problem (CSP), logic, machine learning, and natural language processing (NLP), and we will go into some depth. We will have 2 or 3 mini-projects in this course, and the programing language can be Java or Python. The students' programs will be partially automatically graded, so they must be written to run on the computers. The goal is to provide every student who takes the course a basic set of ideas and tools to employ on AI, and to be able to pursue advanced study and research in the field if desired.

16. 预达学习成果 Learning Outcomes

同学们可以掌握人工智能常用模型和算法，包括搜索、博弈、约束满足、逻辑、机器学习和自然语言理解；并熟练运用到实际问题中，也为后续学习更高级的课程和相关研究打下基础。

1. Students will demonstrate an understanding of the idea of AI and agent-based AI.
2. Students will demonstrate an understanding of basic and advanced search-based agent, game, and constraint satisfaction problem (CSP).
3. Students will demonstrate an understanding of basic logic-based agents, e.g., propositional logic, first order logic.
4. Students will demonstrate an understanding of the most widely-used machine learning algorithms, and basic NLP method.

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

理论课 （32 学时） LECTURE (32 Credit Hours):

Lec1 介绍 Introduction

Lec2 智能体 Intelligent agent

Lec3 无信息搜索 Uninformed Search

Lec4 有信息搜索 Informed Search

Lec5 局部搜索 Local Search

Lec6 对抗搜索（博弈） Adversarial Search (Game)

Lec7 约束满足问题 Constraint satisfaction problem

Lec8 命题逻辑 Propositional logic

Lec9 一阶逻辑 First order logic

Lec10 机器学习概念 Machine Learning Concepts

Lec11 线性回归和逻辑回归 Linear Regression & Logistic Regression

Lec12 感知器和神经网络 Perceptron & Neural Networks

Lec13 决策树和朴素贝叶斯 Decision tree & Naive Bayes

Lec14 集成学习和聚类 Ensemble learning & Clustering

Lec15 自然语言处理 Natural language processing

Lec16 总结 Summary and Review

实验课（32 学时） LAB (32 Credit Hours):

Lab1 Python 介绍 Introduction to Python I

Lab2 Python 介绍 Introduction to Python II

Lab3 无信息搜索及实现 Uninformed Search and Implementation

Lab4 有信息搜索其实现 Informed Search and Implementation

Lab5 局部搜索及实现 Local Search and Implementation

Lab6 对抗搜索（博弈）及实现 Adversarial Search (Game) and Implementation

Lab7 约束满足问题及其实现 Constraint satisfaction probem and Implementation

Lab8 命题逻辑及实现 Propositional logic and Implementation

Lab9 一阶逻辑及实现 First order logic and Implementation

Lab10 机器学习基础及实现 Machine Learning Concepts and Implementation

Lab11 线性回归和逻辑回归及实现 Linear Regression & Logistic Regression and Implementation

Lab12 感知器和神经网络及实现 Perceptron & Neural Networks and Implementation

Lab13 决策树和朴素贝叶斯及实现 Decision tree & Naive Bayes and Implementation

Lab14 集成学习和聚类及实现 Ensemble learning & Clustering and Implementation

Lab15 自然语言处理及实现 Natural language processing and Implementation

Lab16 总结 Summary and Review

18. 教材及其它参考资料 **Textbook and Supplementary Readings**

Textbook: Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach (Third edition), Cambridge University Press, 2009.

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance		10%		
小测验 Quiz				
课程项目 Projects		20%		
平时作业 Assignments		20%		
期中考试 Mid-Term Test				
期末考试 Final Exam		50%		
期末报告 Final Presentation				
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 **GRADING SYSTEM**

☑ A. 十三级等级制 **Letter Grading**
☐ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority