Shih Chien University

STP Program (July 01-Aug 02)

CSC 122 Introduction to Artificial Intelligence

Course Outline

Course Code: CSC 122

Instructor: Dr. Suman Saha

Home Institution: Pennsylvania State University

Office Hours: TBA

Email: szs339@psu.edu

Credits: 4

Class Hours:

This course will have 144 class hours, including 50 lecture hours, professor 30 office hours, 20-hour TA discussion sessions, 10-hour review sessions, 34-hour extra classes.

Prerequisites: N/A

Course Description:

The course commences with an overview of the capabilities of the latest artificial intelligence techniques. After introducing fundamental concepts and methods, the course showcases these techniques' potential and current limitations through examples from various applications. We dedicate time to understanding the strengths and weaknesses of human decision-making and learning, particularly when integrated with AI systems. We also explore the ethical and policy implications of emerging AI capabilities. Exercises will involve:

- Hands-on application of basic AI techniques.
- Selecting suitable technologies for specific problems.

- Considering design implications.

Required Course Materials:

Artificial Intelligence: A Modern Approach, Pearson, 2020, by Russell, S. & Norvig, P. (Fourth Edition)

Grading System (1 ~ 100):

Quality Points	Grade	Percentage %
4	A	80-100
3	B	70-79
2	C	60-69
1	D	50-59
0	E	0-49

Course Schedule:

Week1

- Session 1: Introductions, Proposing and evaluating AI applications
- Session 2: Importance of search for AI, Uniformed search and informed search
- Session 3: Adversarial search, and Local search
- Session 4: Uncertainty, Bayesian networks

(Quiz 1 and HW1)

Week2

- Session 1: Machine learning. Supervised and Unsupervised learning
- Session 2: Regression—linear, logistic, ridge

- Session 3: Classification – decision trees, SVM, random forests, Clustering – k-means, hierarchical clustering

- Session 4: Model Evaluation, Reinforcement learning

(Quiz 2 and HW2)

Week3

- Session 1: Neural networks and back-propagation

- Session 2: CNN and Recurrent neural networks

- Session 3: LSTMs and Transfer learning

- **Session 4: Midterm Exam**

Week4

- Session 1: Introduction to Computer vision, Image segmentation

- Session 2: Edge and motion detection, Object classification

- Session 3: Introduction to natural language understanding, Sentiment Analysis

- Session 4: Language models for natural language understanding =

(Quiz 3 and HW3)

Week5

- Session 1: Speech recognition and Speech synthesis

- Session 2: Natural language generation, language models for natural language interactions

- Session 3: Case studies: Google Duplex and ChatGPT
- **Session 4: Final Exam**