CSC 114 Artificial Intelligence I

COURSE DESCRIPTION:

Prerequisites: None
Corequisites: None

This course covers the study of intelligent agent design and rational decision making. Topics include goal-driven agents, search techniques, optimization, basic problem-solving methods, logic, knowledge-based agents, statistical and probabilistic reasoning, and the basics of machine learning. Upon completion, students should be able to demonstrate artificial intelligence design concepts.
Course Hours per Week: Class, 2. Lab, 3. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Explain intelligent agent design concepts, including rational decision-making and goal-driven behavior.
2. Apply basic search, optimization, and problem-solving techniques used in artificial intelligence.
3. Explain how logic, knowledge representation, probabilistic reasoning, and machine learning support artificial intelligence system design.

OUTLINE OF INSTRUCTION:

I. Introduction to Artificial Intelligence
   A. Foundations and applications of artificial intelligence
   B. Intelligent agents, environments, and rational behavior
   C. Goal-driven agents and decision-making
   D. Problem formulation and basic AI problem-solving

II. Ethical Impact of AI
   A. Responsible AI design and use
   B. Bias, fairness, privacy, and transparency
   C. Implications of automated decision-making

III. Introduction to Machine Learning
   A. Machine learning concepts and terminology
   B. Supervised, unsupervised, and reinforcement learning
   C. Training, testing, and evaluating models
   D. Machine learning applications in intelligent systems

IV. Programming for Machine Learning Applications
   A. Programming tools and workflows for AI
   B. Representing problems and implementing simple agents
   C. Developing and testing introductory AI applications

V. Understanding Math Fundamentals for Machine Learning Applications
   A. Foundations of statistics and probability
   B. Conditional probability and reasoning under uncertainty
   C. Mathematical concepts supporting optimization
   D. Interpreting quantitative results

VI. Reinforcement Learning
   A. Agents, actions, states, and rewards
   B. Policies and goal-directed decision-making
   C. Exploration, exploitation, and feedback
   D. Simple reinforcement learning applications

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the instructor.