# Course Information Sheet

## CSCI 4550

**Artificial Intelligence**

### Brief Course Description

(50-words or less)

An introduction to the fundamental concepts in computer science, including algorithms and logic, and the theoretical foundations in philosophy that define the field of artificial intelligence.

### Extended Course Description / Comments

This course is cross-listed with PHIL 4550 and is a 3-credit hour course.

### Pre-Requisites and/or Co-Requisites

CSCI 2610: Discrete Mathematics for Computer Science

Or PHIL 2500: Symbolic Logic

### Required, Elective or Selected Elective

Selected Elective Course

### Approved Textbooks

(if more than one listed, the textbook used is up to the instructor’s discretion)

Author(s): Stuart Russell and Peter Norvig

Title: *AI: A Modern Approach*

Edition: 3rd


### Specific Learning Outcomes

(Performance Indicators)

This course presents a survey of topics in artificial intelligence most relevant to students studying computer engineering. At the end of the semester, all students will be able to do the following:

1. Represent the environments of decision-making problems including their observability, determinism, continuousness, and other criteria
2. Identify and compare agent types, such as reflex, goal-based, and utility-based
3. Implement uninformed search strategies such as BFS, DFS, depth-limited search, and bidirectional search
4. Implement heuristics in informed search strategies, as well as identify the aspects of a good heuristic
5. Evaluate the effectiveness of local search algorithms, including hill-climbing, simulated annealing, and beam searches
6. Evaluate competitive game outcomes by using minimax algorithms, alpha-beta pruning, and evaluation functions
7. Utilize basic inferencing rules in propositional logic, such as resolution and forward/backward chaining
8. Express propositional statements using quantifiers and functions in First-Order logic
9. Implement Java or written algorithms that evaluate goal-oriented problems using propositional or first-order propositional logic
10. Represent knowledge using constructs such as Ontologies
Program Outcomes

(ABET Specific)

A. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

B. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.

C. Communicate effectively in a variety of professional contexts.

D. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

E. Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.

F. Apply computer science theory and software development fundamentals to produce computing-based solutions.

### Relationship Between Student Outcomes and Learning Outcomes

<table>
<thead>
<tr>
<th>Specific Learning Outcomes</th>
<th>ABET Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td>●</td>
</tr>
<tr>
<td>2</td>
<td>●</td>
</tr>
<tr>
<td>3</td>
<td>●</td>
</tr>
<tr>
<td>4</td>
<td>●</td>
</tr>
<tr>
<td>5</td>
<td>●</td>
</tr>
<tr>
<td>6</td>
<td>●</td>
</tr>
<tr>
<td>7</td>
<td>●</td>
</tr>
<tr>
<td>8</td>
<td>●</td>
</tr>
<tr>
<td>9</td>
<td>●</td>
</tr>
<tr>
<td>10</td>
<td>●</td>
</tr>
</tbody>
</table>

### Major Topics Covered

(Approximate Course Hours)

- Intelligent Agent Design (4-hours)
- Uninformed Search (3.5-hours)
- Informed Search (3.5-hours)
- Adversarial Search (3.5-hours)
- Propositional Logic Syntax (3-hours)
- Knowledge-Based Agents (1-hour)
- Inferencing Rules in Prop. Logic (2-hours)
- First-Order Propositional Logic Syntax (3-hours)
- Inferencing with Quantifiers (1-hour)
- Forward and Backward Chaining (2-hours)
- Knowledge Representation (5-hours)
- Classical Planning (1.5-hours)
- Exams (4.5-hours)

Note: Exams count as a major topic covered

### Course Master

Dr. Khaled Rasheed.

### Last modified

2/4/2022 by Dr. Khaled Rasheed.