1. **Course number and name**: CSCI 5430 Artificial Intelligence

2. **Credits and contact hours**: 3 credit, 3 contact

3. **Instructor's or course coordinator's name**: Ray Hashemi, PhD

4. **Textbook, title, author and year**: Artificial Intelligence: Structures and Strategies for Complex Problem Solving, by George Luger, Publisher, Addison Wesley
   a. **Other supplemental materials**: None

5. **Specific course information**
   a. **Brief description of the content of the course (Catalog Description)**
      Introduction to different paradigms for creating software that can reason, access a knowledge base, handle uncertainty, learn, communicate, perceive and act.
   b. **Prerequisites**: A minimum grade of “C” in CSCI 3230 and CSCI 5330
   c. **Indicate whether a required, elective, or selected elective course in the program**
      Elective course for BS-CS.

6. **Specific goals for the course**
   a. **Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**

<table>
<thead>
<tr>
<th>Course Learning Outcomes</th>
<th>Student Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>express the differences among schools of thought in AI (Artificial Intelligence)</td>
<td>1a, 2a</td>
</tr>
<tr>
<td>express structures and strategies for state space search and implement at least one such search</td>
<td>1a, 1b</td>
</tr>
<tr>
<td>describe knowledge acquisition methods, knowledge representation, and intelligent agents</td>
<td>1a, 1b, 2a</td>
</tr>
<tr>
<td>analyze, design, and implement a rule-based system</td>
<td>1b, 1c</td>
</tr>
<tr>
<td>explain the basics of robotics and how to program a robot</td>
<td>1a, 1b, 1c</td>
</tr>
<tr>
<td>use logic and theorem proving</td>
<td>1a</td>
</tr>
<tr>
<td>explain the principles of game trees, natural language processing, and soft computing and implement at least one such principle</td>
<td>1a, 1b, 1c, 1i</td>
</tr>
</tbody>
</table>
a. Student Outcomes:
   • 1a: An ability to apply knowledge of computing and mathematics appropriate to the discipline
   • 1b: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
   • 1c: An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
   • 1i: An ability to use current techniques, skills, and tools necessary for computing practice
   • 2a: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices

7. Brief list of topics to be covered
   • Introduction to artificial intelligence: its roots and scope
   • Structures and strategies for state space search
   • Knowledge Representation
   • Rule-based systems
   • Frame-based, Model-based, and case-based expert systems
   • Intelligent agents
   • Multiple-agents
   • Robotics
   • Logic and theorem proving
   • Introduction to machine learning