

COMP343 (AI) Course Competencies

1. (***Understanding and Evaluating Agent Programs***) Alone or as part of a team, be able to evaluate a given agent program and determine if or to what degree it satisfies a user's performance requirements.

<u>Knowledge Area</u>	<u>Skill Level</u>
1	Analyzing
2 - 5 (all)	Understanding
6a - Analytical and Critical Thinking	Applying
6b - Collaboration and Teamwork	Applying
6d - Mathematics and Statistics	Applying
6k - Research and Self-Starter/Learner	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Collaborative	Adaptable

2. **(Designing and Implementing Agent Programs)** Given a problem and a user's requirements, design and implement an appropriate agent program for the user. Be able to work alone or as part of a team.

<u>Knowledge Area</u>	<u>Skill Level</u>
1	Creating
2-5	Evaluating
6a - Analytical and Critical Thinking	Applying
6d - Mathematics and Statistics	Applying
6k - Research and Self-Starter/Learner	Applying
6g - Problem Solving and Troubleshooting	Evaluating
6i -Quality Assurance / Control	Applying
6c - Ethical and Intercultural Perspectives	Applying
6b - Collaboration and Teamwork	Applying
6d - Multi-Task Prioritization and Management	Applying
6h - Project and Task Organization and Planning	Applying
6l - Time Management	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Inventive	Adaptable
Professional	Responsible	Responsive	Collaborative

3. **(Presenting AI to a Technical Audience)** Given an agent program and its user requirements, present the program and its analysis to a technical audience.

<u>Knowledge Area</u>	<u>Skill Level</u>
1	Evaluating
2-5	Analyzing
6a - Analytical and Critical Thinking	Applying
6d - Mathematics and Statistics	Applying
6k - Written Communication	Applying
6f - Oral Communication and Presentation	Applying
6c - Ethical and Intercultural Perspectives	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Inventive	Adaptable
Self-directed	Proactive	Purpose-Driven	

4. **(Sharing AI Programs with a Non-Technical Audience)** Given an agent program program, be able to explain, to a non-technical user, how to use the program to address a given problem and potential limits of that program.

<u>Knowledge Area</u>	<u>Skill Level</u>
1 - 5 (all)	Understanding
9f - Oral Communication and Presentation	Applying
9j - Relationship Management	Applying
9m - Written Communication	Applying
9c - Ethical and Intercultural Perspectives	Applying

<u>Dispositions</u>			
Collaborative	Passionate	Responsible	Adaptable
Self-directed	Proactive	Responsive	Professional

AI Knowledge Areas

1. Agent Specification
 - a. PEAS descriptions and analysis
 - b. Agent Program Patterns
2. Goal-based Agents and Search
 - a. Uninformed Search (breadth, depth, Dijkstra)
 - b. Informed Search (Greedy, A*)
 - c. Heuristics
 - d. For Two-player zero-sum games (minimax, Alpha-Beta, Monte Carlo)
 - e. Constraint Satisfaction Problems (backtracking)
3. Probability Theory
4. Model-based Agents
 - a. Naive Bayes
 - b. Bayesian Networks
 - c. Markov Models
 - d. Kalman Filters
 - e. Dynamic Bayesian Networks
5. Utility-based Agents
 - a. Markov Decision Process
 - b. Bandit Problems
6. *Professional Knowledge (Table 4.2 from CC2020 (pg 50))*
 - a. Analytical and Critical Thinking
 - b. Collaboration and Teamwork
 - c. Ethical and Intercultural Perspectives
 - d. Mathematics and Statistics
 - e. Multi-Task Prioritization and Management
 - f. Oral Communication and Presentation
 - g. Problem Solving and Troubleshooting
 - h. Project and Task Organization and Planning
 - i. Quality Assurance / Control
 - j. Relationship Management
 - k. Research and Self-Starter/Learner
 - l. Time Management
 - m. Written Communication

AI Skills Hierarchy (Bloom's Taxonomy, CC2020 pg 50)

1. *Remembering* - Recall facts, terms, concepts, answers, etc.
2. *Understanding* - Be able to organize, compare, translate, interpret, and give descriptions of facts and ideas
3. *Applying* - Use knowledge, ideas, facts in different ways to solve problems in new situations.
4. *Analyzing* - Make inferences and find evidence to support solutions
5. *Evaluating* - Make judgements about information, validity of ideas, or quality of material

6. *Creating* - Combine elements of information in a new pattern or propose alternative solutions.

AI Dispositions (From CC2020, pg 51.)

1. Adaptable
2. Collaborative
3. Inventive
4. Meticulous
5. Passionate
6. Proactive
7. Professional
8. Purpose-Driven
9. Responsible
10. Responsive
11. Self-directed

AI Tasks

1. Design an appropriate AI for a problem given user requirements
2. Evaluate the correctness and appropriateness of a given AI against user requirements
3. Present an AI to a technical audience
4. Present an AI to a non-technical audience