



**NATIONAL UNIVERSITY**  
of Computer & Emerging Sciences, Lahore

# FAST School of Computing

## **AI2002 – Artificial Intelligence Spring 2024**

**Instructor Name:** Maham Naeem

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**Office Location:** Office # 62 Block F

**Office Hours:** Tuesday/Thursday 11:30 to 1:00 PM

### **Course Information**

**Program:** BS(CS)      **Credit Hours:** 3 and (1 for Lab)      **Type:** Core      **Pte-requisites:** Data Structures

**Class Venue:** NB-305

**Class Time:** BCS-6A Mon/Fri 11:30 – 1:00pm

### **Course Learning Outcomes (CLOs):**

The course learning outcomes of this course are:

1. Understand principles and techniques of artificial intelligence
2. Identify the problems and their solutions with respect to intelligent solutions
3. Model a solution for a given problem using artificial intelligence tools and techniques
4. Examine latest trends in AI and its applications
5. Able to propose and implement AI based state of the art solutions

### **Course Textbooks:**

1. Stuart Russell, Peter Norvig - Artificial Intelligence a Modern Approach - (3rd Edition)

### **Additional references and books related to the course:**

2. George F. Luger - Artificial Intelligence
3. Tom Mitchell Machine Learning

### **(Tentative) Grading Criteria:**

**Assignments (10%)      Quizzes (10%)      Project (10%)      Midterms (30%)      Final Exam (40%)**

- Grading scheme for this course is **Absolute** under application of CS department's grading policies.
- Minimum requirement to pass this course is to obtain at least **50%** absolute marks. **Course**

### **Policies:**

- Quizzes may be announced or surprised. No Late Submissions or Makeup Quizzes.
- Students bear all the responsibility for protecting their assignments. In case of cheating, both parties will be considered equally responsible.
- **Plagiarism** in any work (Labs, Quiz, Assignment, Midterms, and Final Exam) from any source, Internet or a Student will result in **F** grade or deduction of absolute marks.

- 80% attendance is required for appearing in the Final exams.

## Tentative Weekly Schedule

Topic	Details	Week
<b>Introduction</b>	<ul style="list-style-type: none"> <li>– Introduction and Applications</li> <li>– Knowledge and Reasoning</li> <li>– Blocks world and Predicate Calculus</li> <li>– Introduction to Agent and Agent Architectures – PEAS</li> </ul>	<b>1</b>
<b>Strategies for State Space Search</b>	<b>Blind/Uninformed/Brute-force Search</b> <ul style="list-style-type: none"> <li>– Depth First Search (DFS)</li> <li>– Breadth First Search (BFS)</li> <li>– Iterative Deepening Search (IDS)</li> <li>– Uniform Cost Search (UCS)</li> </ul> Direction of Search, Branching Factor	<b>2</b>
	<b>Heuristic/Informed Search</b> <ul style="list-style-type: none"> <li>– Hill Climbing Search</li> <li>– Best First Search</li> <li>– Algorithm A</li> <li>– A* Search</li> </ul> Informedness, Monotonicity, Admissibility, Optimality, Completeness,	<b>3</b>
	<b>Adversarial Search Algorithms (Game Playing)</b> <ul style="list-style-type: none"> <li>– Minimax Search</li> <li>– Alpha-Beta Pruning</li> <li>– Evaluation Functions</li> <li>– Move generators and evaluators</li> </ul> Problem Solving by Searching	<b>4</b>
	<b>Evolutionary Search:</b> <ul style="list-style-type: none"> <li>– Genetic Algorithm</li> <li>– Genetic Programming</li> <li>– Automatic/Evolutionary Programming</li> </ul>	<b>5</b>
<b>Introduction to Machine Learning, Data Mining, &amp; Data Science</b>	<b>Classification (ANN)</b> <ul style="list-style-type: none"> <li>– Architecture: Feed-Forward Neural Network and Recurrent Network</li> <li>– Activation Functions</li> <li>– Types of Problems for Neural Networks</li> <li>– Training Algorithms</li> <li>– Perceptron Learning Rule</li> <li>– Hebb Learning Rule</li> <li>– Back Propagation Algorithm (Gradient Descent Learning)</li> <li>– Issues of ANN</li> <li>– Recurrent Networks (Elman and Jordan)</li> </ul>	<b>6-7</b>
	<b>Clustering</b> <ul style="list-style-type: none"> <li>– k-means and k-medoids algorithm</li> <li>– Cobweb</li> </ul>	<b>8-9</b>
	<b>Regression</b> <ul style="list-style-type: none"> <li>– Simple and Multiple Linear Regression</li> <li>– Attribute/Feature Selection</li> </ul>	<b>10-11</b>

	– WEKA - Assignment	
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