Ghulam Ishaq Khan Institute of Engineering Sciences and Technology

Department of Computer Science & Engineering

Semester Project – Advanced Artificial Intelligence

Course Instructor: Dr. Ayaz Umar

Lab Instructor: Ms. Memoona Saleem

Project Submission Deadline: Friday, Week 14 of the Semester

Total Marks: 100

Semester Project Guidelines: [CLO3—GA4—C3]

1. Purpose of the Project

The purpose of this project is to enable students to apply advanced artificial intelligence techniques to real-world problems by designing, implementing, and evaluating an AI-based solution of their own choice. Through this project, students will gain hands-on experience with data handling, model development, experimentation, and critical analysis. It encourages creativity, independent research, and practical application of theoretical concepts learned in class, while also preparing students for industry-level AI problem solving and future research opportunities.

The goal of this semester's project is to allow students to apply AI concepts learned in class to solve real-world problems using modern techniques such as:

Recommended Algorithms for the Project

Students may apply any of the following algorithm categories:

1. Search algorithms
2. Constraint satisfaction problem techniques
3. Reinforcement learning
4. Regression methods
5. Support Vector Machines (SVM)
6. Artificial Neural Networks (ANN)
7. Convolutional Neural Networks (CNN)
8. Computer vision techniques

Note: Students may also choose other algorithms not listed above if:

1. They provide a clear justification for why the algorithm fits their problem.
2. They are prepared to explain and present the method in detail.

2. Project Selection Requirements

Students must ensure their selected project:

1. Uses an AI/ML technique meaningfully (not just simple if-else logic).
2. Involves a dataset (Publicly Renowned Datasets only).
3. Includes training, testing, and evaluation of a model.
4. Solves a non-trivial problem relevant to one domain (healthcare, finance, NLP, CV, robotics, security, games, etc.).
5. Can be completed within the semester timeframe.

3. Examples of Acceptable Project Categories

You may choose any one of the following categories or propose your own idea:

Domain	Topics / Applications
NLP	Text classification, Emotion detection, Chatbots, Summarization, Recommendation using text
Computer Vision	Image classification, Object detection, Pose estimation, medical imaging, Face/Gesture recognition
Machine Learning	Predictive modeling, Fraud detection, Forecasting models, Clustering/Segmentation

Deep Learning	CNNs, RNNs, Transformers (Image classification with CNNs, Text generation with Transformers)
Reinforcement Learning	Game playing agents, Path planning, Robotics simulation

4. What Your Proposal Must Include

Each student/team must submit a one-page proposal containing:

1. Project Title
2. Problem Statement
3. Motivation (Why this topic?)
4. Dataset Source
5. Proposed Methodology
6. Expected Outcomes
7. Tools & Libraries (Python, PyTorch, TensorFlow, etc.)

5. Deliverables (Final Submission)

Your final project must include:

Category	Items
Report	Introduction & problem definition, Literature review, Dataset description, proposed model, Experiments & results, Conclusion & future work.
Code Implementation	Clean and documented, GitHub repository preferred.
UI(User Interface)	Students must also create a working interface for their project, either a web-based interface or a desktop/mobile application**.** The interface should allow users to interact with the AI model in a simple and meaningful way**.**
Presentation / Demo	8–10 minutes, Show model performance.

6. Team Structure

1. Each project team must consist of a minimum of 2 and a maximum of 4 students.
2. All team members must contribute equally and be able to explain their part during the presentation.
3. Only one submission per team is required, but the names and roll numbers of all members must be clearly listed.

7. Approval Process

4. Submit your proposal by Week 11 **(25th November 2025 in AI Lab)**
5. Instructor will review, approve or suggest modifications.
6. After approval, work consistently each week.

The deadline for project submission is the Friday of Week 14 of the Semester.