Softwarica College of IT & E-Commerce

STW5000CEM Introduction to Artificial Intelligence

Assignment Brief 2024/2025

Module Title **Introduction to Artificial Intelligence**	**Ind/Group** Ind	**Cohort** March 2025 –Regular / Resit	**Module Code** STW5000CEM
Coursework Title Coursework Component			**Hand out date:** 15 June, 2025
Module Leader Er. Suman Shrestha			**Due date:** TBD
Estimated Time (hrs): 100 hours **Word Limit***: 4000	**Coursework type:** Report		**% of Module Mark** Coursework : 100%
Submission arrangement online via Schoolworkspro page: The coursework report must be submitted via the Schoolworkspro Page. All relevant project details for the course are accessible on Schoolworkspro. **Mark and Feedback date:** Mark and feedback will be provided within 3 weeks of final submission. **Mark and Feedback method:** All marks will be delivered on campus4.0. Written feedback will be provided.			

Module Learning Outcomes Assessed:

1. Comprehend the fundamental theoretical principles that are relevant to the Artificial Intelligence.
2. Design / Implement an AI model to solve some real-world problems.
3. Relevant performance metrics should be used to evaluate the performance of implemented AI model
4. Suitable Data visualization technique should be used
5. Work with version control systems

Coursework (100%))

Overview and Purpose

This individual coursework is designed to assess your understanding of the module's core concepts by having your design, implement, and evaluate an AI model to solve a real-world problem. You are required to apply algorithmic techniques discussed in class and demonstrate problem-solving, experimentation, and critical thinking.
You will create an AI-driven solution using one or more algorithms in the domains of:

- Classification
- Clustering
- Recommendation Systems
- Search Techniques
- Constraint Satisfaction Problems

Key Tasks and Deliverables

Each student must complete the following:

1. **Topic Selection & Problem Definition**
    a. Choose a topic aligned with one of the AI problem domains.
    b. Coordinate the topic with your Module Leader for approval.
    c. Clearly define the problem and justify its relevance and impact.
2. **Data Collection & Preprocessing**
    a. Identify and source a suitable dataset.
    b. Explain your data preprocessing steps: cleaning, normalization, feature selection, etc.
3. **Model Design**
    a. Choose an appropriate AI algorithm from the module.
    b. Provide justification for your algorithm selection.
    c. Design and implement the solution using **custom-defined data structures, functions, or classes** where appropriate.
4. **Training & Evaluation**
    a. Train the model and test it using standard practices.
    b. Evaluate performance using **relevant metrics** (accuracy, F1 score, precision, recall, RMSE, etc.).
    c. Include a **comparative analysis** if multiple models or approaches are tested.
5. **Interface Development**
    a. Develop a **CLI or GUI** to demonstrate your project.
    b. The interface should allow users to interact with the model in a meaningful way (e.g., predict, search, recommend).
6. **Version Control**
    a. You must use GitHub Classroom for source code management.
    b. Commit code frequently with meaningful messages.
7. **Report Writing**
    a. A final 4000-word report must include:
        i. Abstract and introduction
        ii. Literature review of related AI work
        iii. Problem description and methodology
        iv. Algorithm and implementation details
        v. Data collection and preprocessing
        vi. Experimental results and analysis
        vii. Conclusion and future improvements
        viii. Proper APA 7th referencing throughout
8. **Video Demonstration**
    a. A 10-minute video demonstrating:

i. Problem overview
ii. Code and interface walkthrough
iii. Model in action
iv. Brief explanation of results

9. **Viva Session**
    a. Each student will defend their work through a 15-20-minute individual viva.
    b. You may be asked to run your code, explain design decisions, and discuss evaluation results
    c. Questions will be based on the coursework and/or topics covered in class

Example Topics

- Nepali Stock Price Prediction using Regression
- Movie Recommendation System using Collaborative Filtering
- Spam Email Detection using Naive Bayes Classifier
- Customer Segmentation using K-Means Clustering
- Sentiment Analysis of Tweets using Naive Bayes Classifier
- Constraint Solver for Timetabling using Backtracking
- Credit Card Fraud Detection using Decision Trees

Marking Criteria	Weight
Problem Understanding and Justification	5%
Use of Appropriate AI Algorithm	10%
Data Collection and Preprocessing	5%
Model Design and Implementation	15%
Evaluation and Metrics	10%
Interface Functionality (CLI / GUI)	5%
Code Quality and Github usage	10%
Report Structure and Clarity	10%
Referencing and Academic integrity	5%
Viva Performance	25%

Note:

1. Students are strongly encouraged to utilize their own custom-defined data structures, function or class wherever possible instead of relying on the built-in data structures, functions or classes provided by the programming language.
2. You are expected to use the APA 7th style for referencing. For support and advice on this, students can contact the Centre for Academic Writing (CAW).
3. Please notify your registry course support team and module leader for disability support.

4. The University is not liable for any loss or corruption of coursework stored on disks, laptops, or personal computers. It is essential for students to frequently back up their work and are advised to save it in the University system.
5. If there are technical or performance issues that prevent students submitting coursework through the online coursework submission system on the day of a coursework deadline, an appropriate extension to the coursework submission deadline will be agreed. This extension will normally be 24 hours or the next working day if the deadline falls on a Friday or over the weekend period. This will be communicated via your Module Leader.
6. Collusion between students (where sections of your work are like the work submitted by other students in this or previous module cohorts) is taken extremely seriously and will be reported to the academic conduct panel. This applies to both coursework and exam answers.
7. If there is a significant contrast in the writing style, knowledge, and skill level exhibited between your class discussions, test conditions, and a coursework assignment, it may be necessary for you to participate in an in-person examination. The purpose of this examination would be to confirm that the coursework assignment has been solely completed by you.
8. If you make use of the services of a proof-reader in your work, you must keep your original version and make it available as a demonstration of your written efforts.
9. It is strictly prohibited to submit work for assessment that has already been submitted, either partially or in its entirety, for your current course or any other qualification offered by the college. However, in the case of resits, you may be asked to revise and enhance a previous attempt for the coursework. The specific guidelines regarding this requirement will be outlined in your assignment brief or provided within the course or module information. If you are referencing earlier work that has been previously published or submitted, it must be cited clearly. Submitting identical pieces of work concurrently can also be considered as self-plagiarism.

Learning Outcomes matrix:

Question No.	**Learning Outcomes Assessed**
Coursework	**1,2, 3, 4,5**

	40% >=above	50% >= above	60%>=above	70% >= above
Problem Understanding and Dataset Handling (15%)	Weak problem definition with little justification. Uses an inappropriate or poorly prepared dataset, with significant preprocessing issues.	Basic problem definition with limited justification. Uses a dataset but preprocessing is minimal or has noticeable flaws.	Defines the problem well with good justification. Uses a relevant dataset with proper preprocessing but minor issues	Clearly defines the problem with strong justification. Uses a high-quality dataset, applies advanced preprocessing techniques, and handles missing/noisy data effectively.
Model Selection and Implementation(20%)	Model selection is weak or inappropriate. Implementation is functional but poorly structured, inefficient, or missing key elements.	Model selection is acceptable but lacks proper justification. Implementation works but has inefficiencies or lacks clarity.	Selects a suitable model with good justification. Code is mostly efficient with minor issues. Some parameter tuning is attempted.	Selects the best-suited model with strong justification. Implements efficiently with clean, well-documented code. Considers hyperparameter tuning.
Performance Evaluation & Optimization(20%)	Uses incorrect or minimal evaluation metrics. No meaningful optimization attempted.	Uses basic evaluation metrics but lacks deeper analysis or optimization.	Uses proper metrics and applies some model evaluation techniques. Minor optimizations attempted.	Uses appropriate evaluation metrics, applies cross-validation, and compares models. Optimizes performance effectively.
Innovation and real-world applicability (15%)	Lacks innovation. Minimal real-world applicability considered.	Project follows standard approaches with little innovation. Application to real-world scenarios is weak.	Shows some innovation and attempts to apply practical improvements.	Demonstrates creative thinking, applies novel techniques, and considers real-world applications effectively..
Presentation and Documentation (20%)	Report is disorganized, missing key explanations. Presentation lacks clarity or engagement.	Report is understandable but lacks depth, clarity, or proper formatting. Presentation is average.	Good report structure with mostly clear explanations. Presentation is organized but lacks some details.	Clear, well-structured report with strong justification and references. Presentation is engaging, logical, and professional.

Mark allocation guidelines to students: marking rubric