Assumption:

All students attending the lecture already have the basic knowledge level required for the topic. Therefore, the profiling will only measure learning style (Objective/Subjective, Theoretical/Practical, Independent/Collaborative) and assignments will be tailored accordingly."

Questionnaire – Student Learning Style Profiling

Section A: Orientation (Objective vs. Subjective)

1. When I solve problems, I prefer:
   ☐ Clear rules, formulas, and correct/incorrect answers (Objective)
   ☐ Open-ended reasoning, interpretation, or multiple possible answers (Subjective)
2. I feel more confident when:
   ☐ My answer can be verified as correct (Objective)
   ☐ My answer is based on argument, explanation, or creativity (Subjective)

Section B: Knowledge Preference (Theoretical vs. Practical)

3. I learn best when:
   ☐ I study theories, models, and explanations (Theoretical)
   ☐ I work on real-world problems, coding, or projects (Practical)
4. In lectures, I prefer:
   ☐ Reading, note-taking, and understanding concepts (Theoretical)
   ☐ Solving exercises, doing activities, and applying knowledge (Practical)

Section C: Engagement (Independent vs. Collaborative)

5. When given assignments, I prefer:
   ☐ Working alone, following my pace (Independent)
   ☐ Working with peers, sharing and discussing ideas (Collaborative)
6. I feel I learn more effectively when:
   ☐ I focus on my own structured tasks (Independent)
   ☐ I discuss and solve problems in a group (Collaborative)

Scoring & Categorization

- Orientation → Objective vs. Subjective
- Knowledge Preference → Theoretical vs. Practical
- Engagement → Independent vs. Collaborative

Each student receives a 3-part learning style profile, e.g.:

- *Objective–Practical–Independent*
- *Subjective–Theoretical–Collaborative*

Assignment Mapping (Based on Learning Style)

Example Lecture Topic: *Convolutional Neural Networks (CNN) for Text Mining*

Objective – Theoretical – Independent

- Write definitions of CNN components used in text mining (e.g., embedding layer, convolutional filter, pooling).
- Summarize one CNN text classification architecture (e.g., Kim's CNN for sentence classification) in your own words.

Objective – Theoretical – Collaborative

- In small groups, create a concept map of CNN steps in text mining (data preprocessing → embedding → convolution → pooling → dense → classification).
- Peer-teach each other one CNN concept (e.g., filters, word embeddings) and present.

Objective – Practical – Independent

- Implement a CNN for sentiment analysis on a small text dataset (e.g., IMDB reviews).
- Submit your Jupyter Notebook with preprocessing, CNN model, training results, and accuracy metrics.

Objective – Practical – Collaborative

- Group coding task: Train and compare two models (CNN vs. simple Logistic Regression) for text classification.
- Present results as accuracy/F1-score metrics in a shared slide.

Subjective – Theoretical – Independent

- Write a short essay: *"Why might CNNs capture semantic patterns in text better than traditional bag-of-words models?"*
- Reflect on ethical issues of text mining (e.g., bias in sentiment analysis of political or financial texts).

Subjective – Theoretical – Collaborative

- Group discussion: *"Are CNNs the best approach for text mining, or should interpretability (e.g., decision trees) be prioritized?"*
- Prepare a short debate presentation highlighting both interpretability vs. accuracy trade-offs.

Subjective – Practical – Independent

- Work on a mini case: Train a CNN to classify spam vs. ham emails.
- Write 5 lines about the strengths/weaknesses of your model (e.g., accuracy, overfitting, interpretability).

Subjective – Practical – Collaborative

- Group project: Build a text-mining pipeline with CNN (data preprocessing → embedding → CNN training → evaluation).
- Present findings, focusing on both interpretation and real-world implications (e.g., misuse in fake news detection).

Teacher Expectation Questionnaire (Aligned with Student Learning Style)

Assumption
It is assumed that all students possess the foundational knowledge required to engage with the lecture content. Accordingly, the evaluation of student progress will not rely on comparisons with peers, but rather on the alignment between the student's individual learning style and their personal learning trajectory. The teacher's assessment will emphasize growth within each student's preferred mode of learning, ensuring that progress is measured relative to the student's own abilities and developmental path.

Questionnaire

1. For this student, the main goal of the assignment is:
   ☐ Show accuracy in solving tasks (Objective)
   ☐ Show reasoning and reflection (Subjective)
   ☐ Apply theory and explain models (Theoretical)
   ☐ Apply learning to real-world tasks (Practical)
   ☐ Work independently with discipline (Independent)
   ☐ Collaborate effectively with peers (Collaborative)
2. I expect this student to demonstrate progress mainly in:
   ☐ Understanding concepts
   ☐ Applying methods
   ☐ Critical thinking

☐ Creativity/originality
☐ Teamwork

Now by matching student learning style and teacher expectations , the assignment is generated that reflect *both sides*.

Framework

We have 2 inputs:

1. Student Learning Style (Objective/Subjective × Theoretical/Practical × Independent/Collaborative).
2. Teacher Expectation (Accuracy, Reasoning, Application, Creativity, Teamwork).

The output = Custom Assignment that blends *how the student learns* with *what the teacher expects*.

Examples of Matched Assignments (Topic: CNN for Text Mining)

Case 1

- Student style: Objective – Practical – Independent
- Teacher expectation: Accuracy in solving tasks

Assignment

- Implement a Convolutional Neural Network (CNN) for sentiment classification on a small text dataset (e.g., IMDB movie reviews or Twitter sentiment).
- Submit your Jupyter Notebook with preprocessing steps (tokenization, embeddings), model code, training results, and accuracy metrics.
- Evaluation: Correctness of preprocessing pipeline, CNN implementation, and final accuracy score.

Case 2

- Student style: Subjective – Theoretical – Collaborative
- Teacher expectation: Reasoning and teamwork

Assignment

- In groups of 3, prepare a short debate presentation:
  "Are CNNs more effective than RNNs for text mining tasks such as sentiment analysis or document classification?"
- Each student should contribute 2 well-reasoned arguments with references to academic papers or case studies.

- Evaluation: Depth of reasoning, critical analysis of CNN vs. RNN, and teamwork in structuring the debate.