

Course Home Content Grades Course Tools > Help >

Assignments > Final Project: Recommender System Challenge

# Final Project: Recommender System Challenge

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**Group Category** 

Group

**Group Name** 

Group 30

Instructions

#### **General Info**

• Deadline: June 1st, 11:55 PM

• Late Penalty: 5% deduction per day

- Submissions made after June 7th, 23:55 PM will receive 0 points
- Submission Format: (Submit by Group)
  - o [Through Kaggle] A CSV file with top-10 recommendations per user (see detailed submission format in the Kaggle link).
  - [Through Brightspace] A zip file with executable code and README file.
  - o [Through Brightspace] A technical report (PDF) describing your methodology, trade-offs, and error analysis (Maximum 8 pages without reference).
- Kaggle Link: https://www.kaggle.com/t/187997f011b64c5e9d67fde04aded7d8
- !! There is no retake option for the Assignments. Please manage your time wisely.

#### **Task**

In this final project, you are required to design and implement a complete recommender system using a unified user-item interaction dataset. Your model will be evaluated on ranking-based metrics using a hidden test set. All students/teams will compete on a public leaderboard hosted on Kaggle.

You are encouraged to explore and combine a variety of modern recommendation techniques. Your focus should be on both model performance and engineering rigor - from preprocessing to inference and analysis.

## **Learning Objectives**

- Apply and integrate key recommendation algorithms (collaborative, sequential, graph-based, neural, hybrid)
- Practice end-to-end model development: preprocessing, modeling, training, inference, and evaluation
- Analyze trade-offs, identify model weaknesses, and communicate results clearly

#### **Project Requirements**

1. Modeling Flexibility:

Use any combination of techniques or propose your own models. Examples include:

- Neural Collaborative Filtering (NCF)
- o Graph-based methods (e.g., LightGCN)
- $\circ\,$  Transformer-based models (e.g., BERT4Rec)
- o Hybrid and content-aware recommenders

#### 2. Reproducibility:

Your entire pipeline must be executable and reproducible by instructors.

# **Evaluation Breakdown**

Component	Weight	Description
Leaderboard Rankin	g 30%	Based on public leaderboard score using Recall@10
Technical Quality	30%	Assesses code structure, modeling rigor, and efficiency
Technical Report	40%	Evaluates depth of understanding and analysis quality

# 1. Leaderboard Ranking (30%)

Your team's performance on the public leaderboard will contribute to your final score.

### Leaderboard Rank Score Contribution

Top 10%	100%
11-30%	90%
31-50%	80%
51-70%	70%
71-100%	60%

## 2. Technical Quality (30%)

Sub-Criterion	Description
Code Completeness	Code runs from end-to-end with clear README/instructions
Efficiency	Resource usage is reasonable; training/inference time is optimized where possible
Code Readability & Style	Code is well-structured, modular, and uses consistent naming
Modeling Technique	Chosen methods are justified, and demonstrate a clear understanding of recommender system concepts
Engineering Rigor	You perform sensible evaluation, model selection, and tuning

### 3. Technical Report (40%)

Your report should be **clear**, **concise**, **and demonstrate analytical thinking**. It should be structured with the following components:

Section	Description
1. Dataset Preprocessing	Explain how you handled missing values, timestamps, duplicates, etc.
2. Model Design	Describe your architecture(s), embedding strategy, loss functions, hybrid structure, etc.

3. Training Describe training process: data splits, sampling

**Procedure** strategies, negative sampling, etc.

**4. Inference** Explain how top-k items are ranked for each user

Pipeline efficiently

.

Show your tuning process and rationale for final

Hyperparameter Analysis

settings

**6. Performance** Analyze evaluation results, failure cases, and possible

Analysis reasons for poor performance

7. Reflections What worked well? What would you try next?

Due on 01 June 2025 23:55

# **Submit Assignment**

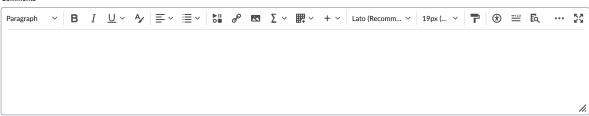
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