

Weighted Competency Scoring Engine

1. Overview

The Weighted Competency Scoring Engine (WCSE) is the core module of the Explainable Skill-Based Internship and Project Matching Platform. It ranks candidates using transparent mathematical scoring instead of keyword-based resume filtering.

2. Core Formula

Base Formula: Match Score = $\sum (\text{Skill Weight} \times \text{Candidate Proficiency Score})$
Extended Formula:
Final Match Score = [$\sum (\text{W}_s \times \text{P}_s) \times \text{D}_a \times \text{E}_m$] + $\text{C}_b + \text{P}_v + \text{S}_c + \text{A}_f$

3. Key Components

W_s = Skill Weight P_s = Candidate Proficiency D_a = Domain Alignment Factor E_m = Experience Multiplier
 C_b = Certification Bonus P_v = Portfolio Validation Score S_c = Soft Skill Compatibility A_f = Availability Factor

4. Skill Normalization

Normalized Skill Score = Candidate Score / Maximum Score Ensures fairness, prevents inflated ratings, and enables cross-domain comparability.

5. Domain Alignment Factor

Exact Match: 1.2 Related Domain: 1.0 Cross Domain: 0.8

6. Experience Multiplier

$\text{E}_m = 1 + (\text{Years of Relevant Experience} \times 0.05)$ Maximum Cap: 1.3

7. Certification Bonus

Platform Verified: +5 Industry Recognized: +8 Advanced Professional: +12

8. Portfolio Validation Score

Evaluates code quality, documentation, deployment, real-world impact. Score Range: 0–15

9. Soft Skill Compatibility

Assessed via communication, teamwork, leadership, adaptability. Score Range: 0–10

10. Availability Alignment

Full Match: +10 Partial Match: +5 Low Match: +0

11. Explainability Features

- Skill-wise contribution breakdown
- Ranking justification
- Improvement recommendations
- What-if simulation capability

12. Fairness & Bias Mitigation

- Removes gender, college, location bias
- Applies normalization and weight caps
- Includes fairness auditing and monitoring

13. Benefits

- Transparent ranking
- Merit-based evaluation
- Bias reduction
- Scalable architecture
- Encourages skill development