

# 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 =  $[\sum (W_s \times P_s) \times D_a \times E_m] + C_b + P_v + S_c + A_f$

## 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

$E_m = 1 + (\text{Years of Relevant Experience} \times 0.05)$  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