



## An Analytic Hierarchy Process Approach to Prioritising Employability Skills of Engineering Graduates in Telangana State

Gitasri Mukherjee, Abdul Majeed, Ega Chandra Shekhar, V. Shyam Prasad, Md. Abdul Rawoof Sayeed, Gaddam Shankarajothi and Sk. Nuslin

**ABSTRACT:** Telangana, a rapidly expanding hub for information technology, engineering services, and manufacturing industries in India, has become a competitive destination for engineering graduates seeking employment. However, consistent with national trends identified by Andrews and Higson [1] and reinforced in the Indian context by Kulkarni [2], industry feedback across the state, particularly in Hyderabad, points to a persistent gap between academic training and workplace expectations, especially in transferable and soft skills. The Unstop Talent Report [3] corroborates these findings by revealing that 83% of engineering graduates in India remain jobless or without internship offers, highlighting persistent employability challenges. This study applies the Analytic Hierarchy Process (AHP) to systematically identify, evaluate, and rank employability skills most valued by employers in the city. Four crucial skills-Communication Skills, Problem-Solving Ability, Teamwork and Critical Thinking-were shortlisted in consultation with industry professionals, experienced faculty, and final-year engineering students. The findings underscore the urgent need for targeted curriculum reforms, aligning with recent state-level educational initiatives that integrate vocational training, industry partnerships, and soft-skill development to improve employability. By proposing a structured, data-driven prioritisation model, the research contributes actionable insights for policymakers, academic institutions, and corporate recruiters.

**Keywords:** Employability skills, Analytic Hierarchy Process, skill ranking, industry readiness, Fuzzy AHP Method, Fuzzy TOPSIS Method.

### Contents

<b>1 Introduction</b>	<b>1</b>
<b>2 Aim of the Study</b>	<b>2</b>
<b>3 Literature Review</b>	<b>3</b>
<b>4 Methodology</b>	<b>4</b>
4.1 Fuzzy AHP Method [6, 9]:	5
4.2 Fuzzy TOPSIS Method[9, 12]:	5
<b>5 Results</b>	<b>6</b>
<b>6 Findings from the AHP Analysis</b>	<b>9</b>
<b>7 Conclusion</b>	<b>9</b>

### 1. Introduction

Over the past two decades, Telangana has transformed into one of India’s most dynamic economic hubs, particularly in sectors such as information technology, engineering services, pharmaceuticals, and manufacturing domain. Hyderabad, the capital of the state, is home to a thriving technology corridor which is often referred to as “Cyberabad,” and houses global giants like Microsoft, Google, and Deloitte, alongside a strong ecosystem of engineering firms, manufacturing units, and start-ups. This rapid industrial expansion has created unprecedented demand for a skilled workforce, particularly engineering graduates who are capable and ready to contribute to complex, technology-driven projects from the outset.

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However, this demand for talent has not been fulfilled with a corresponding supply of industry-ready graduates. In fact, the state of Telangana sees thousands of engineering students graduating annually, mirroring a national trend. Yet it faces a significant employability gap. Employers often express their dissatisfaction stating that while many graduates possess adequate theoretical knowledge, they often lack transferable and soft skills viz. effective communication, adaptability, teamwork, and critical thinking which are the requisites for workplace success. This gap has been documented extensively in both international and Indian contexts. Andrews and Higson [1] first highlighted the persistent mismatch between higher education curricula and industry expectations in a European setting, particularly in relation to the lack of workplace-ready soft skills. Kulkarni [2] reaffirmed the findings' relevance to India, pointing out that even with excellent academic records, engineering graduates often perform poorly on employability tests.

These observations resonate strongly in Telangana, where employer feedback echoes the same concerns. Graduates possess theoretical competence but frequently fall short in communication, adaptability, teamwork, and critical thinking. In the state's fast-evolving industrial ecosystem these skills that are of utmost importance. The Unstop Talent Report [3] underscores the severity of the issue, revealing that 83% of engineering graduates in India are unemployed or without internship offers, despite the increasing number of technical jobs available. This paradox, where jobs exist but graduates remain unemployable, points to systemic deficiencies in aligning academic training with real-world skill requirements. In Telangana, the state government has begun to address this challenge and is keen to bring educational reforms. The EY-Parthenon/CII-Telangana [4] report emphasises the integration of industry-aligned vocational modules, project-based learning, and soft-skill development into undergraduate engineering programmes. However, without a systematic, evidence-based method to identify and prioritise the skills that would be most valued by employers, such reforms risk being generic rather than targeted.

To the best of the authors' knowledge, no prior study has applied the Analytic Hierarchy Process (AHP) to develop a context-specific ranking of employability skills for engineering graduates in Telangana. This study represents a critical gap since most existing research on graduate employability in India either focuses on broad national trends or relies on qualitative assessments and thus may lack the precision needed for actionable curriculum design and recruitment reforms. Addressing this gap, the present study applies the AHP, a structured decision-making framework, to evaluate and rank the importance of four key employability skills: Communication Skills, Problem-Solving Ability, Teamwork and Critical Thinking. These skills were selected in consultation with industry professionals, experienced faculty, and final-year engineering students to ensure relevance to the context of the state of Telangana.

The justification for this study stems from an urgent need to generate clear, evidence-based insights that can genuinely support the ongoing educational reforms in Telangana. Although many reports and policy documents acknowledge the importance of employability skills, there remains a noticeable gap in localized, quantifiable evidence showing which specific skills employers value most. The Analytic Hierarchy Process (AHP) provides a systematic and transparent way to fill this gap, helping policymakers and educators make better-informed choices about curriculum design, assessment methods, and training priorities. By anchoring its recommendations in measurable data rather than general impressions, this study seeks to combine practical usefulness with academic depth—ensuring that the findings are both relevant to the local context and reliable for broader application.

## 2. Aim of the Study

This research aims to address two critical questions:

1. Which employability skills are most valued by employers recruiting engineering graduates in Telangana?
2. How can a data-driven prioritisation framework inform curriculum reform and recruitment practices?

The authors have developed a data-driven prioritisation model for employability skills that can inform targeted curriculum reforms, enhance industry-academia collaboration, and guide recruitment strategies in Telangana's engineering sector. By systematically ranking skills through AHP, this study provides

actionable insights to bridge the gap between academic output and industry demand. In doing so, the research not only contributes to the scholarly discourse on graduate employability but also offers practical recommendations for policymakers, educators, and employers working to strengthen Telangana's position as a hub for skilled engineering talent.

### 3. Literature Review

The severity of the employability issue in engineering education in India is highlighted by recent empirical research. IIT Kanpur and La Trobe University conducted a nationwide poll that revealed a startling disparity in employer-student perceptions: While 78% of companies think engineering graduates lack the necessary skills for the job, students are nevertheless confident in their preparedness. Although students rated cooperation, flexibility, cultural awareness, critical thinking, and decision-making skills highly, employers specifically pointed out inadequacies in these areas [5]. According to the 2019 annual employability survey conducted by Aspiring Minds, only 20% of engineering graduates in India are employable. According to [6], employability among Indian graduates decreased from 44.3% in 2023 to 42.6% in 2024, primarily due to non-technical skill deficiencies.

The employability of engineering graduates is currently one of the primary concerns. According to the 2019 annual employability survey conducted by Aspiring Minds, only 20% of engineering graduates in India are employable. According to data provided by the All India Council of Technical Education (AICTE) for the previous five years, the nation's average pass rate is 50% and the average placement rate for engineering graduates is 26% [7].

An article [8] emphasizes that only about 43% of engineering students are placed in jobs and advocates a behavioral-science-informed shift from rote learning to the development of learning habits and practical competencies. Several assessments attribute the employability gap to outdated, theory-centric curricula and insufficient emphasis on practical, real-world learning. An article [8] reports that just over 43% of engineering graduates secure employment, advocating a behavioral science-informed shift away from rote memorization toward developing learning habits and applied competencies.

According to [9], because engineering curricula at universities and institutes have mostly focused on technical subjects, young engineering students mistakenly think that employability skills in engineering are solely about technical subjects, failing to grasp the harsh realities of employability skills [9].

Unfortunately, many engineering students in most colleges remain largely unaware of the value and necessity of developing employability skills. The terms unemployment and unemployability are often used interchangeably, though they refer to different situations. Unemployment occurs when individuals possess the qualifications, aptitude, and educational background for a role but face limited job opportunities. Unemployability, on the other hand, refers to a lack of eligibility for a job due to insufficient education, training, or experience, even when the individual is actively seeking work. Students may often live in a self-perception bubble that differs significantly from employers' perceptions. Unless technical knowledge is complemented with employability skills—including both soft skills and essential life skills—this gap is unlikely to be bridged.

If we focus upon the context of Telangana, the state has witnessed proactive interventions aimed at bridging this persistent gap. The Young India Skills University (YISU), launched in 2024 under a public-private partnership, trained over 500 students in its inaugural year and achieved an impressive placement rate of over 82% [10, 11]. The university's continued expansion and its collaboration with industry partners illustrate targeted efforts to nurture employability through aligned vocational and soft-skill training.

Despite such thoughtful initiatives, there remains a notable gap in the research: a lack of context-specific, data-driven frameworks for prioritizing employability skills in Telangana. While the Analytic Hierarchy Process (AHP) has seen application in Indian settings—for instance, in Kerala, where it revealed differences between academic and industry prioritization of skills—no such structured analysis has yet been conducted for Telangana.

Through pairwise comparisons, the Analytic Hierarchy Process (AHP) simplifies complex problems into a hierarchy of elements, allowing for more straightforward and consistent evaluation. It contains an integrated consistency check, allows context-specific priorities, and integrates both quantitative and qualitative data to increase reliability. By producing clear, weighted rankings of factors—in this case,

employability skills—AHP offers valuable insights for curriculum modification, recruitment strategies, and targeted training programs tailored to local needs [12].

Employing an AHP-based approach in this study addresses a methodological gap in skills prioritization research and fills a geographic void, as limited empirical work has applied such structured, quantitative analysis to the engineering education context of Telangana. Thus, It offers a quantitative, locally relevant insight into skills prioritization that can guide targeted curriculum reform, recruitment strategies, and stakeholder collaboration across Telangana’s engineering education ecosystem.

#### 4. Methodology

The selection of alternatives and criteria in this study is the outcome of a systematic and evidence-driven process, ensuring that both dimensions capture the essential skills and evaluative benchmarks relevant to employability in the engineering sector. The alternatives were identified based on consistent findings in literature, employer feedback, and graduate employability frameworks, while the criteria were derived from a blend of industry needs, educational feasibility, and measurable performance outcomes. Together, they form a coherent decision-making framework in which each alternative can be rigorously assessed against a set of strategically chosen criteria to determine its relative priority and impact.

The study applies the following sets of alternatives and criteria:

##### Alternatives (A):

- A1 – Problem-Solving Ability
- A2 – Critical Thinking
- A3 – Communication Skills
- A4 – Teamwork

##### Criteria (C):

- C1 – Industry Relevance
- C2 – Transferability
- C3 – Trainability
- C4 – Impact on Job Performance

The evaluation framework’s logical coherence and practical significance are guaranteed by the alignment of these options and criteria. Employers in the engineering, IT, and industrial sectors frequently state that adaptive problem-solving is essential to satisfying changing market needs, hence Problem-Solving Ability (A1) directly addresses Industry Relevance (C1). Because problem-solving frameworks are relevant across fields, graduates may traverse a variety of job situations, demonstrating its transferability (C2). Structured experiential learning can systematically improve analytical and solution-oriented skills in terms of Trainability (C3), and it has a significant impact on job performance (C4) because employees who are good at solving problems tend to be more innovative and efficient in their operations.

Because it plays a part in risk avoidance, quality assurance, and well-informed decision-making—skills that are highly valued in competitive industries—critical thinking (A2) has significant Industry Relevance (C1). Because critical thinking techniques can be used in both technical and managerial contexts, their transferability (C2) is especially high. With moderate Trainability (C3) through case-based learning and reflective practice, critical thinking has a proven Impact on Job Performance (C4) by boosting strategic planning, error detection, and adaptive learning in complicated scenarios.

In a time when client involvement and cross-functional collaboration are key drivers of business success, communication skills (A3) are critical for industry relevance (C1). They possess exceptional Transferability (C2), as effective communication is equally critical in leadership, technical reporting, and intercultural interactions. Since focused instruction in digital communication, report writing, and public speaking can

produce quantifiable progress, trainability (C3) is good. Since effective communication lowers misconceptions, improves stakeholder relationships, and fosters team cohesion, the Impact on Job Performance (C4) is also rather substantial.

Lastly, in organizations that use collaborative innovation labs, agile project environments, or multi-disciplinary teams, Teamwork (A4) closely relates to Industry Relevance (C1). Its applicability across many jobs, industries, and cultural situations demonstrates its transferability (C2). Because group-based projects, role-playing games, and simulations can foster cooperative behaviors and interpersonal skills, trainability (C3) is important. There is a significant impact on job performance (C4) because productive teamwork maximizes workflow, divides workload effectively, and fosters knowledge exchange, all of which directly increase organizational resilience and productivity. Fuzzy AHP Method and Fuzzy TOPSIS Methods were used in the present study.

Table 1 explains Triangular Fuzzy Scale.

Table 1: Triangular Fuzzy Scale

Crisp No	Triangular Fuzzy Number	Definition
1	(1,1,1)	Equal importance
3	(1,3,5)	Little more significant than the other
5	(3,5,7)	Important or very important
7	(5,7,9)	Very strong importance
9	(7,9,11)	Extremely important
2,4,6,8	(1,2,4), (2,4,6), (4,6,8), (6,8,10)	Intermediate values

#### 4.1. Fuzzy AHP Method [6, 9]:

**Step-1:** To the pairwise comparison of all criteria, each decision maker assigns a linguistic phrase, represented by a triangular FN. Let  $\tilde{P} = \tilde{a}_{ij}$  be a  $n \times n$  matrix, where  $\tilde{a}_{ij}$  is the importance of criterion  $C_i$  with respect to criterion  $C_j$ ,

$$\tilde{P} = \begin{pmatrix} (1, 1, 1) & \tilde{a}_{12} & \dots & \tilde{a}_{1n} \\ \tilde{a}_{12} & (1, 1, 1) & \dots & \tilde{a}_{2n} \\ \dots & \dots & \dots & \dots \\ \tilde{a}_{n1} & \tilde{a}_{n2} & \dots & (1, 1, 1) \end{pmatrix}$$

**Step 2:** Calculate the normalized fuzzy weights. To determine the fuzzy weight of criterion  $C_i$ , use the indicated formula.

$$\tilde{w}_i = \tilde{r}_i \times (\tilde{r}_1 + \tilde{r}_2 + \dots + \tilde{r}_n)^{-1}, \text{ where } \tilde{r}_i = (\tilde{a}_{i1} \times \tilde{a}_{i2} \times \dots \times \tilde{a}_{in})^{1/n}$$

#### 4.2. Fuzzy TOPSIS Method[9, 12]:

The most well-known method for overcoming MCDM difficulties is Hwang and Yoon's Technique for Order Performance by Similarity to Ideal Solution (TOPSIS). This method is based on the premise that the final option should be the one that is closest to the Positive Ideal Solution (PIS), which maximizes benefits while minimizing expenses, and the one that is farthest away from the Negative Ideal Solution (NIS). Chen added triangular FNs to TOPSIS. The vertex method was developed by Chen to determine the separation between two triangular FNs.

If  $\tilde{x} = (a_1, b_1, c_1)$ ,  $\tilde{y} = (a_2, b_2, c_2)$  are two triangular FNs then

$$d(\tilde{x}, \tilde{y}) = \sqrt{\frac{1}{3}[(a_1 - a_2)^2 + (b_1 - b_2)^2 + (c_1 - c_2)^2]}$$

**Procedure:**

**Step 1:** Give the alternatives and the criteria ratings. Consider a decision-making group with K members. With regard to criterion  $C_j$ , the  $k_{th}$  decision maker's fuzzy rating for alternative  $A_i$  is shown by  $\tilde{x}_{ij}^k = (\tilde{a}_{ij}^k, \tilde{b}_{ij}^k, \tilde{c}_{ij}^k)$  and the weight of criterion  $C_j$  is indicated by  $\tilde{w}_j^k = (\tilde{w}_{j1}^k, \tilde{w}_{j2}^k, \tilde{w}_{j3}^k)$

**Step 2:** Calculate the aggregated fuzzy weights and aggregated fuzzy ratings for criteria and alternatives. The aggregated fuzzy rating  $\tilde{x}_{ij} = (\tilde{a}_{ij}, \tilde{b}_{ij}, \tilde{c}_{ij})$  of  $i_{th}$  alternative with respect to  $j_{th}$  criterion is calculated as given below.

$$a_{ij} = \min_k \{\tilde{a}_{ij}^k\}, \quad b_{ij} = \frac{1}{k} \sum_{k=1}^k \tilde{b}_{ij}^k, \quad c_{ij} = \max_k \{\tilde{c}_{ij}^k\}$$

The aggregated fuzzy weight  $\tilde{w}_j = (w_{j1}, w_{j2}, w_{j3})$  for  $C_j$  can be obtained as given below:

$$w_{j1} = \min_k \{\tilde{w}_{j1}^k\}, \quad w_{j2} = \frac{1}{k} \sum_{k=1}^k \tilde{w}_{j2}^k, \quad w_{j3} = \max_k \{\tilde{w}_{j3}^k\}$$

**Step 3:** The normalized fuzzy decision matrix should be computed. The normalized fuzzy decision matrix is  $\tilde{R} = [\tilde{r}_{ij}]$  where

$$\tilde{r}_{ij} = \left( \frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right) \text{ and } c_j^* = \max_i \{c_{ij}\} \text{ (Benefit criteria)}$$

$$\tilde{r}_{ij} = \left( \frac{a_j^-}{c_{ij}^-}, \frac{a_j^-}{b_{ij}^-}, \frac{a_j^-}{a_{ij}^-} \right) \text{ and } c_j^- = \min_i \{a_{ij}\} \text{ (Cost criteria)}$$

**Step 4:** Create a weighted normalized fuzzy decision matrix. The weighted normalized fuzzy decision matrix is  $\tilde{V} = v_{ij}$ , where  $\tilde{v}_{ij} = \tilde{r}_{ij} \times w_j$

**Step 5:** Calculate the Fuzzy Positive Ideal Solution (FPIS) and Fuzzy Negative Ideal Solution (FNIS) as explained below:

$$A^* = (\tilde{v}_1^*, \tilde{v}_2^*, \dots, \tilde{v}_n^*), \text{ where } v_j^* = \max_i \{v_{ij3}\}; \quad A^- = (\tilde{v}_1^-, \tilde{v}_2^-, \dots, \tilde{v}_n^-), \text{ where } v_j^- = \min_i \{v_{ij1}\}$$

**Step 6:** Calculate the distance from each alternative to the FPIS and to the FNIS. Let  $d_i^* = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^*)$ ,  $d_i^- = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^-)$  be the distance from each alternative to the FPIS and to the FNIS, respectively. Compute the closeness coefficient  $CC_i$  for each alternative. For each alternative  $A_i$  we calculate the closeness coefficient  $CC_i$  as follows:

$$CC_i = \frac{d_i^-}{d_i^- + d_i^*}$$

**Step 7:** Sort the options in order. The best alternative is the one with the highest proximity coefficient.

## 5. Results

Table 2 presents the normalized weight vector, which was calculated for each alternative with respect to Industry Relevance.

Table 3 illustrates the normalized weight vector derived for each alternative with respect to Creativity.

Table 2: Normalized weight vector of each Alternative with respect to Industry Relevance

Industry Relevance	Problem-solving Ability	Critical Thinking	Communication Skills	Teamwork	Normalized weight Vector
Problem Solving Ability	(1,1,1)	(1/7,1/5,1/3)	(1/6,1/4,1/2)	(3,5,7)	(0.09,0.16,0.31)
Critical Thinking	(3,5,7)	(1,1,1)	(1/7,1/5,1/3)	(2,4,6)	(0.15,0.28,0.51)
Communication Skills	(2,4,6)	(3,5,7)	(1,1,1)	(1,3,5)	(0.23,0.47,0.87)
Teamwork	(1/7,1/5,1/3)	(1/6,1/4,1/2)	(1/5,1/3,1)	(1,1,1)	(0.05,0.09,0.21)

Table 3: Normalized weight vector of each Alternative with respect to Creativity

Creativity	Problem-solving Ability	Critical Thinking	Communication Skills	Teamwork	Normalized weight Vector
Problem-Solving Ability	(1,1,1)	(3,5,7)	(1/5,1/3,1)	(3,5,7)	(0.17,0.32,0.68)
Critical Thinking	(1/7,1/5,1/3)	(1,1,1)	(1/7,1/5,1/3)	(1,3,5)	(0.07,0.14,0.28)
Communication Skills	(1,3,5)	(3,5,7)	(1,1,1)	(1,3,5)	(0.19,0.45,0.88)
Teamwork	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/5,1/3,1)	(1,1,1)	(0.05,0.1,0.25)

Table 4 presents the normalized weight vector, showing the relative importance of each alternative with respect to Fluency.

Table 4: Normalized weight vector of each Alternative with respect to Fluency

Fluency	Problem-solving Ability	Critical Thinking	Communication Skills	Teamwork	Normalized weight Vector
Problem-Solving Ability	(1,1,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/6,1/4,1/2)	(0.05,0.1,0.23)
Critical Thinking	(3,5,7)	(1,1,1)	(1/4,1/2,1)	(1/5,1/3,1)	(0.11,0.21,0.5)
Communication Skills	(1,3,5)	(1,2,4)	(1,1,1)	(2,4,6)	(0.18,0.42,0.87)
Teamwork	(2,4,6)	(1,3,5)	(1/6,1/4,1/2)	(1,1,1)	(0.12,0.27,0.58)

Table 5 illustrates the normalized weight vector for each alternative in terms of Idea Generation.

Table 5: Normalized weight vector of each Alternative with respect to Idea Generation

Idea Generation	Problem-solving Ability	Critical Thinking	Communication Skills	Teamwork	Normalized weight Vector
<b>Problem-Solving Ability</b>	(1,1,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/7,1/5,1/3)	(0.05,0.09,0.21)
<b>Critical Thinking</b>	(3,5,7)	(1,1,1)	(1/5,1/3,1)	(1/6,1/4,1/2)	(0.09,0.18,0.43)
<b>Communication Skills</b>	(1,3,5)	(1,3,5)	(1,1,1)	(1,3,5)	(0.15,0.42,0.88)
<b>Teamwork</b>	(3,5,7)	(2,4,6)	(1/5,1/3,1)	(1,1,1)	(0.16,0.31,0.7)

Table 6 shows the normalized weight vector for all alternatives concerning the criteria.

Table 6: Normalized weight vector between each Alternative and Criteria

	Problem-solving Ability	Critical Thinking	Communication Skills	Teamwork	Normalized weight Vector
<b>Structure</b>	(1,1,1)	1/2	(1/7,1/5,1/3)	(1/5,1/3,1)	(0.06,0.11,0.28)
<b>Creativity</b>	(1,2,4)	(1,1,1)	(1,3,5)	(1/5,1/3,1)	(0.11,0.25,0.63)
<b>Fluency</b>	(3,5,7)	(1/5,1/3,1)	(1,1,1)	(1/6,1/4,1/2)	(0.1,0.18,0.45)
<b>Idea Generation</b>	(1,3,5)	(1,3,5)	(2,4,6)	(1,1,1)	(0.17,0.45,0.95)

Table 7 explains Weighted Normalized matrix between Alternatives and Criteria using Fuzzy TOPSIS method.

Table 7: Weighted Normalized matrix by Fuzzy TOPSIS method

	C1	C2	C3	C4
<b>A1</b>	(0.01,0.02,0.1)	(0.02,0.09,0.49)	(0.01,0.02,0.12)	(0.01,0.05,0.23)
<b>A2</b>	(0.01,0.04,0.16)	(0.01,0.04,0.2)	(0.01,0.04,0.25)	(0.02,0.09,0.46)
<b>A3</b>	(0.01,0.06,0.28)	(0.02,0.13,0.63)	(0.02,0.09,0.45)	(0.03,0.21,0.95)
<b>A4</b>	(0,0.01,0.07)	(0.01,0.03,0.18)	(0.01,0.06,0.29)	(0.03,0.16,0.76)

Table 8 calculates distance between alternatives and criteria using Fuzzy Positive Ideal Solution.

Table 8: Distance from Fuzzy Positive Ideal Solution

	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>d*</b>
<b>A1</b>	0.11	0.08	0.19	0.42	0.81
<b>A2</b>	0.07	0.26	0.11	0.29	0.73
<b>A3</b>	0.00	0.00	0.00	0.00	0.00
<b>A4</b>	0.13	0.27	0.09	0.11	0.59

Table 9 calculates distance between alternatives and criteria using Fuzzy Negative Ideal Solution.

Table 9: Distance from Fuzzy Negative Ideal Solution

	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>d-</b>
<b>A1</b>	0.02	0.18	0.00	0.00	0.20
<b>A2</b>	0.06	0.01	0.08	0.14	0.28
<b>A3</b>	0.13	0.27	0.19	0.42	1.01
<b>A4</b>	0.00	0.00	0.10	0.31	0.42

Table 10 explains the final ranking of each alternative.

Table 10: Ranking of each Alternative

<b>Alternatives</b>	<b>CCi values</b>	<b>Ranking</b>
<b>A1</b>	0.20	4
<b>A2</b>	0.28	3
<b>A3</b>	1.00	1
<b>A4</b>	0.41	2

## 6. Findings from the AHP Analysis

The application of the Analytic Hierarchy Process (AHP) to the prioritisation of employability skills yielded a clear ranking of alternatives based on their computed Composite Consistency Index (CCi) values. The analysis revealed that *Communication Skills (A3)*, with the highest CCi value of **1.00**, emerged as the most critical skill for enhancing graduate employability. This finding underscores the pivotal role of effective communication in bridging the gap between technical expertise and workplace integration, as it facilitates collaboration, client engagement, and knowledge dissemination. *Teamwork (A4)* ranked second with a CCi value of **0.41**, highlighting the growing industry demand for graduates who can function productively in multidisciplinary and cross-cultural teams. *Critical Thinking (A2)*, with a CCi of **0.28**, secured the third position, reflecting its significance in analytical reasoning and decision-making, albeit with slightly lower immediate industry priority compared to collaborative competencies. *Problem-Solving Ability (A1)*, with a CCi value of **0.20**, ranked fourth, suggesting that while it remains a valuable competency, employers may view it as more effectively developed through experience rather than as a primary hiring determinant. Overall, the AHP results demonstrate that interpersonal and collaborative skills currently hold greater strategic weight in employability considerations than purely cognitive or technical problem-solving capabilities.

## 7. Conclusion

This study demonstrates the effectiveness of the Analytic Hierarchy Process (AHP) as a structured, transparent, and scientifically robust tool for prioritising employability skills in the engineering sector. By systematically integrating expert judgment with an objective weighting mechanism, the research identified **Communication Skills** and **Teamwork** as the most critical competencies for engineering graduates

in Telangana, followed by **Critical Thinking** and **Problem-Solving Ability**. These findings underscore a significant shift in employer expectations—from valuing solely technical expertise to prioritising interpersonal and collaborative abilities that enable graduates to adapt and thrive in complex, multidisciplinary environments. The results not only validate the relevance of the selected alternatives and criteria but also offer actionable guidance for curriculum designers, higher education policymakers, and skill development agencies. Embedding structured communication training, collaborative project work, and industry-aligned experiential learning into engineering programmes could bridge the employability gap and align graduate competencies with evolving market demands. From a teaching–learning perspective, this prioritisation calls for a pedagogical shift towards more interactive, learner-centred, and practice-oriented methodologies, such as problem-based learning, simulation exercises, and interdisciplinary team projects. Such approaches would not only develop technical knowledge but also cultivate the soft skills identified as most essential by this study.

Ultimately, this research affirms that the success of engineering graduates in today’s competitive labour market depends on a balanced integration of technical acumen and human-centric skills. By adopting AHP as a decision-making framework, stakeholders can ensure that skill development strategies are data-driven, context-sensitive, and future-ready—paving the way for a workforce that is not only technically competent but also agile, collaborative and globally competitive.

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*Gitasri Mukherjee,*

*Department of English,*

*Muffakham Jah college of Engineering and Technology, Hyderabad, Telangana,*

*India.*

*E-mail address:* gita@mjcollege.ac.in, ORCID ID: <https://orcid.org/0000-0002-0865-141X>

*and*

*Abdul Majeed,*  
*Department of Mathematics,*  
*Muffakham Jah college of Engineering and Technology, Hyderabad, Telangana,*  
*India.*

*E-mail address:* abdulmajeed.maths@mjcollege.ac.in, ORCID ID: <https://orcid.org/0000-0002-0286-0042>

*and*

*Ega Chandra Shekhar,*  
*Department of Mathematics,*  
*Nalla Narasimha Reddy Education Society's group of Institutions, Hyderabad, Telangana,*  
*India.*

*E-mail address:* egachandu15@gmail.com, ORCID ID: <https://orcid.org/0009-0006-8104-0574>

*and*

*V. Shyam Prasad (Corresponding author),*  
*Department of Mathematics,*  
*Neil Gogte Institute of Technology, Hyderabad, Telangana,*  
*India.*

*E-mail address:* shyamnow4u@gmail.com, ORCID ID: <https://orcid.org/0000-0002-7966-1682>

*and*

*Md. Abdul Rawoof Sayeed,*  
*Department of Mathematics,*  
*Muffakham Jah college of Engineering and Technology, Hyderabad, Telangana,*  
*India.*

*E-mail address:* rfsayeed@mjcollege.ac.in, ORCID ID: <https://orcid.org/0000-0002-0317-1492>

*and*

*Gaddam Shankarajyothei,*  
*Department of Mathematics,*  
*Telangana Tribal Welfare Residential Degree College(G), Khammam, Telangana,*  
*India.*

*E-mail address:* shankarajyothei.maths@gmail.com, ORCID ID: <https://orcid.org/0009-0005-9678-531X>

*and*

*Sk. Nuslin,*  
*Department of Mathematics,*  
*Geetanjali College of Engineering and Technology, Hyderabad, Telangana,*  
*India.*

*E-mail address:* nuslinsk@gmail.com, ORCID ID: <https://orcid.org/0000-0002-4331-6027>