Skills Transferability Matrix

Metallurgical and Materials Engineers

With the main task of testing and developing materials for use in engineering and production, Metallurgical and Materials Engineers have strong knowledge of sciences such as physics and chemistry, and mathematics. They also have strong analytical and problem solving skills, developed through studies conducted on materials. Their strong scientific knowledge and skills base will help them succeed in many other professional science related roles, especially engineering roles.

Skills

Skills are developed through training and experience, and are the practical proficiencies someone possesses. The following are top key skills metallurgical and materials engineers employ in their work:

1. Complex Problem Solving
2. Active Listening
3. Science
4. Reading Comprehension
5. Critical Thinking

Technical Knowledge

Technical Knowledge is the understanding of theory and utility of modern tools in a work environment. The following tools are used by metallurgical and materials engineers regularly:

1. Computer-aided design & manufacturing software
2. Enterprise resource planning software
3. Analytical or scientific software
4. Development environment software
5. Process mapping and design software

Tasks

Tasks are the assigned duties that an occupational group performs in their daily work. The following are the tasks metallurgical and materials engineers most regularly encounter:

1. Conduct quantitative failure analyses of operational data.
2. Direct quality control activities.
3. Monitor the productivity or efficiency of industrial operations.
4. Evaluate technical data to determine effect on designs or plans.
5. Test characteristics of materials or structures.

Abilities

Abilities refer to the innate faculties that allow workers to carry out tasks and activities. The following are the top abilities that industrial and metallurgical and materials engineers possess:

1. Inductive & Deductive Reasoning
2. Category Flexibility
3. Written & Oral Comprehension and Expression
4. Problem Sensitivity
5. Mathematical Reasoning

Skills Transferability Matrix

FOCAL's Skills Transferability Matrices analyze the transferability of an occupation across a multitude of other occupations on the basis of similarities in **skills**, **technical knowledge, tasks,** and **abilities** as outlined by the O*Net database. It aims to show workers how to leverage their skill set in changing occupations, planning a career path, and transitioning to other industries. It also assists policy makers and educators address changing skill sets and areas of opportunity for workforce entrants in developing industries. Employers can also use this tool in reskilling or upskilling workers to circumvent skills shortages, and reduce the hiring and training challenges.

Metallurgical and Materials Engineers					
Occupations	Skills	Technical Knowledge	Tasks	Abilities	Total
Other professional engineers, n.e.c.	88%	100%	25%	88%	75%
Mechanical engineers	86%	94%	26%	87%	73%
Chemical engineers	86%	88%	27%	89%	72%
Computer engineers (except software engineers and designers)	85%	94%	15%	91%	71%
Electrical and electronics engineers	89%	94%	9%	92%	71%
Industrial and manufacturing engineers	85%	94%	14%	88%	70%
Chemists	86%	88%	0%	91%	66%
Information systems analysts and consultants	83%	94%	0%	85%	66%
Engineering managers	78%	94%	0%	85%	64%
Biologists and related scientists	86%	81%	0%	89%	64%
Other professional occupations in physical sciences	86%	69%	8%	90%	63%
Geoscientists and oceanographers	85%	75%	0%	88%	62%
Computer programmers and interactive media developers	75%	88%	0%	81%	61%
Database analysts and data administrators	79%	81%	0%	82%	61%
Software engineers and designers	81%	63%	0%	88%	58%

After scanning over 2,600 skills, technical competencies, tasks, and abilities of each of the 500 occupations as defined by the National Occupational Classification (NOC) system, a skills transferability matrix for metallurgical and materials engineers is produced. In the matrix above, a high score is highlighted in green and indicates the high transferability potential of an attribute of an occupation with that of metallurgical and materials engineers. Lower or no transferability areas are marked in red. Transferability among other professional science roles was found to be high for metallurgical and materials engineers. Weaker transferability is observed with roles where the fundamental sciences required in metallurgy are also applied, such as chemistry and other physical sciences. The strong skill, ability and technology transferability makes up for weak task transferability, with strongest transferability observed with other professional engineering roles. With high technology and ability scores for transferability to engineering management, with additional skill and task training, metallurgical and materials engineers may transition into engineering management roles.

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