



NITIC

National Information Technology
Innovation Center

Business Industry Leadership Team (BILT)

Artificial Intelligence KSAs March 2025

This prioritized Knowledge, Skills, and Abilities (KSA) list was developed by the National IT Innovation Center (NITIC) in collaboration with IT industry subject matter experts (SMEs). This list is intended to help faculty and administrators align curriculum with industry needs so graduates are “workforce ready” when they graduate.

SMEs convened online to rank each KSA item one by one – a ranking of “4” meant that item was essential for entry-level IT workers, while a “1” meant that item could be removed from program curriculum. By default, items with an average vote of 2.6 or lower were turned pink to signal that this item may not be worth keeping.

After the vote, the SMEs discussed the results as a group. This discussion led to some revisions in the KSA descriptions and rankings. Some “pink” items the SMEs together deemed important despite the lower average and were kept, while some “green” items with a higher average the SMEs recommended be removed from the list. Those items can be found at the bottom of each KSA section under “Recommended Removal.”

The “To Be Included in the Next Vote” section at the bottom includes items the SMEs suggested that were not included in the original list vote.

This KSA prioritization process is a cornerstone of the successful Business and Industry Leadership Team (BILT) model which puts businesses in a co-leadership role.

Learn more about how the BILT works – and how you can implement it with your own program – by using these resources:

NITIC orientation video; www.tiny.cc/BILTorient
Convergence Technology Center BILT handbook: www.tiny.cc/implementingBILT

A.I. Knowledge and Skills - updated March 2025

		# votes (4 = most important)				
		4	3	2	1	Avg
<p>Knowledge</p> <p>Knowledge focuses on the understanding of concepts. It is theoretical and not practical. An individual may have an understanding of a topic or tool or some textbook knowledge of it but have no experience applying it. For example, someone might have read hundreds of articles on health and nutrition, many of them in scientific journals, but that doesn't make that person qualified to dispense advice on nutrition.</p>						
K-1	Knowledge of history and definition of AI.	5	3	2	0	3.30
K-2	Knowledge of models in production.	5	2	3	0	3.20
K-3	Knowledge of the big picture and history of AI, the transformational story of the building blocks. history, problems enabled now, high impact transformations.	5	2	3	0	3.20
K-4	Knowledge of chatbots and their applications.	5	4	1	0	3.40
K-5	Knowledge of data mining.	1	0	7	0	2.25
K-6	Knowledge of principles of data literacy.	3	4	2	0	3.11
K-7	Knowledge of data readiness assessment.	3	5	0	1	3.11
K-8	Knowledge of developing data strategy.	5	4	1	0	3.40
K-9	Knowledge of data dictionaries.	1	2	6	0	2.44
K-10	Knowledge of accurate representation of data.	4	2	3	0	3.11
K-11	Knowledge of designing and implementing hybrid data solutions.	2	4	3	0	2.89
K-12	Knowledge of ethical principles to be applied to AI problems/models.	9	1	0	0	3.90
K-13	Knowledge of human factors and human computer interaction.	3	4	3	0	3.00
K-14	Knowledge of human centered design.	4	2	3	0	3.11
K-15	Knowledge of management of IO data streams.	1	5	2	1	2.67
K-16	Knowledge of management of public and private cloud platforms.	2	4	4	0	2.80
K-17	Knowledge of cloud data infrastructure operations and maintenance.	3	2	5	0	2.80
K-18	Knowledge and understanding of Data/AI Accountability.	5	5	0	0	3.50
K-19	Knowledge and understanding of data/AI governance and confidence to ask questions.	4	5	1	0	3.30
K-20	Knowledge of what is involved in executing enterprise searches with software such as Apache/AWS/Azure/Elastic/GCP.	3	3	4	0	2.90
K-21	Knowledge and understanding of data/AI Impartiality (RAI).	2	5	2	0	3.00
K-22	Knowledge and understanding of data/AI Resiliency.	2	3	4	0	2.78
K-23	Knowledge of physical, personnel, and information security measures.	4	4	1	1	3.10
K-24	Knowledge and understanding of data/AI security and confidence to ask questions.	7	3	0	0	3.70
K-25	Knowledge and understanding of data/AI transparency.	4	5	0	0	3.44
K-27	Knowledge of natural language generation.	5	2	3	0	3.20
K-28	Knowledge of natural language processing.	4	5	1	0	3.30
K-29	Knowledge of how to understand product or process performance.	3	2	5	0	2.80
K-30	Knowledge of risk assessments.	0	6	4	0	2.60
K-31	Knowledge of applications of vector search.	2	1	6	1	2.40
K-32	Knowledge of deep adversarial networks.	2	3	3	1	2.67
K-33	Knowledge of applications and precautions for adversarial AI.	3	3	4	0	2.90
K-34	Knowledge of Persona design and creation for applications.	2	2	6	0	2.60
K-35	Knowledge in understanding and applying linear regression.	1	4	5	0	2.60
K-36	Knowledge of developing Bayesian statistical models.	1	3	5	0	2.56
K-37	Knowledge of k-means clustering.	1	2	4	0	2.57
K-38	Knowledge of building computer vision with software such as AWS/Azure/GCP.	0	3	6	0	2.33
K-39	Knowledge of developing and applying Supervised Learning Applications.	2	6	1	0	3.11
K-40	Knowledge of developing and applying Unsupervised Learning Applications.	3	6	1	0	3.20
K-41	Knowledge of developing and applying Applications of Neural Networks.	2	5	3	0	2.90
K-42	Knowledge of developing and applying Artificial Neural Networks (ANN).	2	5	3	0	2.90
K-43	Knowledge of developing and applying Convolution Neural Networks (CNN).	1	4	5	0	2.60
K-44	Knowledge of developing and applying Recurrent Neural Networks (RNN).	1	5	4	0	2.70
Recommended Removal - Knowledge						
K-26	Knowledge of Identity and Access Management.	1	2	5	2	2.20

Skills						
The capabilities or proficiencies developed through training or hands-on experience. Skills are the practical application of theoretical knowledge. Someone can take a course on investing in financial futures, and therefore has knowledge of it. But getting experience in trading these instruments adds skills.						
S-1	Skill in applying ethical principles to AI problems and models.	3	5	2	0	3.10
S-2	Skill in using Business Process Automation (BPA).	4	3	2	0	3.22
S-3	Skill in using Robotic Process Automation (RPA).	4	2	3	0	3.11
S-4	Skill in motion detection and classification.	1	4	4	0	2.67
S-5	Skill in object detection and classification.	1	5	3	0	2.78
S-6	Skill in Python programming.	8	1	1	0	3.70
S-7	Skill in building statistical summaries.	1	5	3	0	2.78
S-8	Skill in developing models with Python/R.	2	5	3	0	2.90
S-10	Skill in using feature engineering.	2	2	3	0	2.86
S-11	Skill in feature selection and extraction.	1	3	3	0	2.71
S-12	Skill in identifying and designing a data collection plan.	2	6	1	0	3.11
S-13	Skill in identifying data requirements.	8	2	0	0	3.80
S-15	Skill in data blending.	1	5	3	0	2.78
S-16	Skill in data cleansing with AWS/Azure/GCP/SQL.	2	6	2	0	3.00
S-18	Skill in data wrangling.	2	4	3	0	2.89
S-19	Skill in types of data and transformations.	5	5	0	0	3.50
S-20	Skill in processing and analyzing large datasets with software such as AWS/Azure/GCP/Hadoop/Snowflake.	3	3	4	0	2.90
S-21	Skill in using SQL Database.	6	1	3	0	3.30
S-22	Skill in using integrated automation.	2	4	3	0	2.89
S-23	Skill in performing SQL integrations with AWS/Azure/GCP.	0	4	6	0	2.40
S-24	Skill in advanced methods to visualize data.	2	5	3	0	2.90
S-25	Skill in dashboards with tools such as Alteryx/AWS/PowerBI/Qlik/Tableau/Shiny.	4	4	2	0	3.20
S-26	Skill in designing dashboards.	2	4	4	0	2.80
S-28	Skill in creating and using decision trees.	3	6	0	0	3.33
S-29	Skill in risk modeling.	2	4	3	0	2.89
S-30	Skill in using programmable automation.	3	4	2	0	3.11
S-33	Skill in customer interface, requirements planning, and facilitation.	2	5	3	0	2.90
S-34	Skill in defining use cases for problem solving.	3	6	0	0	3.33
S-35	Skill in developing equitable problem solutions.	1	5	3	0	2.78
S-36	Skill in applying association rules.	1	4	4	0	2.67
S-37	Skill in designing machine learning models.	2	5	3	0	2.90
S-40	Skill in developing and applying reinforcement learning.	2	8	0	0	3.20
S-47	Skill in applications of numerical optimization techniques.	1	5	3	0	2.78
S-48	Skill in topic modeling.	1	4	4	0	2.67
S-49	Skill in contextual analysis.	1	5	3	0	2.78
S-51	Skill in linear optimization.	1	3	4	0	2.63
S-52	Skill in non-linear optimizations.	1	3	4	0	2.63
S-53	Skill in image segmentation.	1	3	4	0	2.63
S-54	Skill in applying manual rules.	1	5	2	0	2.88
S-55	Skill in sentiment analysis.	3	2	4	0	2.89
S-56	Skill in text categorization.	1	6	2	0	2.89
S-57	Skill in performing data transformations with software such as Alteryx/Apache/AWS/Azure/GCP.	3	6	1	0	3.20
Recommended Removal - Skills						
S-9	Skill in using fixed automation.	1	2	4	1	2.38
S-14	Skill in nonparametric statistics.	1	3	5	0	2.56
S-17	Skill in data farming and surrogate data.	1	3	5	0	2.56
S-50	Skill in using facial recognition.	1	1	6	1	2.22
To Be Included in Next Vote						
Items that emerged from BILT group discussion after the KSA vote						
	Knowledge of Gen AI.					
	Knowledge of hardware components used to run the models, understanding the power and cooling needs, GPUs.					
	Knowledge of the cost of technology .					
	Knowledge of agentic system.					
	Knowledge of prompt engineering.					
	Skill testing of truthfulness/groundedness/correctness of responses.					