10 academy

Intensive Training - Cohort A

Preparation/Pre-learning Materials

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10 Academy's Approach to Learning

Our competency-based approach to training is focused on developing the specific skills and knowledge that you need to be successful in your chosen career. We offer training in a variety of areas, including career-focused, AI (Artificial Intelligence), software engineering, and Web3 based competencies.

We focus on **developing the specific skills and knowledge** that you need to be successful in your chosen career. This means that we don't just teach you general concepts; we teach you how to apply those concepts to real-world problems.

We use a **variety of learning methods**, including lectures, hands-on exercises, and project-based learning. This ensures that you learn the material in a way that is most effective for you.

We assess you based on your **ability to demonstrate the competencies** that you have learned. This means that you will be graded on your ability to perform real-world tasks, not just on your ability to pass tests.

We're often asked what trainees should be learning to prepare for intensive training - to enable this, we've put together this curated listing of materials that we recommend becoming familiar in this document.
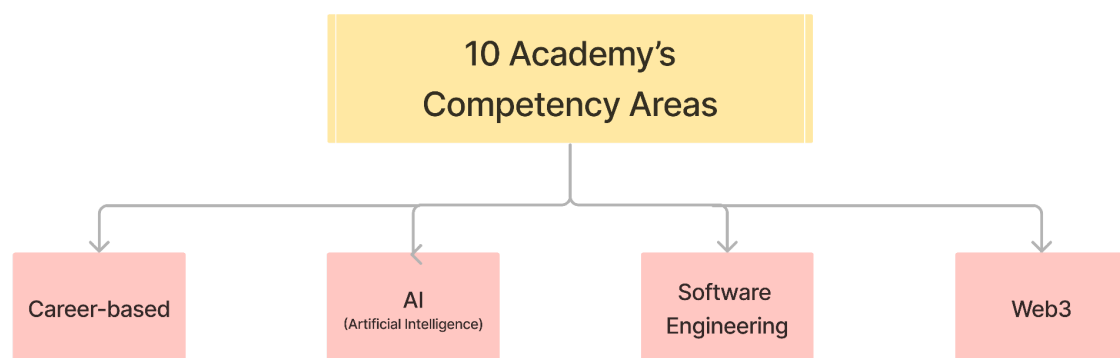
Python Programming

Python is a versatile programming language widely utilized in web development, data science, machine learning, and artificial intelligence. Known for its clear syntax and beginner-friendly nature, Python serves as an excellent entry point for individuals starting their coding journey.

In this competency, we evaluate the development of essential and experienced skills in python.

Essential Python Skills		
Topic	**Language**	**Outcome**
Variables	Python	Basic
Basic Data Structures (strings, floats, integers, booleans, arrays, dictionaries)	Python	Basic
Math operators	Python	Basic
Conditions (true/false)	Python	Basic
Control flow (if, elif, else)	Python	Basic
Loops and iterables (for, while, in)	Python	Basic
Functions	Python	Basic
Sort	Python	Basic
String operations	Python	Basic
Working with files (open, read, write, close)	Python	Basic
PEP-8 formatting	Python	Basic
OOP (classes, objects, methods, basic design patterns)	Python	Basic
Comprehensions	Python	Basic
Lambda functions	Python	Basic
Class inheritance	Python	Basic
pip	Python	Basic
Polymorphism	Python	Intermediate
Data abstraction	Python	Intermediate
Dunder methods	Python	Intermediate
Encapsulation	Python	Intermediate
Async IO	Python	Intermediate
*args	Python	Intermediate
**kwargs	Python	Intermediate
Generators	Python	Intermediate
RegEx	Python	Intermediate

Below, you'll find a list of reference materials for **essential skills** in Python:

[https://www.pythontutorial.net/python-basics/https://www.pythontutorial.net/python-basics/](https://www.pythontutorial.net/python-basics/)
https://www.youtube.com/watch?v=kqtD5dpn9C8

Experienced Python Skills		
Topic	**Language**	**Outcome**
Decorators	Python	Advanced
MetaClass	Python	Advanced
Concurrency	Python	Advanced
Parallelism	Python	Advanced
Cynthon	Python	Advanced

Below, you'll find a list of reference materials for **essential skills** in Python:

https://www.pythontutorial.net/advanced-python/
https://www.pythontutorial.net/advanced-python/
[pandas - Python Data Analysis Library](https://pandas.pydata.org/)

SQL Programming

SQL (Structured Query Language) forms the cornerstone of relational database interaction. Proficiency in SQL enables tasks such as data manipulation, retrieval, and management within databases. This powerful language is integral for data scientists, analysts, and developers in accessing and handling data effectively.

In this competency, we evaluate the development of essential and experienced skills in SQL.

Essential SQL Skills		
Topic	**Language**	**Outcome**
Where clauses (in, between, etc.)	SQL	Basic
Update syntax	SQL	Basic
Inner vs. left vs. right join - understanding and usage	SQL	Basic
Syntax for altering and creating tables	SQL	Basic
Temp tables - usage	SQL	Basic
Cursors	SQL	Basic
Foreign keys (understand what they are for and how to work around them)	SQL	Basic
Transactions - basics	SQL	Basic
Group bys, with aggregate functions	SQL	Basic
coalesce	SQL	Basic
Indexes (understand what they are for, not how to use them)	SQL	Intermediate
Constraints	SQL	Intermediate
How indexes work (clustered, non-clustered)	SQL	Intermediate
Pages and how to implement them	SQL	Intermediate
Subqueries, and how to use them in joins and wheres	SQL	Intermediate
Pivots	SQL	Intermediate
Joining a table on itself	SQL	Intermediate
Understands OLAP and OLTP and where/when to use OLAP	SQL	Intermediate
Triggers	SQL	Intermediate
Understands transactions and layer them, handling failures	SQL	Intermediate
Query tuning with hints	SQL	Intermediate
CTE (common table expression)	SQL	Intermediate
Understandig Views(virtual table)	SQL	Intermediate

Below, you'll find a list of reference materials for **essential skills** in SQL:

https://www.mysqltutorial.org/mysql-basics/
https://lgatto.github.io/sql-ecology/01-sql-basic-queries.html

Experienced SQL Skills		
Topic	**Language**	**Outcome**
Profiling (resource usage)	SQL	Advanced
Execution plans, and understand how queries impact	SQL	Advanced
Traces and profiles for real-world executions	SQL	Advanced
Performance counters	SQL	Advanced
OLAP cube	SQL	Advanced
Distributed transactions, with layers	SQL	Advanced

Below, you'll find a list of reference materials for **experienced skills** in SQL:

https://www.mysqltutorial.org/advanced-mysql/
https://dev.mysql.com/doc/

Software Development Frameworks

Software development frameworks are comprehensive toolkits that lay the foundation for crafting robust applications. These frameworks encompass essential features like user authentication, database accessibility, and web routing, empowering developers to streamline the application development process.

In this competency, we evaluate the development of the following:

Skills	Git, and version control Jira Docker CI/CD Using a remote machine
Knowledge	Frontend Frameworks (React, Angular) Backend Frameworks (Django, Ruby on Rails) Cloud Computing Platforms (AWS, Azure, Google Cloud)
Ideas	Investigating Cross-Platform Development Frameworks, Experimenting with NoSQL databases and Big Data technologies
Attitudes	Adaptability to Emerging Technologies and Frameworks, Code Quality and Maintainability

Below, you'll find a list of reference materials for **software development skills**
https://docs.flutter.dev/get-started/install/macos
https://docs.docker.com/get-started/

Git/version control

Git/version control enables teams to collaboratively work on code by providing a versioning system that tracks changes, allowing for seamless collaboration, easy rollback, and better code management. Understanding Git and version control is crucial for maintaining code integrity and efficiency in a collaborative environment.

https://www.atlassian.com/git

https://medium.com/free-code-camp/learn-the-basics-of-git-in-under-10-minutes-da548267cc91

Continuous Integration/Continuous Deployment (CI/CD)

CI/CD is an essential part of the development pipeline. CI involves automatically integrating code changes from multiple contributors into a shared repository, where automated tests are run to validate the changes. CD, on the other hand, automates the process of deploying code to production or staging environments, ensuring that new features and bug fixes are efficiently delivered to end-users.

Jenkins User Documentation
https://realpython.com/python-continuous-integration/
https://www.asapdevelopers.com/python-for-ci-cd/

Sharing results, collaboration, and communicating with your (remote) team

Effective communication, collaboration, and result-sharing are paramount, especially in remote work scenarios. Familiarity with tools like Git, GitHub, and project management platforms facilitates seamless teamwork and ensures efficient sharing of progress and outcomes.

In this competency, we evaluate the development of the following:

Skills	Using Slack Business English Proof reading
Knowledge	What storytelling is How to undergo idea sparring Slides vs. a document
Ideas	How teamwork benefits from individual effort
Attitudes	Community progress

A list of reference materials:
- [Best Remote Work Management Practices (& Mistakes to Avoid)](#)
- [Six ways to build a solid community | Opensource.com](#)

Data and Analytics Engineering

Data and analytics engineering revolves around constructing and maintaining data pipelines and processing systems. Professionals in this domain design, create, and deploy systems capable of handling and analyzing vast quantities of data, making it a critical facet of modern data-driven enterprises.

In this competency, we evaluate the development of the following:

Skills	Building an ETL pipeline Data streaming
Knowledge	Where data engineering fits into the AI pipeline
Ideas	How to deal with streaming of high-speed/high-volume datasets
Attitudes	Data-driven decision making, Openness to feedback

Below, you'll find a list of reference materials for **essential skills** in data and analytics engineering:

dbdiagram.io - Database Relationship Diagrams Design Tool
Merging dataframes

Below, you'll find a list of reference materials for **experienced skills** in data and analytics engineering:

Apache Airflow
dbt Docs - dbt Labs

Deep Learning and ML model development

This competency focuses on building and training machine learning models, with an emphasis on deep learning techniques. These models play a pivotal role in making predictions, categorizing data, and even generating text with creativity and nuance.

In this competency, we evaluate the development of the following:

Skills	A/B testing Model tuning
Knowledge	Object detection LSTM
Ideas	Where ML modelling fits into the AI workflow Quality of data vs. quality of model
Attitudes	Scalability Reliability

Below, you'll find a list of reference materials for **essential skills** in deep learning and ML model development:

https://course.fast.ai/
Analyzing and Comparing Deep Learning Models

Below, you'll find a list of reference materials for **experienced skills** in deep learning and ML model development:
https://www.mathworks.com/discovery/machine-learning-models.html
https://docs.aws.amazon.com/wellarchitected/latest/machine-learning-lens/ml-lifecycle-phase-model-development.html

Prompt Engineering

Prompt engineering is an essential aspect of working with large language models. This process entails crafting and designing prompts to steer the output of a language model, influencing factors such as writing style and content type.

In this competency, we evaluate the development of the following:

Skills	Understanding of natural language processing (NLP) and machine learning (ML), Ability to write clear, concise, and effective prompts
Knowledge	Prompt engineering to improve the performance of NLP and ML models
Ideas	Solving real-world problems, design prompts that are fair, unbiased, and inclusive
Attitudes	Design prompts that are fair, unbiased, and inclusive

Below, you'll find a list of reference materials for **essential skills** in prompt engineering:

https://medium.com/@fareedkhandev/prompt-engineering-complete-guide-2968776f0431
https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/

Below, you'll find a list of reference materials for **experienced skills** in prompt engineering:
https://wavelineai.medium.com/extract-data-from-documents-with-chatgpt-1ad6a507a3f0
https://github.com/dair-ai/Prompt-Engineering-Guide/blob/main/guides/prompts-chatgpt.md