

Gen AI Roadmap for Beginners

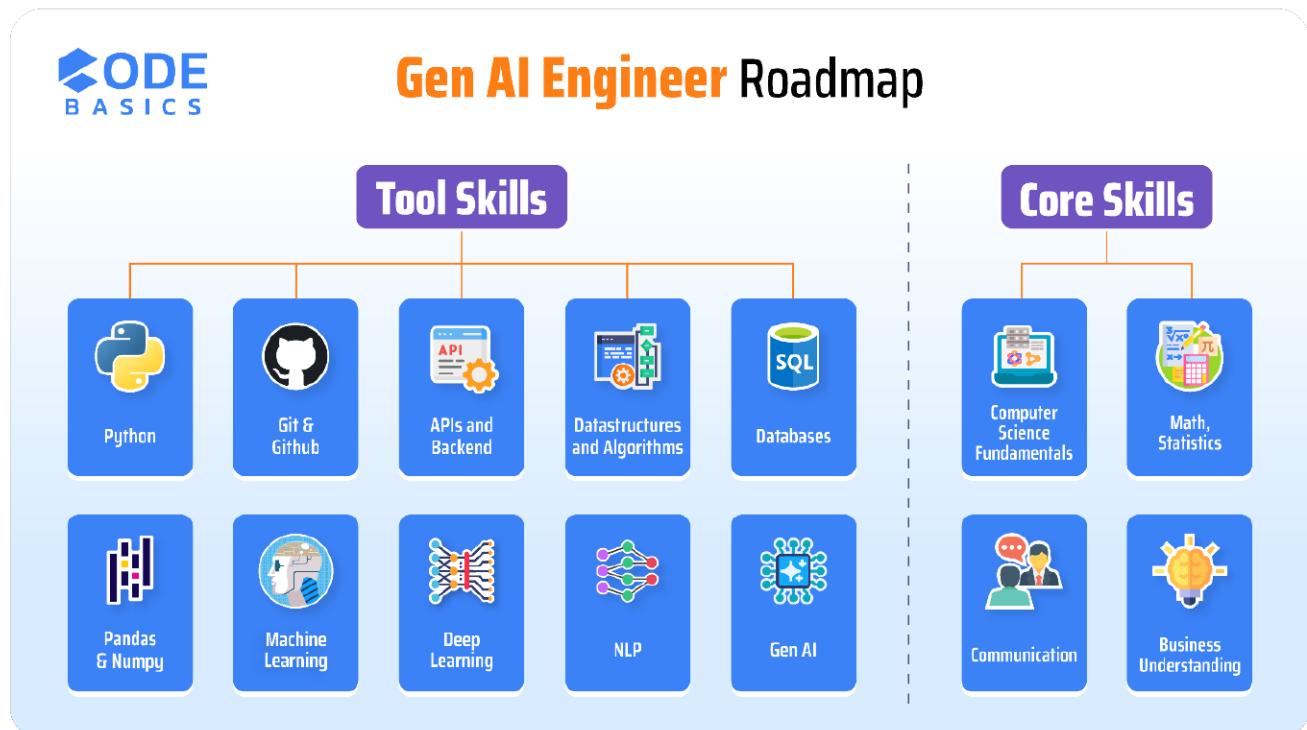
Following is the roadmap to learning **Gen AI Skills** for a total beginner. It includes FREE learning resources for technical skills (or tool skills) and soft (or core) skills 🚀

This roadmap will help you become a Gen AI Engineer (a.k.a Gen AI Developer)

Find Your Suitability: Before you start your learning journey, it is important you find out if AI engineering career really suits your natural abilities and interests. Take this test to know your suitability: <https://codebasics.io/survey/find-your-match-ds>

Proceed further if the results show that this career role matches you.

Total Duration: **6 Months (4 hours)** of study every day, 6 days a week)



Week 0: Computer Science Fundamentals

- **Topics**
 - Data representation: Bits and Bytes, Storing text and numbers, Binary number system.
 - Basics of computer networks, IP addresses, Internet routing protocol
 - UDP, TCP, HTTP, and The World Wide Web
 - Programming basics: variables, strings, and numbers, if condition, loops
 - Algorithm basics
- **Learning Resources**
 - Khan Academy course: <https://bit.ly/42DUXtW>
 - In the above course, only follow the first 4 sections (1) Digital Information (2) The Internet (3) Programming (4) Algorithms. Completing the remaining sections is optional. Do it if you have time and interest.
 - **EXTREMELY IMPORTANT:** Use ChatGPT 🤖 as your personal tutor in case you have doubts and you need clarity on anything

Skip this section if you are already a software engineer, computer science student or know the above fundamentals due to whatever reason.

Week 0: Clear Misconceptions

1. Do not think you will learn LangChain and you can become a Gen AI programmer. You need to have a strong base in AI fundamentals, Math and Backend programming. The real skill is not to know some tool such as Langchain. The real skill is to understand a business problem and then figure out a correct tool and then to use that tool wisely to solve a business problem.
2. Learning Gen AI skills is a long-term process requiring multiple skills. Through this roadmap you will cover essential fundamentals but after that you need to learn continuously
3. Do not fall for “get rich quick” schemes. If someone is selling you a course with “Job guarantee” then that clearly means they are lying, and their goal is not increase their sales and not teach you any real skills.

Week 1: Beginners Python

- **Why learn this?**
 - Python is THE programming language used for building Gen AI solutions. As a Gen AI engineer, you will use this programming language almost daily hence you should have strong Python fundamentals
- **Topics**
 - Variables, Numbers, Strings
 - Lists, Dictionaries, Sets, Tuples
 - If condition, for loop
 - Functions, Lambda Functions
 - Modules (pip install)
 - Read, Write files
 - Exception handling
 - Classes, Objects
- **Learning Resources**
 - Track A (Free)
 - Python Tutorials (Codebasics) on YouTube (first 16 videos)
- <https://bit.ly/3X6CCC7>
 - Corey's Python Tutorials: <https://bit.ly/3uqUgaZ>
 - Codebasics python HINDI tutorials - <https://bit.ly/3vmXrgw>
 - **EXTREMELY IMPORTANT:** Use ChatGPT 😊 as your personal tutor in case you have questions or facing issues
 - Track B (Affordable Fees)
 - AI Bootcamp: <https://codebasics.io/bootcamps/ai-data-science-bootcamp-with-virtual-internship>
- **LinkedIn - Core Skill**
 - Create a professional-looking LinkedIn profile.
 - Have a clear profile picture and banner image.
 - Add tags such as: Open to work etc.
 - Use this LinkedIn Checklist to create a profile: [Click here.](#)

- **Assignment**

- Finish all these exercises: <https://bit.ly/3k1mof5>
- Create a professional-looking LinkedIn profile.
- Ask ChatGPT to take your test by writing this prompt "Take Python MCQ test for basic concepts such as variables, strings, dictionaries, for loop, if, read write files, classes etc. Ask one question at a time, let me answer it and then evaluate the answer"

- **Motivation**

- Check this testimonial that we got in our AI engineer roadmap video where a bank employee became AI engineer with self-study with discipline

@DH0809 1 year ago

Just want to send my sincere thanks Dhaval, I'm from Vietnam, used to be a 30-year-old bank employee struggling with my career and having no tech background. In April 2023, I started learning basic Python, in June discovered your channel and followed your roadmap by watching all the ML and DL playlists, dedicating most of my time to practice. In October, I polished my resume with your guided projects and began applying to tech companies. Faced many failures but didn't give up, finally got accepted into an AI internship program. Imagine a 30-year-old guy (now 31 :D) competing in the internship program with fresh graduates from top tech universities, sounds crazy, right? And now, after 3 months of internship, I've been offered a full-time position as an AI Engineer with the highest evaluation score from the internship program. Thank you for everything, and I also want to convey to all viewers of this channel: Never give up!

Show less

1.3K · 58 replies

Week 2, 3: Data Structures and Algorithms in Python

- **Why learn this?**

- Through strong DSA fundamentals, a Gen AI engineer can build scalable and efficient Gen AI solutions that require processing huge volume of data, optimizing inference and fine-tuning pipelines.

- **Topics**

- Data structures basics, Big O notation
- Data structures: Arrays, Linked List, Hash Table, Stack, Queue
- Data structures: Tree, Graph
- Algorithms: Binary search, Bubble sort, quick sort, merge sort
- Recursion

- **Learning Resources**

- DSA YouTube Playlist: <https://bit.ly/3uiW2Lf>
- One of the testimonials for this playlist: <https://bit.ly/4iYaBb7>

A LinkedIn post from Stephanie Su, a 2nd-year SWE Intern at Meta, sharing her preparation tips for technical interviews. She discusses studying data structures like lists, strings, linked lists, heaps, dictionaries, stacks, queues, and graphs, and reviewing their implementations and time complexities in Python. A red oval highlights a section of resources at the bottom right.

Stephanie Su • 2nd
SWE Intern @ Meta | CS + Regents' Scholar @ UC Berkeley | Lead Director @ Superposition

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How I prepared for my **Meta** technical interviews:

1) Studying data structures
Ex. Lists, strings, linked lists, heaps, dictionaries, stacks, queues, graphs.

I reviewed each data structure's implementation and time complexity for various operations in Python, my preferred language.

★ Resources

- Dhaval Patel's Python DSA playlist lnkd.in/gyb4uFaV
- Big-O Cheat Sheet lnkd.in/gsHUuGQ8
- UC Berkeley Data Structures course lnkd.in/g5cXVFMm

- **Assignment**

- Finish all these exercises in this same playlist: <https://bit.ly/3uiW2Lf>
- ChatGPT test: Write this prompt in ChatGPT "Take my data structures and algorithms test covering big O notation, arrays, linked list, hash table, stack, queue and graph. Ask MCQ questions one by one and after I answer each question, please tell me if my answer is correct or not"

Week 4: Advance Python

- **Why learn this?**

- Advance Python concepts in this section will enable Gen AI engineer to write clean, efficient and high-performance code. These concepts are vital for tasks like data pipeline optimization, model serving and parallel execution of AI workloads

- **Topics**

- Inheritance, Generators, Iterators
- List Comprehensions, Decorators
- Multithreading, Multiprocessing

- **Learning Resources**

- Python Tutorials (Codebasics) on YouTube (17th to 27th video)
 - <https://bit.ly/3X6CCC7>

- **Assignment**

- Finish all these exercises in this same playlist: <https://bit.ly/3X6CCC7>

Core/Soft Skills

- **Linkedin**

- Start following prominent AI influencers.
 - Yann LeCun: <https://www.linkedin.com/in/yann-lecun/>
 - Andrej Karpathy: <https://x.com/karpathy?lang=en>
 - Clem (HuggingFace CEO): <https://x.com/ClementDelangue>
 - Daniel Han (Unsloth founder): <https://x.com/danielhanchen>
 - Nitin Aggarwal: <https://www.linkedin.com/in/ntnaggarwal/>
 - Dhaval Patel: <https://www.linkedin.com/in/dhavalsays/>
- Increase engagement.
 - Start commenting meaningfully on AI and career-related posts.
 - Helps network with others working in the industry build connections.
 - Learning and brainstorming opportunity.
- Remember ***online presence is a new form of resume***

- **Business Fundamentals - Soft Skill**

- Learn business concepts from ThinkSchool and other YT Case Studies
- Example: How Amul beat competition: <https://youtu.be/nnwqtZiYMxQ>

- **Discord**

- Start asking questions and get help from the community. This post shows how to ask questions the right way: <https://bit.ly/3I70Ebl>
- Join codebasics discord server: <https://discord.gg/r42Kbuk>

- **Assignment**

- Ask ChatGPT to take your test on advanced Python concepts in this section
- Write meaningful comments on at least **10 AI related LinkedIn posts**
- Note down your key learnings from **3 case studies** on ThinkSchool and share them with your friend.

- **Motivation**

- ML Engineer after 12th: <https://bit.ly/3DqwLY>

Week 5: Databases: Relational DB and SQL

- **Why learn this?**

- Gen Engineer would often retrieve data from relational databases to build AI applications. Therefore, it is good to have knowledge of the basics of SQL and relational databases.

- **Topics**

- Basics of relational databases.
 - Basic Queries: SELECT, WHERE LIKE, DISTINCT, BETWEEN, GROUP BY, ORDER BY
 - Joins: Left, Right, Inner, Full
 - ORM such as sqlalchemy

- **Learning Resources**

- [Khan academy SQL course](https://www.khanacademy.org/computer-programming/sql-course): <https://bit.ly/3WFku20>
 - <https://www.w3schools.com/sql/>
 - <https://sqlbolt.com/>
 - YT video: <https://youtu.be/Rm0xH2Vpfi0?si=6ZLK8A5LvGqN4NmT>

- **Assignment**

- Take help from ChatGPT to practice SQL questions
 - Send connection requests to at least **10 Gen AI Engineers** working in the industry
Build a rapport with them, if possible, set up a phone call or video call to learn about the kind of work they are doing in their job

Week 6, 7: APIs and Backend Development

- **Why learn this?**
 - Gen Engineer is responsible for writing backend servers that wrap the trained model or existing LLMs (GPT, LLaMa etc.) to serve specific needs of client software programs through REST or streaming APIs. Therefore, it is MUST to have a strong knowledge of API and backend development
- **Topics**
 - What is API?
 - REST protocol
 - FastAPI for Python server development
 - Container Fundamentals
- You will use FastAPI to serve the client calls. The backend will serve the ML model or the agent
- **Learning Resources**
 - FastAPI tutorial: <https://bit.ly/497p6Ex>
 - Docker Tutorial: <https://bit.ly/3uCNpeE>
 - Build an end-to-end Python project for Grocery store: <https://bit.ly/42d77u8>
- **Assignment**
 - Take this Grocery store app project <https://bit.ly/42d77u8> where flask is used for backend. Change that to FastAPI
 - Also finish exercises given in a README file: <https://bit.ly/3XKIRiJ>
 - Join local toastmasters club: <https://www.toastmasters.org/find-a-club> and start attending their sessions regularly

Week 8: Version Control (Git, GitHub)

- **Why learn this?**
 - Gen AI Engineers work in teams with other engineers. They often collaborate on a common code base. To synchronize code changes and collaborate effectively, you need to have a knowledge on version control system. Git is the most popular version control system whereas Github is a tool that uses Git internally as a version control system.

- **Topics**
 - What is the version control system? What is Git and GitHub?
 - Basic commands: add, commit, push.
 - Branches, reverting change, HEAD, Diff and Merge
 - Pull requests.
- **Learning Resources**
 - YT playlist (codebasics): <https://bit.ly/3SECQQ7>
 - YT playlist (Corey): <https://bit.ly/3T0Yrmb>
- **Core/Soft Skills**
 - Presentation skills
 - Death by PowerPoint: <https://youtu.be/lwpi1Lm6dFo>
- **Assignment**
 - Create your Github account. Check in the Python project that you built in a previous week for grocery store app to Github along with README, requirements.txt files etc.
 - Give 1 presentation in your college or in some community event
 - Participate actively in toastmasters where you are giving at least two speeches
- **Motivation**
 - How Kaggle helped this person become ML engineer: <https://bit.ly/3RFVruy>

Week 9: Databases: NoSQL DB

- **Why learn this?**
 - Many organizations use NoSQL databases to store their objects, documents and other types of data. For building Gen AI applications, especially RAG apps, you need to know how to pull the data from NoSQL database. This section will teach you the necessary skills for the same.
- **Topics**
 - NoSQL Fundamentals: Why NoSQL became popular – scalability challenges, unstructured data, real-time analytics etc.
 - Data Modeling in NoSQL

- Base vs. ACID, Data Partitioning and Sharding, Replication, CAP Theorem

- **Learning Resources**

- How do NoSQL DB work: <https://bit.ly/3XMIKmF>
- MongoDB Tutorial: <https://bit.ly/3DKf9ST>

- **Core/Soft Skills**

- **Project Management**
 - Scrum: <https://scrumtrainingseries.com/>
 - Kanban: <https://youtu.be/jf0tlbt9lx0>

Tools: JIRA, Notion

- **Assignment**

- Use ChatGPT to give you one practical assignment for MongoDB and finish that assignment
- Discord: Help people with **at least 10 answers**
- LinkedIn: Write 3 meaningful posts about your learning journey, projects, AI updates etc. Example post: <https://bit.ly/4co6kLB>

- **Motivation**

- Mechanical to Deep Learning Engineer: <https://bit.ly/48IX9aR>

Week 10: NumPy, Pandas, Data Visualization

- **Why learn this?**

- These tools help explore the dataset and clean it before training the model. Gen AI engineers spend a lot of time in this data pre-processing step and it is must to have knowledge on these tools

- **Topics**

- Numpy n dimensional array
- Numpy basic operations: arrange, size, zeros, std, max, min, sum, dot etc.
- Pandas dataframe object.
- Dataframe operations: apply, filter, merge, stack, read/write excel files

- Handling missing data, handle outliers
- Data visualization with Matplotlib and Seaborn

- **Learning Resources**

- **Numpy**
 - numpy YouTube playlist: <https://bit.ly/3GTppa8>
- **Pandas, Matplotlib, Seaborn**
 - Go through chapter 4 in math/stats module (entire chapter is free): <https://codebasics.io/bootcamps/ai-data-science-bootcamp-with-virtual-internship>

- **Assignment**

- Use Huggingface or Kaggle dataset and work on two EDA notebooks
- Attend one AI conference online or in person (in person is the best). For example, here is the one: <https://codebasics.io/lp/ai-and-data-fest-2025>

Week 11, 12: Math for Gen AI

- **Why learn this?**

- Gen AI engineering is not just about calling readymade apis. It often involves using the right algorithms for training, inference and evaluation. This requires STRONG math fundamentals. Hence you need to build math skills so that you can deliver solutions that meet the client's expectations.

- **Topics to Learn**

- Linear Algebra: Vectors, Metrices, Dot Product
- Calculus: Derivatives, gradients, chain rule
- Basic plots: Histograms, pie charts, bar charts, scatter plot etc.
- Measures of central tendency: mean, median, mode
- Measures of dispersion: variance, standard deviation
- Probability theory: Basics of probability, Bayes theorem, conditional probability, probability density, entropy, maximum likelihood estimation

- **Learning Resources**

- Track A (Free)
 - Linear algebra playlist (3b1b): <https://bit.ly/4i5tRCi>
 - Learn the above topics from this excellent Khan academy course on statistics and probability.
 - Course link: <https://www.khanacademy.org/math/statistics-probability>
 - While doing khan academy course, when you have doubts, use statquest YouTube channel: <https://www.youtube.com/@statquest>
 - Use this free YouTube playlist: <https://bit.ly/3QrSXis>
 - Calculus playlist (3b1b): <https://bit.ly/3XMUSmK>
- Track B (Affordable Fees)
 - AI Bootcamp: <https://codebasics.io/bootcamps/ai-data-science-bootcamp-with-virtual-internship>

- **Assignment**

- Finish all exercises in this playlist: <https://bit.ly/3QrSXis>
- Finish all exercises in Khan academy course.
- Track B: Finish exercises and quizzes for relevant topics.
- Start writing blogs on AI and Math topics. E.g. Blog from Himanshu: tinyurl.com/himanshusblogs

Week 13, 14: Statistical Machine Learning

- **Why learn this?**

- Read this post to understand importance of statistical ML in the age of Gen AI? <https://bit.ly/4iUcCVP>

- **Machine Learning: Preprocessing**

- Handling NA values, outlier treatment, data normalization
- One hot encoding, label encoding
- Feature engineering
- Train test split
- Cross validation

- **Machine Learning: Model Building**
 - Types of ML: Supervised, Unsupervised
 - Supervised: Regression vs Classification
 - Linear models
 - Linear regression, logistic regression
 - Gradient descent
 - Nonlinear models (tree-based models) (***Optional***)
 - Decision tree
 - Random forest
 - XGBoost
 - Model evaluation
 - Regression: Mean Squared Error, Mean Absolute Error, MAPE
 - Classification: Accuracy, Precision-Recall, F1 Score, ROC Curve, Confusion matrix
 - Having in depth understanding of which metric to use when. It is art as well as science. For example:
 - Recall: Cancer detection
 - Precision: Spam classification
 - Bias and Variance Tradeoff
 - Hyperparameter tuning: GridSearchCV, RandomSearchCV
 - Unsupervised: DBSCAN, K Means (***Optional***)
- **Learning Resources**
 - Track A
 - YouTube playlist (more than 2 million views): <https://bit.ly/3io5qqX>
 - In this watch video 1 to 9, 11 to 13, 16, 21
 - Track B (Affordable Fees)
 - AI Bootcamp: <https://codebasics.io/bootcamps/ai-data-science-bootcamp-with-virtual-internship>
- **Core/Soft Skills**
 - Community skills
- **Assignment**
 - Complete relevant exercises in ML playlist: <https://bit.ly/3io5qqX>
 - Work on **2 Kaggle ML notebooks**
 - Write **2 LinkedIn posts** on whatever you have learnt in ML
 - Track B: Finish exercises and quizzes for relevant topics

- Attend as volunteer in one of the AI events. Volunteering help you build excellent community skills which will help you job referrals as well as professional growth. Here is the pic of volunteers from AI and Data Fest, 2025 - Hyderabad



Week 15, 16: Deep Learning

- **Why learn this?**
 - LLMs are built using deep learning. Hence having a foundation in deep learning helps in customizing models, fine-tuning them etc.
- **Topics**
 - What is a neural network? Forward propagation, back propagation
 - Building multilayer perceptron
 - Activation functions (ReLU, Tanh, Sigmoid)
 - Loss Functions (MSE, Cross Entropy)
 - Optimizers (SGD, Adam)
 - Special neural network architectures (**Optional**)
 - Convolutional neural network (CNN)
 - Sequence models: RNN, LSTM
 - Why did RNN and LSTM not scale?
 - Transformer architecture (Must)
- **Learning Resources**
 - Track A (Free)
 - Deep Learning playlist (tensorflow): <https://bit.ly/3vOZ3zV>
 - End to end potato disease classification project: <https://bit.ly/3QzkVJi>

- CampusX PyTorch playlist: <https://bit.ly/43yldbP>
 - CampusX 100 days of deep learning: <https://bit.ly/41ZrfkD>
 - Book on Deep Learning: <https://d2l.ai/>
- Track B (Affordable Fees):
 - AI bootcamp: <https://codebasics.io/bootcamps/ai-data-science-bootcamp-with-virtual-internship>

- **Assignment**

- Instead of potato plant images use tomato plant images or some other image classification dataset.
- Deploy to Azure instead of GCP.
- Create a presentation as if you are presenting to stakeholders and upload video presentation on LinkedIn. Here is an example post: <https://bit.ly/3FVMFGN>

Week 17, 18: NLP (Natural Language Processing)

- **Topics**

- Regex
- Text preprocessing: Tokenization, stemming, lemmatization, NER, POS
- Text presentation: Count vectorizer, TF-IDF, BOW, Word2Vec, Embeddings
- Text classification: Naïve Bayes
- Fundamentals of Spacy & NLTK library
- One end to end project.

- **Learning Resources**

- NLP YouTube playlist: <https://bit.ly/3XnjfEZ>

- **Assignment**

- NLP Track: Complete exercises in this playlist: <https://bit.ly/3XnjfEZ>
- Participate in open source by fixing one issue in any open-source repository.
For example: <https://github.com/pandas-dev/pandas/issues> Here search for issues with Label good first issue and pick any one issue, solve it and raise a PR

The screenshot shows a GitHub search results page with the query `is:issue state:open label:"good first issue"`. The results are filtered by 'Newest' and show four issues:

- BUG: date comparison fails when series is all pd.NaT values** - Bug, Datetime, good first issue. Opened by imrehg last week.
- BUG: CustomBusinessDay not respecting calendar** - Bug, Frequency, good first issue. Opened by benmgrant on Jan 2.
- TST: Make test_sql.py parallelizable** - good first issue, IO SQL, Testing. Opened by WillAyd on Nov 20, 2024.
- DOC: fix docstring validation errors for pandas.Timestamp** - Code Style, Docs, good first issue. Opened by natmokval on Aug 9, 2024.

Week 19, 20: Gen AI Basics

- **Topics**

- What is Gen AI? What is LLM?
- Understand different LLMs and their capabilities: e.g. OpenAI GPT, Anthropic Claude Sonnet, Google Gemini, Meta's LLaMa etc.
- Building effective prompts: Zero shot, one shot and a few shot prompt, CoT (Chain of Thought prompting), Contextual (RAG) prompt
- Vector databases and Embeddings.
 - Explore at least one vector db from this list: Chromadb, Qdrant, Pinecone, pgvector, FAISS
 - Dockerized version of vector db
- Fundamentals of RAG (Retrieval Augmented Generation)
- Langchain framework

- **Learning Resources**

- Gen AI crash course: <https://bit.ly/3Fn7Zoh>
- HuggingFace NLP Course: <https://huggingface.co/learn/llm-course/chapter1/1>
- Intro to LLM (Andrej Karpathy): <https://bit.ly/3XJaXtF>

- **Assignment**

- Practice Gen AI Basics questions through ChatGPT.
- Attend more offline community events. For example: IDC (Indian Data Club) <https://www.indiandataclub.com/> organizes many such events. You can attend as a volunteer or participant.

- Build friendship with other Gen AI aspirants that you meet during offline events. Make a group with them and exchange ideas together.

Week 21, 22: Gen AI Advanced

- **Topics**

- Basics of AI Agents
- Hands on with one agentic framework: Agno (previously called phidata), smolagents, LlamaIndex, LangGraph
- Multimodel agentic systems
- Model Context Protocol (MCP)
- Building Agentic apps using MCP
- Model fine tuning: LoRA, Prefix Tuning, P-Tuning, Unslot and trl library, distillation, RL
- SLMs -Small Language Models (**Optional**)
 - SmoLLM (1.7B), Llama3.2 (1B), Qwen2.5 (1.5B), DeepSeek-R1 (1.5B)

- **Learning Resources**

- AI Agents Tutorial: <https://bit.ly/4io8YD5>
- HuggingFace Agents Course: <https://bit.ly/42faa57>
- What is MCP: <https://bit.ly/4ia1ymk>
- Additional Reading
 - Blog: <https://huyenchip.com/blog/>
 - Book: <https://www.amazon.in/AI-Engineering-Building-Applications-Foundation/dp/1098166302>

- **Assignment**

- Participate Gen AI Hackathon (you can Google and find many such events)
- On Codebasics.io, you will see upcoming AI resume project challenges. Participate in them and make a LinkedIn post of your project

Week 23, 24: Gen AI Projects

- **Topics**

- Projects that include using LLMs, RAG, Agents to solve real life problems

- **Learning Resources**

- Real life Gen AI Project that uses a hybrid approach of Regex, BERT and LLM: https://youtu.be/Ji3_VX80YJg
 - Cold email generator using LLaMa, Chromadb and Langchain: https://youtu.be/CO4E_9V6li0
 - Linkedin post generator (Llama, Groq, streamlit): https://youtu.be/qZ_J-Xg0QM4
 - RAG application in finance: <https://youtu.be/MoqgmWV1fm8>
 - Gen AI project playlist: <https://bit.ly/4ilzEnX>
 - More projects coming up in this playlist

- **Assignment**

- Build professional looking project portfolio website. E.g. <https://codebasics.io/portfolio/Ishwar-Baba-Zore>
 - Prepare ATS friendly resume using these tips: <https://bit.ly/4i2Dame>
 - Have ChatGPT conduct your Gen AI mock interview

Week 25 Onwards

- More projects 
- Online brand building through LinkedIn, Kaggle, HuggingFace, Discord, Opensource contribution 
- Mock interviews
- Job application and Success 

Tips for Effective Learning 🔥

- **Spend less time in consuming information, more time in**
 - Digesting
 - Implementing
 - Sharing
- **Group Learning**
 - Use **partner-and-group-finder** channel on codebasics discord server for group study and hold each other accountable for the progress of your study plan. Here is the discord server link: <https://discord.gg/r42Kbuk>