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AI SUMMER OF CODE 2.0

SEASON 2 CURRICULUM ▶

Starting

JULY 26 – NOV 22

2025

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Specialist Pathway

01

APPLIED AI

Applying pretrained models and modern AI technologies to build intelligent applications

Week 1: Prelims

- Getting Started with LLMs
- Build Your First LLM App - Raw and Stupid
- Making LLMs Useful
- Model & Infrastructure Ecosystem for AI

Weeks 2–3: Prototypes

- Embeddings & Vector DBs
- Tokenization & Self Attention
- RAG Deep Dive
- Build a Streamlit Frontend for Your LLM App
- Chat Engines with Memory

Weeks 4–5: Pipelines

- Designing LLM Applications
- Data Engineering for AI
- Evaluating & Optimizing LLM/RAG Applications
- Building LLM Agents
- MCP & Multi-Agent Systems

Weeks 6–7: Products

- Conversational Analytics: RAG Over Databases
- AI Engineering: Building High-Performance AI Applications
- AI Engineering: PoC Deployments with Vercel

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02

ML FOUNDATIONS

Understanding and building the models that power intelligent systems

Week 1: Motivations

- Getting Started with ML
- Statistics Fundamentals
- Preparing Data for Machine Learning
- ML Workflow with Python & Scikit-Learn

Weeks 2–3: Methods

- Statistical Methods in Machine Learning
- Mathematical Methods in Machine Learning
- Introduction to Empirical Risk Minimization

Weeks 4–5: Algorithms

- Regression & Classification Deep Dive
- ML Experiment Design
- Conformal Prediction
- Unsupervised Learning
- Deep Learning

Weeks 6–7: Artifacts

- Feature Engineering & Selection
- Model Evaluation, Finetuning & Selection
- Introduction to Machine Learning Systems
- Practical Challenges in ML

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02

ML ENGINEERING

Building high-performance machine learning pipelines and systems for production use

Weeks 1–2: Premises

- Tooling & Infrastructure Ecosystem for MLE
- Statistical Methods in Machine Learning
- Mathematical Methods in Machine Learning

Week 3: Principles

- ML Experiment Design
- Conformal Prediction
- AutoML & Neural Architecture Search
- Model Evaluation, Finetuning & Selection

Weeks 4–5: Pipelines

- Algorithm Chains & Model Pipelines
- Designing ML Systems
- Data Management for ML
- High-Performance Machine Learning

Weeks 6–7: Production

- MLOps: Reproducibility & ML Infrastructure
- MLOps: Orchestration & Deployment
- Model Interpretability
- Data & Model Observability

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03

LLM ENGINEERING

Understanding, training and finetuning the models that power large-scale AI systems like ChatGPT & Gemini

Week 1 : Prelims

- Getting Started with LLMs
- Build Your First LLM App - Raw and Stupid
- Making LLMs Useful
- Model & Infrastructure Ecosystem for AI

Weeks 2–3: Premises

- Statistical & Mathematical Methods in ML
- Neural Nets, Deep Learning & LLM Architectures
- Tokenization & Self Attention
- Transformers from Scratch

Weeks 4–5: Pipelines

- Designing LLM Pipelines
- High-Performance LLM Engineering
- Supervised Finetuning
- Evaluation Techniques for LLMs

Weeks 6–7: Practices

- Model Serving & Inference Optimization
- LLM Alignment with Reinforcement Learning
- LLM Interpretability
- LLM Operations (LLMOps)

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04

PRODUCTION AI

Taking AI systems from models and prototypes to production and large-scale use

Wk 1: Motivations

- Getting Started with Production AI
- Making LLMs Useful
- Model & Infrastructure Ecosystem for AI

Wks 2–3: AI Engineering

- Understanding AI Models and Architectures
- Designing Production AI Systems
- High-Performance AI Engineering

Wks 4–5: AIOps

- Evaluating AI Systems
- AIOps Principles/Practices
- AI System Orchestration and Deployment
- Managing AI Failures
- Online Eval & A/B Testing

Wks 6-7: AI Governance

- Model Interpretability
- Data & Model Observability
- Ethics, Privacy & Legal AI
- Security for AI Systems
- Debugging Production AI Systems

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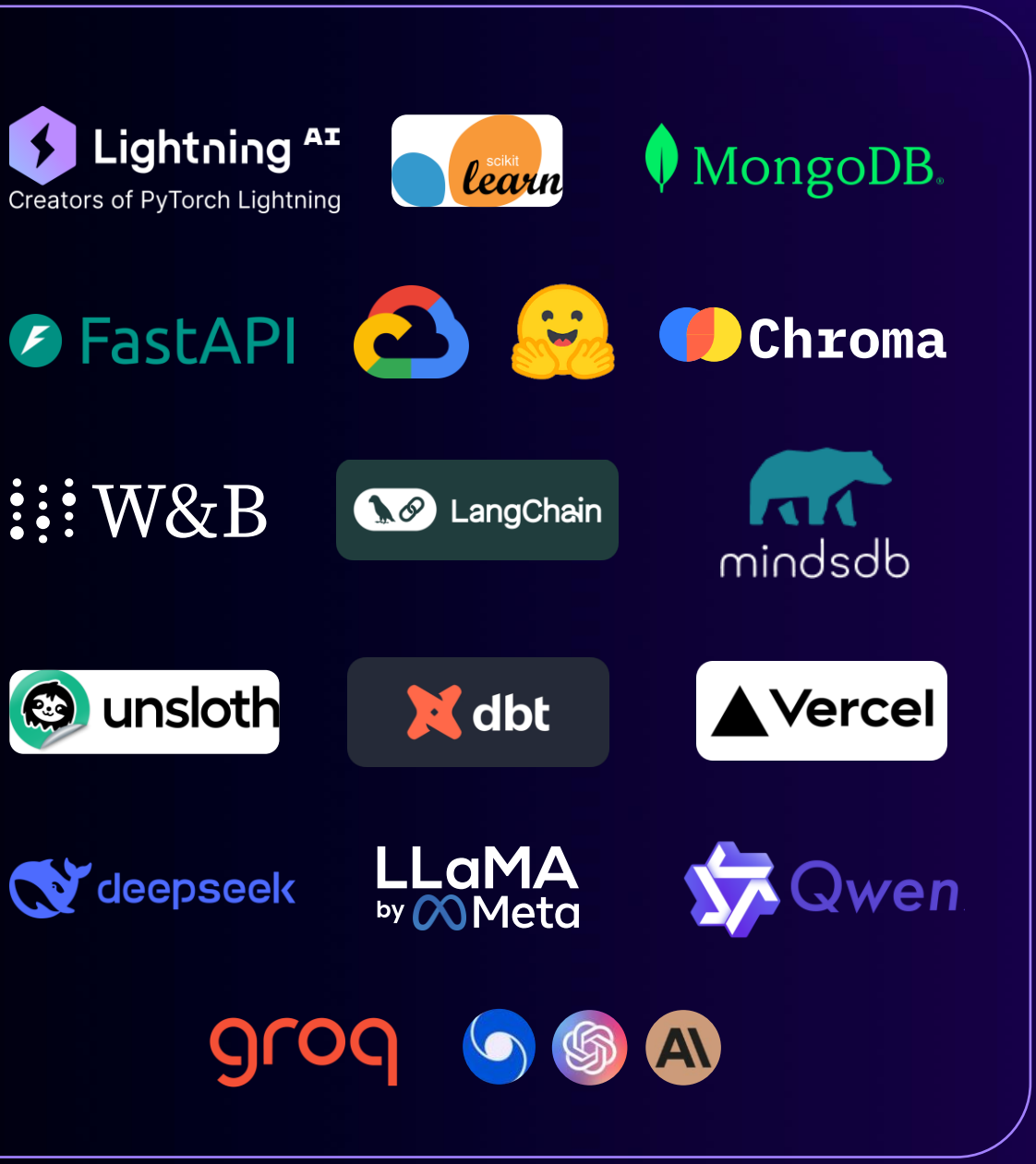
Modern AI tooling and infrastructure covered



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