



LLM Engineering and Prompt Design Curriculum



CURRICULUM FOR LLM ENGINEERING AND PROMPT DESIGN

MODULE 1: Foundations of Large Language Models

Topics

- Transformer Architecture
- Attention Mechanism
- Embeddings
- Positional Encoding
- Pre-training vs Fine-tuning
- RLHF vs RLAIIF
- Tokenization (BPE & SentencePiece)
- Context Windows & Long-Context Models

MODULE 2: LLM Constraints and Operational Characteristics

Topics

- Hallucinations
- Knowledge Cut-off
- Sycophancy
- Verbosity Bias
- Temperature
- Top-p
- Top-k
- Frequency Penalty
- Presence Penalty
- Multi-Modal Models
- Multi-SDK Fluency
- OpenAI
- Claude
- Gemini

MODULE 3: Prompt Design Fundamentals

Topics

- Zero-shot Prompting
- One-shot Prompting
- Few-shot Prompting
- Role Prompting
- Persona Design
- System Prompt Architecture
- Prompt Chaining
- Sequential Prompt Pipelines

MODULE 4: Advanced Reasoning Techniques

Topics

- Chain-of-Thought (CoT)
- Tree-of-Thought (ToT)
- Self-Consistency
- ReAct Prompting
- Reasoning vs Acting
- Multi-step Problem Solving

MODULE 5: Structured Outputs & Function Calling

Topics

- JSON Mode
- JSON Schema Enforcement
- Typed Outputs
- Function Calling
- Schema Design
- Parallel Tool Calls
- Structured Response Contracts

MODULE 6: Prompt Chaining and Multi-Step Workflows

Topics

- Prompt Chaining Concepts
- Sequential Prompt Pipelines
- Workflow Design
- Multi-Step Prompt Strategies
- Context Preservation
- Enterprise Workflow Patterns

MODULE 7: Prompt vs RAG vs Fine-Tuning Decision Framework

Topics

- Prompt Engineering
- Retrieval-Augmented Generation (RAG)
- Fine-Tuning
- Decision Framework
- Cost vs Accuracy Trade-offs
- Enterprise Use Cases

MODULE 8: Cost Optimization and Model Routing

Topics

- Token Counting
- Prompt Caching
- Cost Optimization
- Latency Optimization
- Model Routing
- Multi-Model Strategies

MODULE 9: Prompt Evaluation and Quality Assurance

Topics

- Prompt Evaluation
- Evaluation Metrics
- Benchmarking
- Automated Testing
- Quality Assurance
- Regression Testing

MODULE 10: Prompt Management and Version Control

Topics

- Prompt Version Control
- Prompt Management Systems
- PromptOps
- Experiment Tracking
- A/B Testing
- Governance & Documentation

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