THINKLAND.AI

# AI Coding (16+ y/o)

## AI Programming 501 – Advanced AI Systems

### Course Description

AI501 is designed as an advanced continuation of AI500, moving from understanding how AI systems work into exploring how they are scaled, optimized, and extended into new frontiers. The course emphasizes the design and evaluation of cutting-edge architectures, advanced retrieval methods, multi-agent coordination, and multi-modal systems. Students are also introduced to frontier challenges in alignment, governance, and real-world applications of AI at scale.

Through research-driven learning, hands-on exploration, and innovation projects, students will gain exposure to the methods that power the most advanced AI systems today. The course blends technical study with critical discussion of open problems, preparing students to think like researchers and innovators.

**By the end of AI501, students will be able to:**

- Explain advanced architectures
- Build and experiment with multi-agent and multi-modal systems.
- Analyze and implement advanced retrieval methods for domain-specific applications.
- Evaluate AI systems using modern benchmarks for reasoning, robustness, and safety.
- Conduct a research-style project that extends or applies advanced GenAI methods.

### Course Structure

AI501 is taught in two levels of eight modules each. Level 1 explores the foundations of advanced system design, including architectures, memory, multi-agent frameworks, optimization, and alignment. Level 2 extends into specialized models, autonomy, evaluation frameworks, and emerging applications, culminating in a major innovation project.

### Who Should Enroll

This course is for advanced students who have completed AI500 or have equivalent technical background. It is suited for those interested in research, system design, or building next-generation AI applications.

### Curriculum Outline

Level 1:

- Module 1: Advanced LLM Architectures
- Module 2: Memory and Long-Context Models
- Module 3: Multi-Agent Systems
- Module 4: Optimization and Efficiency at Scale
- Module 5: Advanced Retrieval-Augmented Generation (RAG)
- Module 6: Multi-Modal Foundation Models
- Module 7: Safety, Alignment, and Governance
- Module 8: Capstone Part III (Research/Build Project)

Level 2:

- Module 9: Custom Model Training and Fine-Tuning at Scale
- Module 10: Autonomy and Planning in AI Systems
- Module 11: Specialized Architectures and Domain Models
- Module 12: AI Evaluation and Benchmarking at the Frontier
- Module 13: Human-AI Collaboration Systems
- Module 14: Emerging Applications of GenAI
- Module 15: Open Problems in AI Research
- Module 16: Capstone Part IV (Innovation Project)

About: https://school.thinkland.ai/about

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