AIFI

ARTIFICIAL INTELLIGENCE
FINANCE INSTITUTE

AI AGENTS
IN FINANCE CERTIFICATE

SEPTEMBER 2025

OUTLINE COURSE

COURSE DESCRIPTION

This intensive, hands-on course explores cutting-edge **Large-Language-Model (LLM) Agents**-and their hybridisation with reinforcement learning-in the financial domain. Students design, orchestrate, interpret and govern agentic systems for algorithmic trading, fraud detection, risk management and personalised advisory. Every session features sub- stantial coding labs using production frameworks (OpenAI Responses SDK, AutoGen, CrewAI, LlamaIndex, LangChain) alongside emerging RL–tool-use libraries (ARTIST, ReCall, verl).

PREREQUISITES

- Working knowledge of Python programming.
- Introductory understanding of financial markets and instruments.
- Basic familiarity with machine-learning concepts; prior RL is helpful but not required.

LEARNING OUTCOMES

Upon completion students will be able to:

- Distinguish business workflows, AI-augmented workflows and autonomous AI agents.
- Combine orchestration, retrieval and RL frameworks for finance.
- Implement multi-agent crews that plan, code and self-correct using OpenAI Re- sponses, AutoGen and CrewAI.
- Build knowledge-integrated agents with Corrective-RAG and thought-tracing hooks.
- Augment LLM agents with RL reward layers for tool selection, compliance and performance.
- Evaluate agent safety with AgentBench tasks, tail-risk metrics and audit trails.

```
  attr_reader :ignored

  # An Array of observations which didn't match the
  attr_reader :mismatched

  # An Array of Observations in execution order.
  attr_reader :observations
```

COURSE OUTLINE (21 HOURS)

SESSION 1 Foundations - Workflows – AI Workflows – Agents (3 h)

- Working knowledge of Python programming.
- Introductory understanding of financial markets and instruments.
- Basic familiarity with machine-learning concepts; prior RL is helpful but not required.

SESSION 2 Multi-Agent Architectures & Collaboration Patterns (3 h)

- Crew roles, dynamic spawning, delegation and debate.
- Communication schemas, reflection, voting.
- Lab: three-agent investment committee parses SEC filings and issues a decision memo.

SESSION 3 Interpretability, Safety & Thought Tracing (3 h)

- Anthropic circuit tracing; scratch-pad logging & sanitisation.
- Governance: audit trails, pausable workflows.
- Lab: instrument advice agent with circuit traces and auto-redaction.

SESSION 4 Tool-Using & Coding Agents (3 h)

- Coder–Critic–Executor loops (Reflexion, Self-Refine).
- Safe sandboxing and unit-test-driven repair.
- MCP and advanced tools
- Lab: repair-bot iteratively fixes a faulty VaR calculator.

SESSION 5 Knowledge-Integrated Agents & RAG 2.0 (3 h)

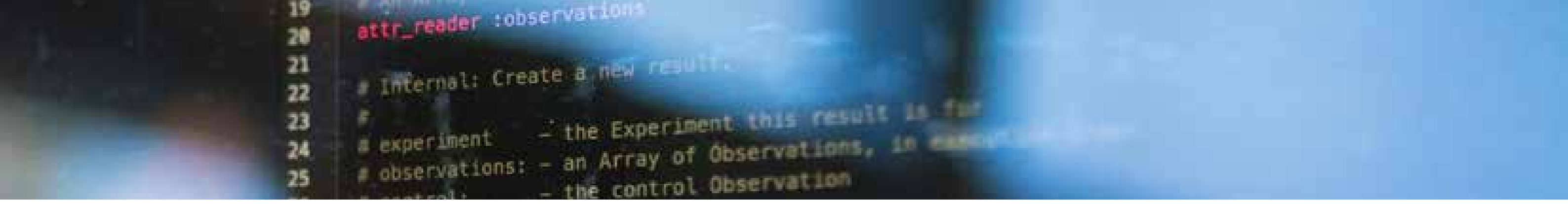
- Corrective-RAG (CRAG), Introspective Agents, structured retrieval.
- Stateful agents with Letta
- Streaming pipelines, vector-DB ops, compliance logging.
- **Lab**: streaming RAG agent ingests live 10-Q filings and flags covenant breaches.

SESSION 6 LLM Agents + RL Layers in Production Finance (3 h)

- **RL Adds Value**: RLHF/RLAIF and policy-level RL (ARTIST) for tool-selection and compliance.
- Turn-level credit assignment; ReCall & Agent-R1 for end-to-end tool-calling RL.
- **Hybrid market simulators**: TradingAgents crews, FinRL-Meta; LLM-only vs PPO trader comparison.
- **Evaluation**: AgentBench finance tasks, CRAG-based factual rewards, Self-Taught Eval- uator.
- **Lab**: four-agent prop-desk crew (planner, analyst, coder, risk officer) deployed in FinRL-Meta equities env-targets: Sharpe, CVaR, compliance.

SESSION 7 Evaluation, Governance & Deployment (3 h)

- **Benchmarks**: AgentBench, SWE-agent regression.
- **Risk metrics**: CVaR, stress scenarios, fail-rate.
- **Deployment pipelines**: blue–green, guard-rails, kill-switches, EU AI Act mapping.
- **Capstone**: monitoring dashboards and audit procedures.



```
    attr_reader :observations

    # Internal: Create a new result.
    #
    # experiment    - the Experiment this result is for
    # observations: - an Array of Observations, in execution order
    # control:      - the control Observation
```

ASSESSMENT METHODS

- **Practical Labs (60%)** – graded coding exercises.
- **Final Project (30%)** – finance-sector agent meeting safety & performance targets.
- **Participation (10%)** – engagement and peer reviews.

RECOMMENDED RESOURCES

- **Frameworks**: OpenAI Responses, AutoGen, CrewAI, LlamaIndex, LangChain.
- **RL & Tool-use**: ARTIST, ReCall, verl.
- **Benchmarks/Simulators**: AgentBench, TradingAgents, FinRL-Meta, SWE-agent.
- **Key Papers**: Tree-of-Thoughts, Algorithm-of-Thoughts, CRITIC, Corrective-RAG, Turn-Level Credit Assignment, Self-Taught Evaluator.
- **Interpretability**: Anthropic Circuits, Thought-Tracing Toolkit.

INSTRUCTORS

- Nickole Koenigstein
- Miquel Noguer i Alonso
- David Pacheco Aznar
- Miquel Trafi Ruiz

COURSE LOGISTICS

- **Course Duration** 21 Hours (7 lectures & 7 Office Hours)
- **Start Date** Monday, 8th September 2025
- **Course Fee** Standard Price: 2,000 USD
- **Discounts** **Super Early Bird:** 20% discount (1,600 USD) – Available until 4th July 2025
  Early Bird: 10% discount (1,800 USD) – Available until 8th August 2025

```
  Scientist::Result

    attr_reader :candidates

    attr_reader :control

    attr_reader :experiment

    attr_reader :ignored

    attr_reader :mismatched

    attr_reader :observations

    # Internal: Create a new result.
    #
    # experiment    - the Experiment this result is for
    # observations: - an Array of Observations, in [illegible]
    # control:      - the control Observation
    #
    def initialize(experiment, observations = [], control = nil)
      @experiment   = experiment
      @observations = observations
      @control      = control
      @candidates   = observations - [control]
      evaluate_candidates

      freeze
    end

    # Public: the experiment's context
    def context
      experiment.context
    end

    # Public: the name of the experiment
    def experiment_name
      experiment.name
```

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