

# Course : CrewAI, AI agent programming

*Practical course - 3d - 21h00 - Ref. PYY*

*Price : 2030 € E.T.*

NEW

CrewAI is a modern, lightweight framework designed specifically for the creation, orchestration and deployment of multi-agent artificial intelligence (AI) systems. It enables the creation of "teams" (or crews) of collaborative AI agents, each with a specialized role, clear objectives and specific tools. The aim of this course is to establish the theoretical foundations of agent-based programming using the CrewAI environment and the Python language.

## Teaching objectives

At the end of the training, the participant will be able to:

- ✓ Understanding the CrewAI environment and its various concepts
- ✓ Schedule and synchronize AI prompt tasks
- ✓ Learn the syntax of the Python language to build CrewAI teams
- ✓ Master collaboration mechanisms and integrate external tools to empower agents

## Intended audience

project managers wanting to acquire a precise vision of the techniques for using AI, traditional developers wanting to evolve towards AI.

## Prerequisites

Fundamental knowledge of programming and the use of artificial intelligence.

## Practical details

### Hands-on work

The course alternates lectures and practical work illustrating the concepts described.

## Course schedule

### PARTICIPANTS

project managers wanting to acquire a precise vision of the techniques for using AI, traditional developers wanting to evolve towards AI.

### PREREQUISITES

Fundamental knowledge of programming and the use of artificial intelligence.

### TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

### ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.

Participants also complete a placement test before and after the course to measure the skills they've developed.

## 1 Introduction and key AI concepts

- Fundamentals and introduction to AI.
- AI agent: definition, components (language model, memory, tools, planning).
- Multi-agent systems (MAS): advantages (specialization, robustness, complexity).
- Overview of orchestration frameworks (CrewAI, LangChain, AutoGen).

## 2 CrewAI: the AI agent team orchestrator

- Agent AI fundamentals and first steps with CrewAI.
- The basics of agent-based programming with CrewAI.

### Hands-on work

Set up the CrewAI environment to create a first agent.

## 3 CrewAI: focus on collaboration

- The fundamental concepts of CrewAI.
- Agent: definition of roles, objectives and personality.
- Task: definition of the objective to be achieved and the tools required.
- Crew: collaboration orchestrator, process definition (sequential versus hierarchical).
- The role of the manager or orchestrator.

### Hands-on work

Installation et configuration de CrewAI, configuration de l'environnement Python (pip, venv). Installation de la librairie CrewAI. Configuration des clés API (OpenAI ou autres modèles locaux/ouverts).

## 4 Creating agents and simple tasks

- Creation of a first agent.
- Step-by-step code for instantiating an agent.
- Attribute implementation: role, goal, backstory, verbose.
- Best prompt engineering practices to define an effective role.
- Define and execute static tasks.
- Definition of a simple task with a single agent.
- Execute a simple crew with a single task and a single agent.
- Analysis of the execution process (the agent thinks, performs the task, gives the result).

### Hands-on work

Objectif : créer un agent capable de générer un contenu court sur un sujet donné. Mise en application des concepts.

## 5 Interagents collaboration

- Setting up a core team.
- Create two agents with distinct roles (e.g. researcher and analyst).
- Sequential task definition.
- Instantiate crew with a sequential process (Process.sequential).

### TEACHING AIDS AND TECHNICAL RESOURCES

- The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
- At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
- A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

### TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

### ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

## 6 Mastering collaboration language

- How do agents communicate?
- Optimization of the setpoint (task) to ensure good information transfer.
- Debug collaboration errors (infinite loop, bad output).

### Hands-on work

Build a team in which one agent gathers information and the other synthesizes it.

## 7 Tool integration and autonomy

- The concept of tools.
- What is a tool in CrewAI: external action capabilities.
- Use of predefined tools: Google Search Tool with crewai-tools.
- Assign tools to agents.
- Creation of a customized tool.
- The basics of creating a BaseTool class.
- Define tool description and function.
- Integration of the customized tool into an agent.

### Hands-on work

Create a team, for example a journalist and an editor, in which the journalist uses a research tool to gather facts before writing the article, and the editor corrects the style.

## 8 Advanced processes and best practices

- Advanced structuring and use cases.
- Process.hierarchical.
- Understand the manager's role in a hierarchical process.
- When to use the hierarchical approach?
- Example of implementation.
- Output and deliverables management.
- Structured extraction of results (Pydantic models or JSON formats).
- History management and intermediate steps.
- Added validation and software conditions.

### Hands-on work

Design a hierarchical system in which a manager delegates an analysis to several agents, then consolidates their reports to make a decision.

## 9 Optimization, ethics and future steps

- Optimization and improvement.
- Cost and performance management: choice of Language Model (LLM) per agent.
- Use a lightweight model for simple tasks, a powerful model for analysis.
- Techniques for reducing tokens and API calls.
- Introduction to memories: adding knowledge persistence.
- Recommended design patterns for CrewAI teams.
- Ethical considerations: biases, responsibilities, and transparency of autonomous agent actions.
- Security and management of sensitive data when using tools.

### Hands-on work

Launch of a realistic project (e.g. creation of a complete marketing plan).

## Dates and locations

### REMOTE CLASS

2026 : 23 Mar., 24 June, 14 Sep., 9 Dec.

### PARIS LA DÉFENSE

2026 : 16 Mar., 17 June, 7 Sep., 2 Dec.