Micro-credential

CLOUD COMPUTING

September 2026 – December 2026

GHENT UNIVERSITY

Cloud Computing

As software systems are becoming more and more complex and fully intertwined with our daily lives, the need to operate these systems in a reliable and typically always-on manner is becoming more and more apparent. Companies with great ideas can, over the course of a few months' time, see global uptake of their software products, through proper use of cloud infrastructure in a pay-as-you-go model.

The goal of this course is to get to know how microservice-based applications can lead to more agile ways of developing software and how the ensuing embrace failure mantra of distributed systems can be used to increase the reliability of said applications.

The increased complexity of these multi-service applications can be countered by means of automation on numerous levels: introducing DevOps culture, CI/CD pipelines, infrastructure-as-code, testing automation, etc. Container technologies are identified as a prime candidate to deploy such microservices, while managing the complexity of running thousands of container instances is shown to be the work of a dedicated container orchestration platform.

The course will provide students both theoretical and hands-on extensive knowledge of state-of-the-art techniques to develop, operate and support modern cloud-native applications.

CONTENTS

- Cloud concepts: pay-per-use, cloud offerings (IaaS, CaaS, PaaS, SaaS, FaaS/serverless, MaaS), public / private / hybrid / multi-cloud choices, standards
- Microservice based application design: concept of applications as loosely coupled services, strengths and drawbacks, communication methods, patterns to increase resilience in highly distributed environments, etc.
- DevOps: from source code to operational support
- Virtualisation: overview of container technologies (OS-level virtualisation, microVMs, sandboxing, trusted computing, WebAssembly, etc.)
- Container orchestration: Kubernetes architecture and functionality
- Infrastructure-as-Code, automation / configuration management and provisioning tools
- Cloud Native Computing Foundation developments: service meshes, monitoring, policy agents, artefact registries, etc.

FINAL COMPETENCES

⇨ Understand and be able to use the terminology dealing with cloud-based distributed systems, OS-level virtualisation and orchestration.
⇨ Knowledge of the drive and motivation behind microservice based applications
⇨ Deep understanding of OS-level virtualisation types, along with strengths and weaknesses in terms of security and performance.
⇨ Deep understanding of container orchestration functionality, including attaching workloads to persistent storage.
⇨ The ability to set up a Cloud-based application on a large public cloud vendor, using Infrastructure-as-Code tooling.
⇨ The ability to set up a CI/CD pipeline transforming versioned source code into artefacts which automatically get tested and deployed on a container orchestration platform.

LECTURER

- **Prof. Bruno Volckaert,** Department of Information Technology, Ghent University

TARGET AUDIENCE

The target audience for this course is ICT-knowledgeable / ICT-curious people with a background in computer science through education or experience.

Participants are expected to:

have programming skills in Python.
have knowledge of computer architecture, computer networking fundamentals , web/service-oriented programming and operating system internals.
have basic Linux (i.e. Bash) knowledge.
The language of instruction is English, which requires a sufficient command of the English language.

PRACTICAL INFO

⇨ **FEE** € 393,-
⇨ **LOCATION** Universiteit Gent, Campus Technologiepark Zwijnaarde
⇨ **TIME** September – December

More info? Go to ⇨ **WWW.UGAIN.UGENT.BE/CC**