

## IDENTIFICATION

Code matière : DEV901  
ECTS : 2

## HORAIRES

Cours : 5  
TD : 11  
TP : 6  
Total : 22

Projet :  
Travail personnel :

## EVALUATION

A knowledge assessment, a lab report, and an oral presentation.

## SUPPORT PEDAGOGIQUE

Slides and practical work sheets.

## LANGUE D'ENSEIGNEMENT

Français

## CONTACT ENSEIGNANT RÉFÉRENT

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UE : UE9-Ressources

MATIÈRE : Introduction to Research

## OBJECTIFS RECHERCHES PAR CET ENSEIGNEMENT

### But du cours

- Understand how to create cloud-based applications and use cloud automation tools in the DevOps process.
- Understand the theoretical context of DevOps and cloud automation techniques.
- Demonstrate the application of these techniques to a series of software applications and development scenarios/processes.
- Understand the features offered by popular DevOps and cloud automation tools such as Chef, Puppet, Ansible, and SlipStream.
- Gain practical experience with one of these tools through a project.

### Acquis d'apprentissage visés

- Master fundamental programming paradigms, languages, and algorithms to design and develop applications for any environment (1,4)-(2,4)
- Apply and master integration engineering, interoperability, deployment, and testing (1,4)-(2,4)
- Apply and master methodologies, tools, and formalisms to design, implement, and maintain high-quality and secure software (1,5)-(2,4)

## PROGRAMME

- Fundamental principles of DevOps, continuous integration, continuous delivery, continuous testing. Relationship with other agile development technologies : Lean, CAMS, and ITSM.
- Organizational impact of DevOps, digital transformation, and DevOps ; structure and operation of the DevOps team, leadership, collaboration, and structured problem-solving ; success factors and key performance indicators.
- Agile software development : Scrum, Kanban, Kaizen ; Scrum Agile process and team management ; role of multidisciplinary teams. Agile Manifesto.
- DevOps tools and processes : CI/CD pipeline ; DevOps Toolchain ; coding, versioning, collaboration, and testing. Version control and team development, Git, automated testing.
- DevOps practices and platforms : Software packaging, containerization. Container technologies, Kubernetes, tools.
- Cloud computing architectures, service and deployment models, Cloud IaaS and Infrastructure as Code, cloud economics.
- Cloud-powered software development : Example and AWS tools.
- Cloud monitoring tools and operational concepts for development.
- Overview of cloud automation : Cloud-based tools (e.g., AWS CloudFormation, Azure ARM) ; multicloud tools such as Chef, Puppet, Ansible, Terraform, others.
- Popular cloud automation tools : Chef, Puppet, Ansible (depending on available platform).
- Cloud security architecture and models, cloud compliance, CSA Consensus Assessment Initiative questionnaire and certification.

- DevSecOps ; secure software development lifecycle ; cloud-based tools for secure software development.

## BIBLIOGRAPHIE

- Teaching DevOps and Cloud based Software Engineering in University Curricula
- P. Bourque and R.E. Fairley, eds., Guide to the Software Engineering Body of Knowledge, Version 3.0, IEEE Computer Society, 2014 ;  
DevOps Institute : The Association for DevOps Professionals [online] [https ://devopsinstitute.com/](https://devopsinstitute.com/)  
DevOps Agile Skills Association (DASA) [online] :  
[https ://www.devopsagileskills.org/certifications/dasa-devopsfundamentals/](https://www.devopsagileskills.org/certifications/dasa-devopsfundamentals/)

## PRE-REQUIS

Advanced system administration, Software engineering