

## System Administration (E765025)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 6.0**                      **Study time 170 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 2)	Dutch	Gent	lecture seminar
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**Lecturers in academic year 2023-2024**

Volckaert, Bruno	TW05	lecturer-in-charge
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**Offered in the following programmes in 2023-2024**

	crdts	offering
<a href="#">Master of Science in Information Engineering Technology</a>	6	A

**Teaching languages**

Dutch

**Keywords**

Windows Server, Powershell, Active Directory, System administration, Infrastructure as Code, Cloud

**Position of the course**

Thorough study of modern usage and management of systems in datacenters and clouds

**Contents**

- Windows Server
  - Powershell
  - Desired State Configuration (DSC)
  - Active Directory, Active Directory Federation Services (ADFS), Azure AD
- File systems
  - Cloud file systems like OneDrive, Google drive
  - Storage virtualisation, Software Defined Storage, distributed storage, IOPS, redundancy (SAN, NAS, archiving, object storage, etc.)
- Cloud
  - IAAS, PAAS, SAAS, FAAS, MAAS
  - Public cloud (e.g. Amazon AWS / Google Cloud / Microsoft Azure )
  - Private cloud
  - Hybrid cloud
- Virtualisation
  - Hypervisors (e.g. VSphere, VMWare, Esxi, Hyper-V, KVM)
  - Storage management (e.g. LUNS / storage arrays / vplex)
  - Backup and disaster recovery (strategies and concepts)
  - High availability
  - Containers and container orchestration (advanced concepts): Docker, Kubernetes, OpenShift
  - Scripting: automation, logging
- Monitoring: alerting – metrics (e.g. SCOM Microsoft, Zabbix, ELK stack: Elasticsearch / Logstash / Kibana, Telegraf/Influxdb/Grafana)
- Patch management
- Automation, configuration management (e.g. Ansible, Saltstack)
- Provisioning tools (e.g. Puppet / Chef)
- Infrastructure as Code (e.g. Terraform of AWS CloudFormation)
- Remote execution
- ITIL4

### **Initial competences**

- Knowing the basic principles of computer architecture and of the architecture of operating systems.
- Being able to configure network interfaces.
- Being able to use and debug static and dynamic IP routing, in mixed IPv4/IPv6 environments.

### **Final competences**

- 1 Being able to configure Windows Server systems and manage them by means of Powershell
- 2 Being able to manage and configure file systems (local / cloud)
- 3 Knowledge of IaaS, PaaS, SaaS, FaaS and MaaS Cloud-concepts and advanced virtualisation techniques
- 4 Being able to apply Infrastructure as Code and automation tools
- 5 Being able to configure and deploy a monitoring stack for system administration

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Group work, Seminar, Lecture

### **Extra information on the teaching methods**

Lecture, seminar: practical PC room classes (or on a laptop)

### **Learning materials and price**

Slides on the electronic learning platform

### **References**

Windows Server 2019 Inside Out, Orin Thomas, 5/26/2020, 1st Edition, ISBN 978-0-13549227-7

### **Course content-related study coaching**

Interactive support via the electronic learning environment; assistant-guided labs; contact with professor and assistants through mailing list and personally by means of an appointment.

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

### **Examination methods in case of periodic assessment during the second examination period**

Written assessment

### **Examination methods in case of permanent assessment**

Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible

### **Extra information on the examination methods**

- First term:
  - PE1: written exam with open questions
  - NPE1: evaluation of result labs based on report / scripts
- Second term:
  - PE2: written exam with open questions
  - NPE2: evaluation of result labs based on report / scripts

### **Calculation of the examination mark**

- 50% of the final grade is determined by the answers to the written exam
- 50% of the final grade is determined by evaluation of the result of the labs
- To pass, a student needs to receive at least 9/20 for both the PE and NPE. If this is not the case and the calculated result is 10 or more, the final grade will be changed and the student receives 9/20.

