

Course Specifications

Valid in the academic year 2023-2024

Network Modelling and Design (E004720)

Course size	(nominal values; actual values	s may depend on pro	gramme)			
Credits 4.0	Study time 120 h					
Course offerings and te	aching methods in academic ye	ar 2023-2024				
A (semester 2)	Dutch	Gent	pro	oject		15.0h
			gu	ided self-study		12.5h
			se	minar: coached e	xercises	2.5h
B (semester 2)	English	Gent	lec	ture		
			sei	seminar		
	2027 2027					
Lecturers in academic y	ear 2023-2024					
Pickavet, Mario			TW05	lecturer-in-ch	arge	
Audenaert, Pieter			TW05	co-lecturer		
Offered in the following programmes in 2023-2024				crdts	offering	
Master of Science in Electrical Engineering (main subject Communication and Informat				on 4	В	
Technology) Master of Science in Business Engineering(main subject Data Analytics)				4	В	
Master of Science in Industrial Engineering and Operations Recearch(main subject				4	B	
Manufacturing and	d Supply Chain Engineering and Opt		un subject	-	D	
Master of Science in Business Engineering (Double Degree)(main subject Operations Management)				4	В	
Master of Science in Business Engineering(main subject Operations Management)				4	В	
Master of Science in Industrial Engineering and Operations Research(main subject				4	В	
Transport and Mob	pility Engineering)				_	
Master of Science in Computer Science Engineering				4	В	
Master of Science in Industrial Engineering and Operations Research				4	А	
Exchange Programme in Computer Science (master's level)				4	В	

Teaching languages

English, Dutch

Keywords

network problems, complex networks, graph models, network design

Position of the course

The goal of this course is to give insight in the wide variety of network problems and their mutual similarities/differences. To introduce the concepts, models and techniques to efficiently solve these problems.

Contents

- Overview and diversity of network problems
- Network modelling and analysis
- Network traversal and routing
- Design of random networks
- Models for social networks and communication networks
- Advanced topics and recent evolutions

Initial competences

Basic mathematical knowledge (graph theory) and programming skills

Final competences

- 1 Representing real-life network problems via mathematical formulation.
- 2 Identifying similarities and differences between varying network problems.
- 3 Knowing the key techniques for solving important network problems.

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

Seminar, Lecture, Independent work

Learning materials and price

Syllabus (5-10 Euro)

References

van Steen, Martinus Richardus, Graph theory and complex networks: an introduction, [S.I.]: Maarten van Steen, 2010. ISBN: 978-9081540612 Location: T57.SY.0865 Newman, M. E. J, Networks: an introduction, London : Oxford University Press. 2010. ISBN: 978-0199206650 Location: EBIB.EB02.PR0JECTB0EK

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

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

Written assessment open-book

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

Written assessment open-book

Examination methods in case of permanent assessment

Oral assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

During examination period: written open-book exam During semester: graded project reports; graded oral presentation. Second chance: Possible in adapted form Frequency: 1 project

Calculation of the examination mark

mpe = marks (on 20) on evaluation during examination period and mnpe = marks
(on 20) on evaluation outside examination period
If (mpe smaller than 8 or mnpe smaller than 8)
then: score = minimum (mpe,mnpe)
else: score = 0.5 x mpe + 0.5 x mnpe