

Network Modelling and Design (E004720)

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

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2023-2024

Offering	Language	Location	Teaching Methods	Hours
A (semester 2)	Dutch	Gent	project	15.0h
			guided self-study	12.5h
			seminar: coached exercises	2.5h
B (semester 2)	English	Gent	lecture	
			seminar	

Lecturers in academic year 2023-2024

Pickavet, Mario	TW05	lecturer-in-charge
Audenaert, Pieter	TW05	co-lecturer

Offered in the following programmes in 2023-2024

Programme	crdts	offering
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	4	B
Master of Science in Business Engineering(main subject Data Analytics)	4	B
Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	4	B
Master of Science in Business Engineering (Double Degree)(main subject Operations Management)	4	B
Master of Science in Business Engineering(main subject Operations Management)	4	B
Master of Science in Industrial Engineering and Operations Research(main subject Transport and Mobility Engineering)	4	B
Master of Science in Computer Science Engineering	4	B
Master of Science in Industrial Engineering and Operations Research	4	A
Exchange Programme in Computer Science (master's level)	4	B

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.L.]: 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.PROJECTBOEK

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**