GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2018-2019

Computational Fluid Dynamics in Chemical Technology (E040533)

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

Credits 3.0	Study time 90 h	Contact hrs 30.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	seminar	15.0 h
		lecture	15.0 h
B (semester 2)	Dutch	seminar	15.0 h
		guided self-study	15.0 h

Lecturers in academic year 2018-2019

Heynderickx, Geraldine	TW11	lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Bridging Programme Master of Science in Chemical Engineering	3	A
Bridging Programme Master of Science in Chemical Engineering	3	B
Master of Science in Chemical Engineering	3	A
Master of Science in Chemical Engineering	3	B

Teaching languages

Dutch, English

Keywords

CFD models; Chemical Production Processes; Chemical Reactors; Analysis, Design and Optimization of Reactors and Processes using CFD

Position of the course

Introduction to the modeling and the analysis of flow combined with mass and heat transport in chemical reactors. Combination with species transport and with reactions. Description and Optimization of existing reactors and design of new reactors.

Contents

- Implementation of CFD models for reactor design
- Analysis and design of chemical processes
- Use of CFD models to solve problems in chemical process industry
- Analysis of transport phenomena in chemical reactors
- Practical guidelines for the use of CFD models for analysis, design and optimization of chemical reactors

Initial competences

The course 'Computational Fluid Dynamics (CFD) in chemical technology builds on a number of final competences of the courses, Momentum transport (Transportverschijnselen), Heat and Mass transfer (Warmtetechniek en Stoftransport), Chemical Kinetics (Chemische Kinetiek).

Final competences

1 To design CFD models
2 To implement CFD models
3 To validate CFD models
4 To use CFD models in chemical industry
5 To use CFD models in design of chemical reactors
6 To use CFD models in optimization of chemical reactors

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

Guided self-study, lecture, seminar

Extra information on the teaching methods

The classroom lectures are used to study the theoretical background and are complemented with some practical examples. In the exercise sessions, examples are worked out. It is shown how Computational Fluid Dynamics can be used in practice. It is shown how Computational Fluid Dynamics can be used in chemical technology, based on examples for the different competences.

Learning materials and price

Syllabus/book:
'Computational Fluid Dynamics for Chemical Engineers', door B. Andersson, R. Andersson, L. Hakansson, M Mortensen, R. Sudiyo en B. van Wachem, 2012, Cambridge University Press
Price: 77 EURO

References

- Computational models for turbulent reacting flows, door Rodney Fox, Cambridge University Press, 2003
- 'Advances in Chemical Engineering, volume 31, Computational Fluid Dynamics', uitgegeven door G.B. Marin, Elsevier 2006

Course content-related study coaching

Lecturer and assistents are available for additional information on the course and for feedback on the evaluations upon appointment

Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

- During examination period: oral closed-book exam, written preparation
- During semester: based on graded reports

Calculation of the examination mark

- Permanent and periodic evaluation
- Special conditions: 25% permanent evaluation, 75% periodic evaluation