Functional Programming (C003775)

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

Credits 6.0   **Study time 180 h**

Course offerings and teaching methods in academic year 2025-2026

| A (semester 1) | Dutch | Gent | seminar |
| | | | lecture |

Lecturers in academic year 2025-2026

| Scholliers, Christophe | | WE02 | lecturer-in-charge |

Offered in the following programmes in 2025-2026	**crdts**	**offering**
Bachelor of Science in Computer Science	6	A
Master of Science in Teaching in Science and Technology(main subject Mathematics)	6	A
Master of Science in Mathematics	6	A

Teaching languages

Dutch

Keywords

programming languages, functional programming, higher-order functions,
polymorphism, monads, type classes, lazy evaluation, monads, monad
transformers, Haskell

Position of the course

The student immerses herself/himself in the functional programming paradigms.
At the end of the course, she/he should:
- be able to make use of a functional programming language in practice;
- master the common concepts, programming techniques and data structures of
  this paradigm;
- have gained insight in the commanilties between functional programming and
  object-oriented programming
- have gained insight in the underlying evaluation mechanisms of theses
  languages.

Contents

Haskell in depth, aspects of other functional languages
evaluation mechanisms: lazy evaluation
type system: algebraic datatypes, polymorphism, type classes
higher-order functions continuations, functors, monads
data structures: immutable, infinite

Initial competences

Being able to program in a programming language, e.g., by having taken
the Programming course.

Final competences

1 The student is able to write small and medium size programs in a functional
   programming language.
2 The student is able to apply the common concepts and data structures in this
   language in practice.
3 The student understands the underlying evaluation strategy of Haskell
4 The student can apply the abstraction mechanisms of Haskell in small and
   medium sized programs
5 The student understands how parsing can be implemented functionally and can

also apply these techniques.

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

Extra information on the teaching methods

Lectures, exercise sessions: supervised exercises, in computer lab

Study material

Type: Slides

Name: Slides'
Indicative price: Free or paid by faculty
Optional: no

References

- Programming in Haskell, Graham Hutton, University of Nottingham, Cambridge University Press, January 2007.
- Simon Thompson: Haskell: The Craft of Functional Programming, Second Edition, Addison-Wesley, 507 pages, paperback, 1999.
- Learn You a Haskell for Great Good!: A Beginner's Guide 1st Edition by Miran Lipovaca (Author)

Course content-related study coaching

Supervised exercise/lab sessions
Electronic learning environment

Assessment moments

end-of-term and continuous assessment

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

Written assessment with open-ended questions

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

Written assessment with open-ended questions

Examination methods in case of permanent assessment

Skills test, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Permanent evaluation: assignment, proficiency test, oral defence
Second exam chance in case of permanent evaluation: new assignment

Calculation of the examination mark

Permanent evaluation (50%) + periodic evaluation (50%).
When a student obtains a grade less than 10/20 for either the theory or the project,
the total end grade will be maximally the highest failing grade 9/20.
If the student does not pass the non-periodical evaluation, it can be retaken in the
second examination period with a new project assignment