Syllabus

for course at first level

Programming languages and paradigms
Programspråk och programmeringsparadigmer

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	IB439C
Valid from:	Autumn 2023
Date of approval:	2011-06-15
Changed:	2023-04-20
Department	Department of Computer and Systems Sciences
Main field:	Computer and Systems Sciences
Specialisation:	G2F - First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus was approved by the Head of the Department 2011-06-15.
This syllabus was updated 2023-04-20.

Prerequisites and special admittance requirements

15 ECTS Object Oriented Programming or equivalent knowledge

Course structure

Examination code	Name	Higher Education Credits
39CH	Programming languages and paradigms, home exam	3
39CI	Programming languages and paradigms, assignment	4.5
39CT	Programming Languages and Paradigms, written exam	3

Course content

Fundamental: History, design principles, syntax, semantics, control mechanisms, type systems, names, scopes, binding, abstraction mechanisms.
Object oriented languages: Class-based languages, prototype-based languages, encapsulation, information hiding, inheritance, delegation, polymorphism, dynamic binding.
Functional languages: Polymorphism, recursion, functions as first-class program constructs, higher order functions, lazy versus eager evaluation, currying.
Logic languages: Facts and rules, resolution and unification, searching and backtracking, recursion, functions and arithmetic, lists and other structures.
Final summary and outlook.

Learning outcomes

Upon successful completion of the course, the student will be able to:
1. account for and discuss important concepts and mechanisms in programming language construction and implementation
2. explain differences between the imperative, object oriented, functional and logic-based programming paradigms
3. read, understand and write non-trivial programs in at least one language from each of the object oriented, functional and logic-based programming paradigms while using problem solving strategies suitable for the paradigm used

4. reason about and compare languages from the paradigms mentioned above and /or give account for some current research problem in programming language research.

Education

The teaching activities consist of lectures and seminars. The language of instruction is English.

Forms of examination

a. The course is examined through a written exam and assignments. All assignments must be performed and submitted on time according to the schedule of the current course. A missed or incomplete assignment can be re-submitted at a scheduled time window. Alternatively, the student will have to follow the schedule of next round of the course.

b. The final grading of the course is based on the following grading scale related to the learning outcomes of the course: A = Excellent B = Very Good, C = Good, D = Satisfactory, E = Sufficient, Fx = Fail, F = Fail.

c. The grading criteria are communicated to the students at the start of the course.

d. In order to complete the whole course the student must obtain at least grade E (or P with Pass/Fail grades) in all course components/examinations.

e. In addition the following regulations also apply:

- Students who obtain grade Fx in a written examination task are allowed to complete a supplementary assignment in order to elevate the grade to E. The examiner informs the concerned students when the results of the written examination are published. The supplementary assignment has to be submitted within a given deadline and can only be utilized to elevate the grade of the actual examination task.

- Students who obtained grade E in an examination task are not allowed to re-write the examination or resubmit the assignment in order to obtain a higher grade.

- Students who have failed the same examination task twice are allowed to have another examiner appointed, unless there are special reasons to the contrary.

Interim

When a course is discontinued, or its contents are substantially altered, the following applies:

- Failed examination tasks are replaced with other similar examination tasks according to a specific plan.

- If no similar examination tasks can be provided, at least three examination opportunities per examination task should be offered during a period of at least three terms from the date of the decision. After this period, no examinations should be carried out on the course.

Limitations

This course may not be included in a degree together with a course, taken in Sweden or elsewhere, of identical or partially similar content.

Required reading

Information about course literature is available on the department's website - www.dsv.su.se - at least two months before the start of the course.