Faculty of Applied Sciences

INGI2131   Computer language concepts

[30h+30h exercises] 5 credits

This course is taught in the 2nd semester

Teacher(s):   Baudouin Le Charlier, Peter Van Roy (coord.)
Language: French
Level: Second cycle

Aims

- To show a deep understanding of the major programming concepts
- To understand and apply the basics of the most popular formalism for defining languages (syntax and semantics), specifically algorithmic programming languages.
- To understand how languages work in the principal programming paradigms, understand the relations between paradigms.
- To be able to quickly learn new languages, design languages targeted toward an arbitrary application, and be able to interface different languages.

Main themes

- Syntax: basics of abstract and concrete syntax, formalisms to define these syntaxes, representation of formal texts (syntax trees, graphs).
- Semantics: introduction to methods for defining semantics (operational semantics, axiomatic semantics, denotational semantics).
- Major programming concepts: function, object, class, abstraction, instantiation, inheritance, state, encapsulation, nondeterminism, concurrency, higher-order programming, compositionality, etc.
- Techniques for using these concepts.
- Programming paradigms and an introduction to the major programming languages.
- Principles and techniques of designing and interfacing languages.
- Practical applications in several domains (for example, distributed systems, constraint programming, human-computer interfacing).

Content and teaching methods

see "Main themes"

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

- Prerequisite:
Maîtrise de la programmation dans un langage de haut niveau tel que
LINF2121 Algorithmique et structures de données P. Dupont
- References
Recommended readingss:
(1) Sethi R, "Programming Languages : Concepts and Constructs" , Addison-Wesley, 1996.
(2) Van Roy P. and Haridi S, "Concepts, Techniques, and Models of Computer Programming" MIT Press, March 2004.
(3) Glynn Winskel, "The Formal Semantics of Programming Language" , MIT Press, 1993.

Programmes in which this activity is taught

ECGE3DS/IG	Diplôme d'études spécialisées en économie et gestion (informatique de gestion - Master in Information Systems)
INFO2	Ingénieur civil informaticien
LINF2	Licence en informatique

Other credits in programs

ECGE3DS/IG	Diplôme d'études spécialisées en économie et gestion (informatique de gestion - Master in Information Systems)	(5 credits)	Mandatory
INFO21	Première année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)	Mandatory
LINF21	Première licence en informatique	(5 credits)	
LINF21/GN	Première licence en informatique (informatique générale)	(5 credits)	Mandatory
LINF21/GS	Première licence en informatique (informatique de gestion)	(5 credits)	Mandatory
MATH22/G	Deuxième licence en sciences mathématiques	(5 credits)	