UCL Faculté des sciences appliquées

FSA

INGI2131 Concepts des langages informatiques

[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: 2nd cycle course

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).

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.

Other credits in programs

ECGE3DS/IG	Diplôme d'études spécialisées en économie et gestion (informatique de gestion - Master in Information Systems)	(5 credits)	
INFO21	Première année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)	Mandatory
INFO22	Deuxième année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)	
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
MAP23	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	
MATH22/E	Deuxième licence en sciences mathématiques (Economie mathématique)	(5 credits)	
MATH22/G	Deuxième licence en sciences mathématiques	(5 credits)	
MATH22/S	Deuxième licence en sciences mathématiques (Statistique)	(5 credits)	