

# Advanced digital architecture

## Titulaire

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## Mnémonique du cours

ELEC-H505

## Crédits ECTS

5 crédits

## Langue(s) d'enseignement

Anglais

## Période du cours

Deuxième quadrimestre

## Contenu du cours

Conception des systèmes de traitement de l'information numérique sous contrainte forte de la puissance de calcul, de la puissance consommée et de la surface de circuit intégré occupée. Architecture des processeurs: parallélisme des instructions et de données. Nouveaux paradigmes de calcul: System-on-Chip et Multi-Processor System-on-Chip. Modélisation et simulation des systèmes numériques à différents niveaux d'abstraction à l'aide de SystemC. Co-design, co-simulation VHDL/SystemC. Méthodologies de conception des circuits de haute performance.

## Objectifs (et/ou acquis d'apprentissages spécifiques)

Méthodes d'analyse et de synthèse des grands circuits logiques et arithmétiques.

## Méthodes d'enseignement et activités d'apprentissages

Cours ex cathedra. TP : Ensemble de baies logiques et de stations de développement FPGA.

## Contribution au profil d'enseignement

This teaching unit contributes to the following competences:

- In-depth knowledge and understanding of integrated structural design methods in the framework of a global design strategy
- In-depth knowledge and understanding of the advanced methods and theories to schematize and model complex problems or processes
- Conceive, plan and execute a research project, based on an analysis of its objectives, existing knowledge and the relevant literature, with attention to innovation and valorization in industry and society

- Correctly report on research or design results in the form of a technical report or in the form of a scientific paper
- Present and defend results in a scientifically sound way, using contemporary communication tools, for a national as well as for an international professional or lay audience
- Collaborate in a (multidisciplinary) team
- Work in an industrial environment with attention to safety, quality assurance, communication and reporting
- Develop, plan, execute and manage engineering projects at the level of a starting professional
- Think critically about and evaluate projects, systems and processes, particularly when based on incomplete, contradictory and/or redundant information
- A creative, problem-solving, result-driven and evidence-based attitude, aiming at innovation and applicability in industry and society
- Has an active knowledge of the theory and applications of electronics, information and communication technology, from component up to system level.
- Has a profound knowledge of either (i) nano- and opto-electronics and embedded systems, (ii) information and communication technology systems or (iii) measuring, modelling and control.
- Has a broad overview of the role of electronics, informatics and telecommunications in industry, business and society.
- Is able to analyse, specify, design, implement, test and evaluate individual electronic devices, components and algorithms, for signal-processing, communication and complex systems.
- Is able to model, simulate, measure and control electronic components and physical phenomena.
- Is aware of and critical about the impact of electronics, information and communication technology on society.

## Autres renseignements

### Contact(s)

Systèmes Logiques et Numériques Bât. L, porte E, 3e Niveau  
Secrétariat (matin) : A. Grave : 02/650 22 91 Mail :  
agrave@ulb.ac.be

## Méthode(s) d'évaluation

Examen oral

## Méthode(s) d'évaluation (complément)

Examen oral

## Programmes

IRIF | **Master : ingénieur civil en informatique** | finalité Spécialisée/  
bloc 2

### Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IREL | **Master : ingénieur civil électricien** | finalité Spécialisée  
électronique et technologies de l'information/bloc 2 **et** MA-

