

# Advanced databases

**Titulaire**

Esteban ZIMANYI (Coordonnateur)

**Mnémonique du cours**

INFO-H415

**Crédits ECTS**

5 crédits

**Langue(s) d'enseignement**

Anglais

**Période du cours**

Premier quadrimestre

## Contenu du cours

**Active Databases**

Taxonomy of concepts. Applications of active databases: integrity maintenance, derived data, replication. Design of active databases: termination, confluence, determinism, modularisation.

**Temporal Databases**

Temporal data and applications. Time ontology. Conceptual modeling of temporal aspects. Manipulation of temporal data with standard SQL.

**Object Databases**

Object-oriented model. Object Persistence. ODMG standard: Object Definition Language and Object Query Language.

**Spatial Databases**

Spatial data and applications. Space ontology. Conceptual modeling of spatial aspects. Manipulation of spatial data with standard SQL.

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

Today, databases are moving away from typical management applications, and address new application areas. For this, databases must consider (1) recent developments in computer technology, as the object paradigm and distribution, and (2) management of new data types such as spatial or temporal data. This course introduces the concepts and techniques of some innovative database applications.

## Pré-requis et co-requis

### Cours ayant celui-ci comme co-requis

INFO-F439 | Advanced Methods in Bioinformatics | 5 crédits,  
INFO-H419 | Data warehouses | 5 crédits et INFO-Y099 | Multicore programming | 6 crédits

## Méthodes d'enseignement et activités d'apprentissages

Lectures are accompanied with laboratory exercises realized on computer rooms.

## Références, bibliographie et lectures recommandées

- > C. Zaniolo et al., Advanced Database Systems, Morgan Kaufmann, 1997
- > R.T. Snodgrass, Developing Time-Oriented Database Applications in SQL, Morgan Kaufmann, 2000 (version pdf [[http://cs.ulb.ac.be/public/\\_media/teaching/infh415/tddbbook.pdf](http://cs.ulb.ac.be/public/_media/teaching/infh415/tddbbook.pdf)])
- > R.G.G. Cattel et al., The Object Database Standard: ODMG 3.0, Morgan Kaufmann, 2000
- > Jim Melton and Alan R. Simon, SQL: 1999 - Understanding Relational Language Components, Morgan Kaufmann, 2001
- > Jim Melton, Advanced SQL: 1999 - Understanding Object-Relational and Other Advanced Features, Morgan Kaufmann, 2002
- > Philippe Rigaux, Michel Scholl, Agnès Voisard, Spatial Databases: With Application to GIS, Morgan Kaufmann, 2001

## Autres renseignements

### Contact(s)

ezimanyi@ulb.ac.be

## Méthode(s) d'évaluation

Autre

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

Written examination covering the topics taught in the course.

Further, students, in groups of two, will realize a project in a topic relevant to advanced databases. Each group will study a database technology and illustrate it with an application developed in a database management system to be chosen (e.g., Oracle, PostgreSQL, DB2, SQL Server, mySQL, etc.). The topic

should be addressed in a technical way, to explain the underlying technologies. The application must use the specific technology manipulated.

## Langue(s) d'évaluation principale(s)

Anglais

## Programmes

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

MA-IRIF | **Master : ingénieur civil en informatique** | finalité Spécialisée/bloc 1, finalité Spécialisée/bloc 2 et finalité Big Data Management and Analytics (Erasmus Mundus)/bloc 1

### Programmes proposant ce cours à la faculté des Sciences

MA-BINF | **Master en bioinformatique et modélisation** | finalité Approfondie/bloc 2, MA-GEOG | **Master en sciences géographiques, orientation générale** | finalité Développement territorial/bloc 2, MA-INFO | **Master en sciences informatiques** | finalité Spécialisée/bloc 1 et finalité Spécialisée/bloc 2 et MA-SECU | **Master en cybersécurité** | finalité Erasmus Mundus joint master in Cybersecurity (CYBERUS)/bloc 2

