**Principles and Practice of Database Systems**

**Overview**

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| Level | 2 (Semester 4) |
| Duration | 4 weeks |
| Lectures | 10x40 minutes/week for 2 weeks |
| Practicals/tutorials | 5x2 hours/week for 3 weeks |

**Learning Outcomes**

* The basic organisation and functionality of a variety of types of database system.
* Able to analyse and describe some aspect of the real world in terms of a conceptual model.
* Able to design and use queries in a query language
* Able to perform basic data administration tasks.
* The outcome of the course is, by its nature, widely applicable. In its broadest terms, students will learn to apply a rigorous approach to design methodology.
* Knowledge of secure database connectivity using current programming languages
* Knowledge of theoretical concepts such as transaction management, relational algebra, file organisation and indexing
* Able to design and build secure Web and cloud-based databases
* Possession of a broad awareness and understanding of how database-driven applications operate
* Able to build server-side support for Web-based persistent database applications.

**Syllabus**

Part 1:

* Introduction to data management and databases
* Database development
* Data models. Entity-relationship models.
* Query languages including SQL
* Database administration

Part 2:

* Database connectivity using Python and JAVA
* Transaction Management
* Database Design: logical design and the relational model
* Relational Algebra
* Normalisation; different normal forms.
* Physical design: File Organization and Indexing
* Database security