**Materials** [**https://box.xjtlu.edu.cn/d/31fb06ec0e174e71a7fc/**](https://box.xjtlu.edu.cn/d/31fb06ec0e174e71a7fc/)

**Lecture 1 – tables and data (part 2)**

* **Creating tables**
* Data type (integers, fixed points, floats)
* String types
* Date and time
* Column options (not null, unique, default, auto\_increment)
* **Tuple manipulation**
* Insert
* Update
* Delete (condition!)
* **Table Constraints (part 1)**
* Syntax of constraints (primary key, unique, foreign key, index)
* Domain constraint

**Lecture 2 – tables and data (part2)**

* **Foreign key**
* Binary key words
* Reference options (restrict, cascade, set null, set default)
* Final FK definition
* **Altering tables**
* Alter (add/ drop column, CHANGE, MODIFY)
* Add constrain
* Removing constrain
* **Deleting tables**
* DROP keyword (dropped in listed order)

**Lecture 3 – SQL select**

* **Overview**
* Select statement allows user to look up data from table
* DISTINCT (used after SELECT key word to remove duplicates)
* ALL (retains duplicates)
* The WHERE clause (use AND/ OR between multiple conditions)
* Word search (keyword LIKE)
* **Select and Cartesian Product**
* SELECT column1, column2 … FROM table1, table2 WHERE …
* Aliases (rename column and table)
* Column alias: SELECT column [AS] new-col-name
* Table alias: SELECT \* FROM table [AS] new-table-name
* **Subqueries**
* Options for handling set (IN, EXISTS, ALL/ANY, NOT)

**Lecture 4 – SQL Select II**

* **Joins**
* CROSS JOIN (return all pairs of rows from A&B)
* SELECT \* FROM A CROSS JOIN B; / SELECT \* FROM A, B;
* INNER JOIN: returns all pairs of rows satisfying a condition
* SELECT \* FROM A INNER JOIN B ON condition;
* NATURAL JOIN: return rows with common values in identically named columns
* OUTER JOIN: returns all pairs of rows satisfying a condition and also handles NULLs
* ORDER BY clause (sort the result of a query)
* **Aggregate Functions**
* COUNT, SUM, AVG, MIN, MAX
* **GROUP BY and HAVING**
* SELECT column\_set1 FROM tables

WHERE predicate

GROUP BY column\_set2

* **Set operations**
* UNION, INTERSECT and EXPECT

**Lecture 5 – SQL select III**

* Missing information
* NULL represents the state of unknown or not appliable for the tuple
* Default value (an alternative value of NULL)

**Lecture 6 – Entity Relationship Diagrams**

* Entity
* Attribute
* Relationship (M:M 1:M relationship)

**Lecture 7 – Database Normalization**