Databases for Business Analytics

Course Outline
Academic Semester: 2025/26

1. General

School	**School of Finance and Statistics**		
Academic Unit	**Department of Banking and Financial Management**		
Level of Studies	**Undergraduate**		
Course Code	**XPBΔEA**		
Semester	**5th or 7th**		
Course Title	**Databases for Business Analytics**		
	Idependent Teaching Activities	Weekly Teaching Hours	Credits
	Lectures	**4**	**7,5**
Course Type	**Specialised and Skills Development**		
Prerequite Courses			
Language of Instruction and Examinations	**Greek**		
Is the course offered to Erasmus Students?	**No**		
Url (Eclass)	**https://eclass.unipi.gr/modules/auth/courses.php?fc=64**		

2. Learning Outcomes

Learning Outcomes

Upon successful completion of the course, the student:

a. will be able to draw Entity-Relationship diagrams to illustrate the structure and characteristics of a relational database.
b. will have the ability to manage relational databases through SQL, specifically: (i) create objects, (ii) fill in tables, (iii) update existing data, and (iv) execute queries on databases.
c. will be familiar with the R language and know its basic functions, which are needed to be able to process data stored in a relational database.
d. will be able to use econometric methods to focus on the analysis of a business in order to make optimal decisions.

General Competences

Within the framework of the combined skills that the graduate will acquire with the following all the courses of the study program, the course of Databases and Business Analytics aims for the graduate to acquire abilities:

a. search for, analysis and synthesis of data and information, with the use of the necessary technologies,
b. decision-making
c. working independently
d. production of free, creative and inductive thinking
e. criticism and self-criticism

3. Syllabus

Section 1: SQL & Relational Databases

1. What is a relational database and how it is structured
2. Understanding table schema: fields, data types, constraints
3. Creating and managing tables using CREATE, ALTER, DROP
4. Using basic SQL commands: SELECT, WHERE, ORDER BY, DISTINCT, LIMIT
5. Aggregate functions and grouping: GROUP BY, HAVING
6. Joining tables: INNER JOIN, LEFT JOIN, etc.
7. Subqueries: IN, EXISTS, ANY, ALL
8. Creating virtual tables (Views) for reporting
9. Practical use of **SQL Server Management Studio (SSMS)**

Section 2: Econometric Tools for Practical Applications

1. What is regression and how it is used in economic analysis
2. Estimation of simple and multiple linear regression
3. Assumption checks and interpretation of results (p-values, R^2, t-tests)
4. Problems and diagnostic tests:
    1. Multicollinearity
    2. Heteroskedasticity
    3. Autocorrelation
5. Application of econometric models to financial datasets

Section 3: Data Analysis with R

1. Using **RStudio** for statistical and econometric analysis
2. Connecting **R** to SQL Server (via DBI and odbc)
3. Retrieving data from SQL tables directly into R
4. Data processing with **dplyr**: filter(), select(), mutate(), summarise()
5. Creating basic visualizations (histograms, line charts, scatterplots)
6. Estimating and interpreting regression models using lm()
7. Full pipeline for analysis using SQL and R:
   From **SQL → R → Analysis → Econometric conclusions**

4. Teaching and Learning Methods - Evaluation

Delivery	**Face to Face**	
Use of Information and Communications Technology	**Each student will use the R programming language as well as the SQL relational database through his/her Personal Computer.**	
Teaching Methods	**Activity**	**Semester Workload**
	Lectures	38,25
	Independent Study	111
	Laboratory Practice	38,25
	Course Total	**187,5**
Student Performance Evaluation	Greek, 80% Final Exam and 20% Project presentation at class (optional)	

5. Attached Bibliography

Suggested Bibliography

1. Lecture Notes
2. Lecture Slides

Related Academic Journals