Course Title:	**Advanced Databases**
Institute/Division:	Department of Automation and Computer Engineering Faculty of Electrical and Computer Engineering
Course code:	**E-ADB**
Erasmus subject code:	0612 Database and network design and administration
Number of contact hours:	45
Course duration:	1 semester (Fall/Winter)
ECTS credits:	6

Course description:	The course provides students with a comprehensive understanding of relational databases, equipping them with the The course provides students with in-depth knowledge and practical skills in advanced database administration and programming. It focuses on Oracle and PostgreSQL databases, covering topics such as advanced SQL techniques, programming in PL/SQL and PL/pgSQL, and database administration.
	
	Course Objectives
	• Advanced SQL: advanced SQL techniques such as subqueries, joins, aggregations, window functions, and dynamic queries to enhance data analysis capabilities.
	• Programming in PL/SQL and PL/pgSQL: creating stored procedures and functions using PL/SQL for Oracle and PL/pgSQL for PostgreSQL, enhancing database performance and centralizing business logic.
	• Database Administration: manage Oracle and PostgreSQL databases effectively, including security, and performance optimization.
	
	Course Content
	• Introduction to Advanced Database Concepts
	  ○ Overview of Oracle and PostgreSQL architectures
	  ○ Comparison of database management systems (DBMS)
	• Advanced SQL Techniques
	  ○ Subqueries and joins for complex data analysis
	  ○ Window functions and aggregations for data summarization
	  ○ Common Table Expressions (CTEs) and dynamic queries
	• PL/SQL and PL/pgSQL Programming
	  ○ Creating stored procedures and functions
	  ○ Using control structures (if-else, loops) and error handling
	  ○ Dynamic SQL execution for flexible database operations

	• Fundamentals of Database Administration
	  ○ Core DBA fundamentals: database creation, and management
	  ○ Database and schema management
	  ○ Tablespace management for performance optimization
	  ○ Backup and restore techniques
	
	<u>Benefits for Students</u>
	• Develop advanced skills in database administration and programming.
	• Enhance job prospects in the IT industry with specialized knowledge.
	• Apply theoretical concepts to practical problems through hands-on projects.

Course type:	Lectures (20h), Computer laboratory (20h), Project (5h)
Literature:	Jason Price, *Oracle Database 12c SQL*, McGraw Hill, 2013 Steven Feuerstein and Bill Pribyl, *Oracle PL/SQL Programming*, 2014 Michael McLaughlin, *Oracle Database 12c PL/SQL Programming*, 2014 Luca Ferrari, Enrico Pirozzi, *Learn PostgreSQL. Use, manage, and build secure and scalable databases with PostgreSQL 16 - Second Edition*, 2023 Alice Zhao, *SQL Pocket Guide: A Guide to SQL Usage*, 2021
Assessment method:	Project and laboratory exercises
Prerequisites:	-
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