**Course Syllabus**

Course from study programme starting with the cycle:

## I. General Information

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| Course name | Database programming |
| Programme | Informatics |
| Level of studies (BA, BSc, MA, MSc, long-cycle MA) | BA |
| Form of studies (full-time, part-time) | full-time |
| Discipline | Computer and information sciences, Information and communication technology |
| Language of instruction | English |

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| Course coordinator | Dr Andrzej Michalski |

| Type of class *(use only the types mentioned below)* | Number of teaching hours | Semester | ECTS Points |
|---|---|---|---|
| lecture | 30 | VI | 5 |
| tutorial | | | |
| classes | | | |
| laboratory classes | 30 | VI | |
| workshops | | | |
| seminar | | | |
| introductory seminar | | | |
| foreign language classes | | | |
| practical placement | | | |
| field work | | | |
| diploma laboratory | | | |
| translation classes | | | |
| study visit | | | |

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| Course pre-requisites | Basic knowledge of relational databases.<br>Basic knowledge of SQL language. |

## II. Course Objectives

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| Familiarization with PL/SQL language, an extension of SQL. |
| Development of practical skills in creating anonymous blocks, procedures, functions, and packages. |

## III. Course learning outcomes with reference to programme learning outcomes

| Symbol | Description of course learning outcome | Reference to programme learning outcome |
|---|---|---|
| KNOWLEDGE | | |
| W_01 | The student characterizes the basic structures of the PL/SQL language, such as anonymous blocks, procedures, functions, cursors, packages, triggers, and exception handling mechanisms. | K_W01<br>K_W06<br>K_W10 |
| W_02 | The student explains the differences between SQL and PL/SQL, including declarative and imperative approaches in the context of database programming. | K_W01<br>K_W06<br>K_W10 |
| SKILLS | | |
| U_01 | The student creates PL/SQL blocks, procedures, functions, and packages consistent with good programming practice and uses technical documentation to develop and verify solutions. | K_U02<br>K_U04<br>K_U11<br>K_U27 |
| U_02 | The student integrates SQL statements with PL/SQL code to perform complex data operations. | K_U04<br>K_U26 |
| U_03 | The student analyzes and modifies PL/SQL code, implements error handling, and verifies its correctness and compliance with business requirements. | K_U04<br>K_U11<br>K_U27 |
| SOCIAL COMPETENCIES | | |
| K_01 | The student is able to critically evaluate his/her own PL/SQL programming skills and analyze and verify the correctness and quality of his/her own code and the code of other team members. | K_K01 |
| K_02 | The student demonstrates initiative and commitment when designing and implementing solutions in PL/SQL, effectively planning tasks and proposing improvements. | K_K02 |

## IV. Course Content

Lecture:
PL/SQL language characteristics, block structure, differences from SQL, applications – 2 hours.
Data types, variables, operators, and expressions – 2 hours.
Conditional logic – 2 hours.
Loops and flow control – 2 hours.
Integrating SQL with PL/SQL – 2 hours.
Procedures and functions – 4 hours.
Exception handling – 2 hours.
Explicit and implicit cursors – 2 hours.
PL/SQL packages – 2 hours.
Triggers – 2 hours.
Built-in packages – 2 hours.
Dynamic SQL - 2 hours.
Large object (LOB) processing – 2 hours.
External procedures – 2 hours.

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| Lab Classes:<br>Creating Simple PL/SQL Blocks – 2 hours<br>Expressions and Operators – 2 hours<br>Using Conditional Statements – 2 hours<br>Processing Data with Loops – 2 hours<br>Using SQL in PL/SQL – 2 hours<br>Creating Procedures – 2 hours<br>Creating Functions – 2 hours<br>Handling Errors in Code – 2 hours<br>Implicit and Explicit Cursors – 2 hours<br>Designing and Implementing Packages – 2 hours<br>Creating Triggers – 2 hours<br>Using Built-in Packages – 2 hours<br>Dynamic SQL – 2 hours<br>LOB Operations – 2 hours<br>External Procedures – 2 hours |

## V. Didactic methods used and forms of assessment of learning outcomes

| Symbol | Didactic methods<br>*(choose from the list)* | Forms of assessment<br>*(choose from the list)* | Documentation type<br>*(choose from the list)* |
|---|---|---|---|
| KNOWLEDGE | | | |
| W_01 | Conventional lecture,<br>Conversational lecture | Written test/<br>Written exam | Graded test/ Graded exam |
| W_02 | Conventional lecture,<br>Conversational lecture | Written test/<br>Written exam | Graded test/ Graded exam |
| SKILLS | | | |
| U_01 | Practice exercises<br>Design thinking,<br>Discussion,<br>Problem solving,<br>Guided work | Written test/Written exam<br>Observation of work and participation in class | Graded test/ Graded exam<br>Record in the gradebook (plus/minus, grade) |
| U_02 | Practice exercises<br>Design thinking,<br>Discussion,<br>Problem solving,<br>Guided work | Written test/Written exam<br>Observation of work and participation in class | Graded test/ Graded exam<br>Record in the gradebook (plus/minus, grade) |
| U_03 | Practice exercises<br>Design thinking,<br>Discussion,<br>Problem solving,<br>Guided work | Written test/Written exam<br>Observation of work and participation in class | Graded test/ Graded exam<br>Record in the gradebook (plus/minus, grade) |
| SOCIAL COMPETENCIES | | | |
| K_01 | Design thinking,<br>Discussion,<br>Problem solving | Observation of work and participation in class | Record in the gradebook (plus/minus, grade) |
| K_02 | Design thinking,<br>Discussion,<br>Problem solving | Observation of work and participation in class | Record in the gradebook (plus/minus, grade) |

## VI. Grading criteria, weighting factors.....

The laboratory grade consists of two components: results from 2 tests – 80% of the grade, student's work and participation during classes – 20% of the grade.

Passing the lecture (for students who passed the laboratory) is based on a written exam, which accounts for 70% of the final grade. The remaining 30% of the final grade comes from the laboratory grade.

Grading is based on the following percentage scale:

>= 90% – 5.0,

>= 80% – 4.5,

>= 70% – 4.0,

>= 60% – 3.5,

>= 50% – 3.0,

< 50% – 2.0.

The detailed rules concerning course requirements, absence justification, and procedures for making up missed work are presented during classes.

## VII. Student workload

| Form of activity | Number of hours |
|---|---|
| Number of contact hours (with the teacher) | **63** |
| Number of hours of individual student work | **62** |

## VIII. Literature

| Basic literature |
|---|
| J. Price, Oracle Database 12c. SQL. McGraw-Hill Education 2015<br>Michael McLaughlin, Oracle Database 12c PL/SQL Programming, McGraw-Hill Education 2014<br>docs.oracle.com/en/database/oracle |
| Additional literature |
| B. Bryla, K. Loney, Oracle Database 11g. DBA Handbook. McGraw-Hill Education, 2007<br>A. Reprintsev, Oracle SQL Revealed: Executing Business Logic in the Database Engine, CA: Apress, Berkeley 2018<br>J. Heller, Pro Oracle SQL Development : Best Practices for Writing Advanced Queries, CA : Apress, Berkeley, 2019<br>B. Forta, Sams Teach Yourself Oracle® PL/SQL in 10 Minutes, Pearson Education, 2016 |