



| Teaching Guide      |   |        |   |         |
|---------------------|---|--------|---|---------|
| Identifying Data    |   |        |   | 2024/25 |
| Subject (*)         | Databases   | Code   | 614G01013   |         |
| Study programme     | Grao en Enxeñaría Informática   |        |   |         |
| Descriptors         |   |        |   |         |
| Cycle               | Period  | Year   | Type  | Credits |
| Graduate            | 2nd four-month period   | Second | Obligatory  | 6       |
| Language            | SpanishGalicianEnglish  |        |   |         |
| Teaching method     | Face-to-face  |        |   |         |
| Prerequisites       |   |        |   |         |
| Department          | Ciencias da Computación e Tecnoloxías da InformaciónComputación   |        |   |         |
| Coordinador         | Cerdeira Pena, Ana Belen  | E-mail | ana.cerdeira@udc.es   |         |
| Lecturers           | Bernardo Roca, Guillermo de Cerdeira Pena, Ana Belen Cortiñas Álvarez, Alejandro Fariña Martínez, Antonio Gómez Brandón, Adrián Lamas Sardiña, Víctor Juan López Rodríguez, Juan Ramon Parama Gabia, Jose Ramon Seco Naveiras, Diego  | E-mail | guillermo.debernardo@udc.es<br>ana.cerdeira@udc.es<br>alejandro.cortinas@udc.es<br>antonio.farina@udc.es<br>adrian.gbrandon@udc.es<br>victor.lamas@udc.es<br>juan.ramon.lopez@udc.es<br>jose.parama@udc.es<br>diego.seco@udc.es |         |
| Web                 | campusvirtual.udc.es  |        |   |         |
| General description | In this subject the main technologies for data management are reviewed, with special emphasis on relational databases. The logical design and conceptual modeling of databases will be addressed. The relational model will be reviewed as a mathematical basis for the representation and management of data, and we will discuss aspects related to files, indexes, transaction management, concurrency and recovery. In the practical part, the SQL language will be used to manage a relational database. |        |   |         |

| Study programme competences / results |   |
|---------------------------------------|---|
| Code                                  | Study programme competences / results   |
| A18                                   | Coñecemento e aplicación das características, funcionalidades e estrutura das bases de datos, que permitan o seu adecuado uso, e o deseño e a análise e implementación de aplicacións baseadas nelas. |
| A19                                   | Coñecemento e aplicación das ferramentas necesarias para o almacenamento, procesamento e acceso aos sistemas de información, incluídos os baseados en web.  |
| B1                                    | Capacidade de resolución de problemas   |
| B3                                    | Capacidade de análise e síntese   |
| B4                                    | Capacidade para organizar e planificar  |
| C3                                    | Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.                       |
| C6                                    | Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.   |
| C7                                    | Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.  |

| Learning outcomes   |  |  |                                       |
|---|--|--|---------------------------------------|
| Learning outcomes   |  |  | Study programme competences / results |
| Knowledge and understanding of the concepts, principles, and basic theories of relational databases.  |  |  | A18 B3 C7                             |
| Ability to model and design relational databases in order to allow the storage of the information needed for specific application domains, taking special care with the integrity of the data and the needs of the organization that will use the database. |  |  | A18 B1 C3 B3 C6 B4                    |



|   |     |    |    |
|---|-----|----|----|
| Ability to manage and use relational databases by executing SQL statements. | A18 | B1 | C3 |
|   | A19 | B3 | C7 |

| Contents                      |  |
|-------------------------------|--|
| Topic                         | Sub-topic  |
| Relational databases          | SQL: advanced queries, DDL, views  |
| Database design               | Design problems (anomalies)<br>Design phases<br>Normalization<br>Conceptual design<br>ER to relational model translation |
| File systems                  | Files<br>Indexes   |
| Concurrency and fail recovery | Problems due to concurrency and failures<br>Transactions<br>Recovery techniques<br>Concurrency control techniques        |

| Planning                        |                           |                                      |                               |             |
|---------------------------------|---------------------------|--------------------------------------|-------------------------------|-------------|
| Methodologies / tests           | Competencies / Results    | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Guest lecture / keynote speech  | A18 A19 C6 C7             | 22                                   | 22                            | 44          |
| Problem solving                 | A18 B1 B3 C6              | 22                                   | 33                            | 55          |
| Laboratory practice             | A18 A19 B1 B3 B4 C3<br>C6 | 17                                   | 25.5                          | 42.5        |
| Mixed objective/subjective test | A18 B1 B3 C6              | 3                                    | 4.5                           | 7.5         |
| Personalized attention          |                           | 1                                    | 0                             | 1           |

(\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

| Methodologies                   |   |
|---------------------------------|---|
| Methodologies                   | Description   |
| Guest lecture / keynote speech  | During these lectures the fundamental contents of the subject will be exposed. They are devoted to show objectives, motivation, concept development, utility, and summary.  |
| Problem solving                 | Problem solving lectures where a problem to solve is exposed. First, the student try to solve the problem for a while, considering different aspects to solve it. Finally, the problem is solved, showing the typical errors of the solutions provided by the students.   |
| Laboratory practice             | In laboratory classes, teachers present the knowledge needed to acquire the proposed skills, and students will do exercises that will lead them to develop their operative skills.<br><br>During these classes, students will also make the design and implementation of a relational database. Each student shall develop it alone, with some assistance from the teacher. |
| Mixed objective/subjective test | Face-to-face tests to be done in a limited time, in which both theoretical and practical knowledge is evaluated.  |

| Personalized attention |             |
|------------------------|-------------|
| Methodologies          | Description |
|                        |             |



|                     |  |
|---------------------|--|
| Laboratory practice | <p>In the laboratory, there will be a semi-personalized support (since the groups are formed by around 15/20 people). The teacher will attend specific questions of each student.</p> <p>For the actual tutoring hours, students will be asked to request an appointment at any of the times scheduled by the teachers at <a href="mailto:espazos.udc.es">espazos.udc.es</a>. During these hours, questions made through the corporate email or the messaging service of the Teams platform will also be answered.</p> |
|---------------------|--|

| Assessment                      |                        |  |               |
|---------------------------------|------------------------|--|---------------|
| Methodologies                   | Competencies / Results | Description  | Qualification |
| Mixed objective/subjective test | A18 B1 B3 C6           | <p>Both at the FIRST OPPORTUNITY and at the SECOND OPPORTUNITY, for passing the course it is necessary to pass a conventional written exam which will represent 60% of the global grade.</p> <p>To pass the course globally it is necessary to obtain in the written exam a minimum grade of 3 (over 6). If that minimum grade is not achieved, the maximum global grade will not exceed 4.5 (and therefore the course will be failed)</p> <p>Maximum grade: 6 points<br/>Minimum grade to pass the course: 3 (over 6)</p> | 60            |
| Laboratory practice             | A18 A19 B1 B3 B4 C3 C6 | <p>For the FIRST OPPORTUNITY:</p> <ul style="list-style-type: none"> <li>-SQL language test (maximum grade 2 pt).</li> <li>-Relational database design and implementation project (maximum grade 2 pt).</li> </ul> <p>For the SECOND OPPORTUNITY:</p> <ul style="list-style-type: none"> <li>-SQL language test (maximum grade 2 pt).</li> <li>-The grade corresponding to the database design and implementation project is unrecoverable. The grade from the first opportunity is kept.</li> </ul>                       | 40            |

| Assessment comments   |
|---|
| <p><b>FIRST OPPORTUNITY</b></p> <p>In the FIRST OPPORTUNITY, students that do not take the written exam will obtain a grade of "No presentado" (Absent). According to the UDC regulations, if a student passes the course in the FIRST OPPORTUNITY, he/she will not be able to be evaluated in the SECOND OPPORTUNITY in order to improve his/her grade. If a student fails the course in the FIRST OPPORTUNITY, he/she can retake the SQL language test, the written exam or both in the SECOND OPPORTUNITY.</p> <p><b>SECOND OPPORTUNITY</b></p> <p>In the SECOND OPPORTUNITY, students that do not re-take any of the tests (written test and/or SQL language test) will obtain a grade of "No presentado" ("Absent"). If a student decides to retake a test, the final grade for that test will be the one obtained during the second opportunity (which can be higher or lower than the one obtained in the first opportunity). If a student decides to not retake one of the two tests, he/she will keep the grade for that test obtained in the first opportunity.</p> <p><b>ADVANCED OPPORTUNITY</b></p> <p>The assessment for the advanced opportunity will consist of a written exam that will compute for the 100% of the grade.</p> <p><b>DISCIPLINARY REGULATIONS</b></p> <p>All aspects related to ?academic dispensation?, ?dedication to study?, ?permanence? and ?academic fraud? will be governed in accordance with the current academic regulations of the UDC.</p> |

| Sources of information |
|------------------------|
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|----------------------|---|
| <b>Basic</b>         | <ul style="list-style-type: none"><li>- A. Silberschatz; H. Korth; S. Sudarshan (2010). Database System Concepts. McGraw Hill</li><li>- Elmasri, R.; Navathe, S. (2011). Database systems: models, languages, design, and application programming. Addison-Wesley</li><li>- Alan Beaulieu (2009). Learning SQL (2nd Ed). O'Reilly</li><li>- Alan Beaulieu (2020). Learning SQL (3rd Ed). O'Reilly</li></ul>                                   |
| <b>Complementary</b> | <ul style="list-style-type: none"><li>- Cuadra, D.; Castro, E.; Iglesias, A. M.; Martínez, P.; Calle, F. J.; de Pablo, C.; Al-Jumaly, H.; Mo (2007). Desarrollo de Bases de Datos: casos prácticos desde el análisis a la implementación. Madrid: Ra-ma</li><li>- de Miguel, A.; Martínez, P.; Castro, E.; Caverro, M., Cuadra, D.; Iglesias, A. M.; Nieto, C. (2001). Diseño de bases de datos. Problemas resueltos. Madrid: Ra-ma</li></ul> |

## Recommendations

### Subjects that it is recommended to have taken before

Computer Science Preliminaries/614G01002

Programming II/614G01006

### Subjects that are recommended to be taken simultaneously

### Subjects that continue the syllabus

### Other comments

Gender perspective: According to the different regulations applicable to university teaching, a gender perspective should be incorporated in this subject (e.g. use of non-sexist language, etc.). We will try to identify and modify any prejudices and sexist attitudes, and we will try to influence the context to modify and promote values of respect and equality. To sum up, we will try to detect situations of discrimination (including those related to gender discrimination) and to provide actions and measures to correct them.

(\*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.