#### Pedagogic case and specific course in which designed tasks and units are used

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| Pedagogic case: | * Inquiry-based approach to matrix factorization
* 2nd year of the bachelor programme in Mathematics/Mathematical Engineering/Mathematics and Statistics.
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| Description (including temporal scheme for design, development and implementation) | * We will design tools based on inquiry to better understand this topic.
* temporal scheme:

- design: until February 2019- development: March – May 2019- discussion and improvement: June - July 2019 - implementation: October 2019 |
| Aim of pedagogic case | * Analyze the difficulties of students to work with matrices and use them to solve problems.
* Determine issues and problems (related to matrices and factorization) that may interest students.
* Promote the collaborative work in the students.
* Encourage autonomous study, the ability to pose questions and conjectures.
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| Mathematical concepts  | * Elementary transforms and matrices.
* Gaussian elimination.
* Matrix factorization: PA=LU, LU, LDR, Cholesky, LDL’
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| Addressed practice | 2nd year of the bachelor programme in Mathematics/Mathematical Engineering/Mathematics and Statistics. |
| Place in specific courseCourse namePlace of units | * Numerical Methods course (third semester).
* Matrix factorization is introduced as a tool for the resolution of linear systems. Three weeks of class are devoted to these topics.
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| Learners profileorientation, year, age, prior knowledge, other such as math anxiety, special needs, .. | * Second year undergraduate students. They have already studied Calculus and Linear Algebra. They know matrices and operations with them, but they usually have difficulties.
* It is the first course in which problems of numerical type arise.
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| Organisation of specific course study credits/hours, location, group size | * This is a 6 ECTS course. The student has 2 hours of theory per week, two hours of problems (where the group is divided) and another one in the computer lab (where the group is also divided).
* Each group consists of 60 students and they are divided for tutorial sessions (problems and laboratory) into two subgroups of about 30 students each.
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| Expected learning outcomes | * Learn to perform operations with matrices in order to factor matrices, to solve systems of linear equations.
* Choose the most appropriate method for each problem.
* It is expected that students can implement the matrix manipulation and factorization algorithms in order to solve linear systems.
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| Envisioned use of digital technology | * Students will use Matlab program to implement the different resolution methods.
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| Planning of tasks | * Study of similar experiences and bibliography.
* Design of activities and proposal of issues.
* Discussion of the proposal with other members of the Platinum team.
* Revision of the whole proposal by introducing the agreed changes.
* Perform the real experience including students evaluation
* Evaluation of the experience
* Eventual diffusion of the results
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| Names of persons involved  | * Antonio Díaz-Cano
* Juan Antonio Infante
* All the Professors of the Spanish Platinum Team and Students of the course
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| Course: | Numerical Methods. Second year of the bachelor programme in Mathematics/Mathematical Engineering/Mathematics and Statistics.It is proposed to apply inquiry-based methodology just in one of the topics of the subject. |
| Learning objectives | Students learn:* How to work efficiently with matrices
* Solve linear systems using matrix factorization
* To implement algorithms to factor matrices
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| Learning contents | * Direct methods for solving linear systems: Transformations and elementary matrices. Gaussian elimination. Factorizations: PA=LU, LU, LDR, Cholesky, LDL'.
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| teaching /learning activities | * Course week consists of one 2-hours lecture; one 2-hours tutorial session; 1 hour computer tutorial session. In the three tutorial sessions students group is divided in two subgroups.
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| Media | * Tutorials, computers and computation software.
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| Evaluation | * The unit will be evaluated with a specific test that will count a percentage in the overall grade of the subject.
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| **Instructor role** | * Design of activities, teaching classes, discussion with students.
* Approach of problems, tests, proofreading.
* Overall evaluation of the experience, discussion with other teachers.
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| **Student roles**  | * Active participation in lectures and practical sessions.
* Implement algorithms with Matlab.
* Perform the planned tests.
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