#### 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. |
| 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. |
| Mathematical concepts | * Elementary transforms and matrices. * Gaussian elimination. * Matrix factorization: PA=LU, LU, LDR, Cholesky, LDL’ |
| Addressed practice | 2nd year of the bachelor programme in Mathematics/Mathematical Engineering/Mathematics and Statistics. |
| Place in specific course Course name  Place 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. |
| Learners profile orientation, 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. |
| 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. |
| 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. |
| Envisioned use of digital technology | * Students will use Matlab program to implement the different resolution methods. |
| 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 |
| Names of persons involved | * Antonio Díaz-Cano * Juan Antonio Infante * All the Professors of the Spanish Platinum Team and Students of the course |
| 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 |
| Learning contents | * Direct methods for solving linear systems: Transformations and elementary matrices. Gaussian elimination. Factorizations: PA=LU, LU, LDR, Cholesky, LDL'. |
| 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. |
| Media | * Tutorials, computers and computation software. |
| Evaluation | * The unit will be evaluated with a specific test that will count a percentage in the overall grade of the subject. |
| **Instructor role** | * Design of activities, teaching classes, discussion with students. * Approach of problems, tests, proofreading. * Overall evaluation of the experience, discussion with other teachers. |
| **Student roles** | * Active participation in lectures and practical sessions. * Implement algorithms with Matlab. * Perform the planned tests. |