

Strategic Competences of the UdL according to the "*Plan Director de la Docencia*" approved by the Council of Government of the UdL in July 10th, 2007.

UdL1 Appropriate skills in oral and written language.

UdL2 Command of a foreign language.

UdL3 Mastering ICT's.

UdL4 To respect the fundamental rights of equality between men and women, the promotion of the Human Rights and the principles of a culture of peace and democratic values.

Cross-disciplinary competences approved by the Plenary Commission of the Degrees of Industrial Engineering, Computer Engineering and Building Engineering, gathered on June 16th, 2008.

EPS1. Capacity to solve problems and prepare and defence arguments inside the area of studies.

EPS2. Capacity to gather and interpret relevant data, within the area of study, to judge and think about relevant subjects of social, scientific and ethical nature.

EPS3. Capacity to convey information, ideas, problems and solutions to both a specialized and no specialized public.

EPS4. To have the skills required to undertake new studies or improve the training with self-direction.

EPS5. Capacity of abstraction and of critical, logical and mathematical thinking.

EPS6. Capacity of analysis and synthesis.

EPS7. Capacity to work in situations with a lack of information and/or under pressure.

EPS8. Capacity of planning and organizing the personal work.

EPS9. Capacity for unidisciplinary and multidisciplinary teamwork.

EPS10. Capacity to take part in the structure of a company.

EPS11. Capacity to understand the needs of the user expressed in a no technical language.

EPS12. To be motivated for the quality and steady improvement.

EPS13. Capacity to consider the socioeconomic context as well as the sustainability criteria in engineering solutions.

Specific competences that the students have to acquire according to ORDER CIN/351/2009, of February, 9th

Module of basic training

GEM1. Capacity to solve mathematical problems arisen in the engineering field. Aptitude to apply knowledge on: linear algebra; geometry; differential geometry; differential and integral calculus; differential equations and in partial derivatives; numerical methods; algorithmic, numerical; statistics and optimisation.

GEM2. Understanding and commanding basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application to solve problems in engineering.

GEM3. Basic knowledge of the use and programming of computers, operating systems, databases and computer programs with applications in engineering.

GEM4. Capacity to understand and apply the principles of basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering.

GEM5. Capacity of spatial vision and knowledge of the techniques of graphic representation, either by traditional methods of metric geometry and descriptive geometry or by applications of computer-aided design.

GEM6. Suitable knowledge of the concept of company, institutional and legal framework of the company. Business organisation and management.

Module of common training to the industrial branch

GEM7. Knowledge of applied thermodynamics and heat transfer. Basic principles and their application to solve engineering problems.

GEM8. Knowledge of the basic principles of fluid mechanics and its application to solve problems in the field of engineering. Calculation of pipes, channels and fluid systems.

GEM9. Knowledge of the basics of science, technology and chemistry of materials. Understand the relation between the microstructure, the synthesis or processing and the properties of the materials.

GEM10. Knowledge and use of the principles of circuit theory and electrical machines.

GEM11. Knowledge of the basics of electronics.

GEM12. Knowledge of the basics of automatisms and control methods.

GEM13. Knowledge of the principles of theory of machines and mechanisms.

GEM14. Knowledge and use of the principles of strength of materials.

GEM15. Basic knowledge of production and manufacturing systems.

GEM16. Basic knowledge and application of environmental technologies and sustainability.

GEM17. Applied knowledge to business organization.

GEM18. Knowledge and capacities to organise and manage projects. To know the organisational structure and the functions of a Project Office.

Module of training of specific technology (Mechanical)

GEM19. Knowledge and capacity to apply graphic engineering techniques.

GEM20. Knowledge and capacity for the calculation, design and testing of machines.

GEM21. Applied knowledge of thermal engineering.

GEM22. Knowledge and capacity to apply the basics of the elasticity and strength of materials to the behaviour of real solids.

GEM23. Knowledge and capacity for the calculation and design of structures and industrial constructions.

GEM24. Applied knowledge of the basics of fluidomechanic machinery.

GEM25. Knowledge and capacity for the application of materials engineering.

GEM26. Applied knowledge of manufacturing systems and processes, metrology and quality control.

Module of Bachelor's Thesis

GEM27. Capacity to develop an original and individual project, and to present and defend it in front of a university court. It has to be a project in the mechanical technological field of the Industrial Engineering, of professional nature in which all the competences are integrated and synthesized.

Module of Optional Subjects

GEM28. Applied knowledge to measuring systems and industrial actuators.

GEM29. Capacity to design and implement control systems and automation of mechanical systems.

GEM30. Applied knowledge to multibody mechanisms and robotics.

GEM31. Capacity to design HVAC installations (heating, ventilation and air conditioning).

GEM32. Applied knowledge to distributed energy generation and energy use.

GEM33. Capacity of analysis of energy systems, optimization and integration of them and reduction of the environmental burden.

GEM34. Knowledge and capacity for the analysis and reduction of energetic demand in buildings.

GEM35. Capacity to make energy audits and the corresponding certification according to the existing laws.

GEM36. Capacity to make life cycle analysis of materials and of water and energy flows in order to reduce the environmental impact of construction.