The Original Tuning - AHELO Competence Framework for Engineering

Learning Outcomes Statements for General and Mechanical Engineering (first cycle)

	Original Competence Framework from Tuning - AHELO in Engineering
	Engineering Generic Skills
EGS1	● The ability to function effectively as an individual and as a member of a team.
EGS2	● The ability to use diverse methods to communicate effectively with the engineering community and with society at large.
EGS3	● The ability to recognise the need for and engage in independent life-long learning.
EGS4	● The ability to demonstrate awareness of the wider multidisciplinary context of engineering.
	Basic and Engineering Sciences
BES1	● The ability to demonstrate knowledge and understanding of the scientific and mathematical principles underlying their branch of engineering. 【Mechanical Engineering】 ● The ability to demonstrate knowledge and understanding of the basics of ♦ mathematics including differential and integral calculus, linear algebra, and numerical methods.
BES2	● The ability to demonstrate a systematic understanding of the key aspects and concepts of their branch of engineering.
BES3	● The ability to demonstrate comprehensive knowledge of their branch of engineering including emerging issues. 【Mechanical Engineering】 ● The ability to demonstrate knowledge and understanding of the basics of ♦ high-level programming, ♦ solid and fluid mechanics, ♦ material science and strength of materials, ♦ thermal science: thermodynamics and heat transfer, ♦ operation of common machines: pumps, ventilators, turbines, and engines.

	Engineering Analysis
EA1	● The ability to apply their knowledge and understanding to identify, formulate and solve engineering problems using established methods.
EA2	● The ability to apply knowledge and understanding to analyse engineering products, processes and methods.
EA3	● The ability to select and apply relevant analytic and modelling methods.
EA4	● The ability to conduct literature searches, use databases and other sources of information.
EA5	● The ability to design and conduct appropriate experiments, interpret the data and draw conclusions.
EA6	【Mechanical Engineering】 ● The ability to analyse ♦ mass and energy balances, and efficiency of systems, ♦ hydraulic and pneumatic systems, ♦ machine elements.
	Engineering Design
ED1	● The ability to apply their knowledge and understanding to develop designs to meet defined and specified requirements.
ED2	● The ability to demonstrate an understanding of design methodologies, and be able to use them.
ED3	【Mechanical Engineering】 ● The ability to carry out the design of elements of machines and mechanical systems using computer-aided design tools.
	Engineering Practice
EP1	● The ability to select and use appropriate equipment, tools and methods.
EP2	● The ability to combine theory and practice to solve engineering problems.

EP3	● The ability to demonstrate understanding of applicable techniques and methods, and their limitations.
EP4	● The ability to demonstrate understanding of the non-technical implications of engineering practice.
EP5	● The ability to demonstrate workshop and laboratory skills.
EP6	● The ability to demonstrate understanding of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions within a societal and environmental context, and commitment to professional ethics, responsibilities and norms of engineering practice.
EP7	● The ability to demonstrate knowledge of project management and business practices, such as risk and change management, and awareness of their limitations.
EP8	【Mechanical Engineering】 ● The ability to select and use control and production systems.

Source：OECD (2011), "A Tuning-AHELO Conceptual Framework of Expected Desired/Learning Outcomes in Engineering", *OECD Education Working Papers*, No. 60, OECD Publishing, Paris, https://doi.org/10.1787/5kghtchn8mbn-en.