Annex 1

July 2025

Learning Outcomes of the EMOS programmes

I. Programme Profile

EMOS aims at providing students with an advanced training in the specific themes of statistics in general and official statistics in particular, supported by the complementary quantitative and statistical tools offered by the hosting university. The main objective of EMOS is to enhance the abilities of students to understand and to be able to analyse European official data at different levels: quality, production process, dissemination, and analysis in a national, European and international context.

This range of skills represents the ideal foundation for the development of professionals able to interpret the fast-changing official data production system of the 21st century. This is why it is important that the EMOS learning outcomes are included in a degree designed for students aiming at economical/social/statistical knowledge-intensive careers. The learning outcomes guarantee a solid foundation for those willing to pursue a career in the field of data collection on societal and economic phenomena or other professional activities that require a strong command of the methods and processes for the development, production and dissemination as well as use of official statistics.

II. Learning Outcomes

A) Knowledge

1. Graduates understand the pivotal role of official statistics in data-driven policy decision-making, realising their profound impact on shaping policies and strategies. They are familiar with the main output domains of official statistics: National Accounts, Economic Indicators, Agriculture and Fisheries, Labour, Households, Census and Demographics, Environment, Energy, Transport and Mobility.
2. Graduates are well-versed in the function, organisation and role of National Statistical Institutes and other official data producers such as Eurostat, ECB, IMF, ILO, BIS, UN, OECD, and the World Bank and their legal bases including principles of data confidentiality they adhere to.
3. Graduates have advanced knowledge about the European Statistics Code of Practice principles for the ESS and the Public commitment on European Statistics by the ESCB.
4. Graduates understand issues regarding comparability, definitions, standardization and classification, and the main quality dimensions in official statistics.
5. Graduates consider the main design principles for official statistics production, such as the statistical value chain, the GSBPM, data and metadata management, and monitoring quality dimensions.

6. Graduates are proficient in a range of statistical methods for official statistics, this includes:
    - methods for data collection,
    - methods for data processing e.g. data validation, data cleaning, data integration, outlier treatment, information extraction, unstructured data treatment,
    - methods for dealing with missing or sparse data and measurement errors, e.g. non-response correction, small area estimation, imputation, statistical matching,
    - time series analysis, seasonal adjustment, index theory, multivariate statistics, econometrics, spatial statistics,
    - and methods for confidentiality e.g. disclosure control for tabular data and microdata, privacy-enhancing techniques.

B) Skills

1. Graduates can produce statistical data using various data sources.
2. Graduates are capable of designing and managing a small production system according to architectural design principles that guarantees transparency, reproducibility and accountability of results.
3. Graduates possess strong programming skills for complex data processing tasks using tools and workflows that promote reproducibility, collaboration and transparency.
4. Graduates can use the most important tools to disseminate data and are able to present metadata in a clear, intelligible and comprehensible way. Graduates can present orally and in writing data and data insights effectively to diverse audiences and are able to challenge interpretation of data analysis.
5. Graduates have the skills to apply a wide range of statistical methods for data collection, processing, and analysis in practical scenarios and are able to implement them using a recent programming tool or statistical software (e.g. current tools such as R or Python).
6. Graduates are capable of understanding and assessing the methodological issues related to data collection, processing, estimation and dissemination, to make an informed decision on methodology, and to apply the methodology programmatically in practical circumstances.
7. Graduates are capable of designing or further developing of statistical methods to solve specific challenges.

C) Competencies

1. Graduates apply the European Statistics Code of Practice principles and the Public Commitment in data production and dissemination.
2. Graduates can integrate knowledge from different scientific disciplines to produce and analyse data.
3. Graduates can place their work as a producer or consumer of an official statistic in the legal and institutional context of official statistics, both nationally and internationally. Graduates can convey to policy makers, scientists and the public, the relevance and importance of official statistics and the main features of its legal and institutional context.
4. Graduates will be able to use state-of-the-art statistical methods, including techniques of data science and artificial intelligence, to improve data analysis, ensure reproducibility, and collaborate effectively in interdisciplinary teams.
5. Graduates have an advanced understanding of methodological issues across various statistical domains. They are familiar with the relevance and issues regarding comparability, standardization, classification, definitions of variables, of population and of population units as well as the main quality dimensions.