



EMOS Study Guidelines

for the

Mannheim Master of Applied Data Science & Measurement (MDM)

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Content

1. Overview	3
2. Requirements for the EMOS certificate	4
2.1 Curriculum: EMOS Specialization Track.....	4
2.2 Mandatory Traineeship in Official Statistics	6
2.3 Master-Project in Official Statistics	7
3. Other EMOS-related activities and services.....	8
3.1 EMOS master's thesis competition	8
3.2 EMOS Workshops, Webinars and Study Visits to Eurostat	8

1. Overview

What is EMOS?

EMOS is a label for master's programs awarded by the European Statistical System Committee. EMOS stands for "European Master in Official Statistics" (EMOS) and is a network of master's programs providing post-graduate education in the area of official statistics. Universities offering EMOS master's degrees collaborate actively with the national statistical institutes to reduce the gap between theory and practice.

What are the learning outcomes of EMOS master's programs?

EMOS programs are based on learning outcomes, which familiarize the graduates with the system of official statistics, production models, statistical methods and dissemination.

What are my benefits?

If you decide to study the EMOS Track within the MDM, you will be awarded an additional EMOS certificate upon successful completion of the MDM program. As this EMOS certificate affirms your proficiency with the competencies needed in official statistics, it will prove as a great asset for your career in official statistics. You will be uniquely qualified to apply for positions offered at national statistical institutes or other producers of official statistics.

What are the requirements to receive the EMOS certificate?

For acquiring the EMOS certificate, you must complete the MDM program and you must fulfill the following three conditions (a detailed description of the requirements can be found in chapter 2 below):

1. Completing the elective courses "Introduction to Official Statistics" and "Advanced Topics in Official Statistics".
2. Completing a traineeship in official statistics and pass the "Project Report".
3. Completing your "Master-Project" about a research topic relevant to official statistics.

How do I obtain a traineeship in official statistics?

We established cooperation with prestigious partners in official statistics: The *Deutsche Bundesbank*, the Institute for Employment Research (IAB) and the statistical office of the federal state of Baden-Württemberg. As an EMOS student within the MDM, we will support you with the coordination of your traineeship and will allocate you with a direct contact person within those institutions. If you wish to conduct your traineeship at other institutions of official statistics, please check with your program management team.

How is the obligatory traineeship organized?

You will be assigned a certain project relevant to official statistics from your traineeship institution. Your allocated supervisor guides you through this project and makes sure that you are integrated into the institutional structure.

2. Requirements for the EMOS certificate

2.1 Curriculum: EMOS Specialization Track

The MDM curriculum consists of 54 ECTS credits of pre-selected courses and 6 ECTS credits of elective courses. If you want to study the EMOS Track in order to acquire the EMOS certificate, you must inform the program management latest by the end of “Year 2: Spring” term. In this case, you must follow the EMOS Specialization Track as laid out in Table 1 below. You must choose the two courses “Introduction to Official Statistics” (2 ECTS credits) and “Advanced Topics in Official Statistics” (2 ECTS credits) within your electives (highlighted below). For the remaining 2 ECTS credits, you can choose another course from the range of electives according to your interests (s.

Table 2).

Table 1: MDM EMOS Specialization Track

Course	Focus Area	ECTS
Year 1: Summer		
Review of Statistical Concepts	Data Analysis	6
Privacy Law	Data Output/Access	2
Self-Paced Introduction to R Course	Data Curation/Storage	-
Year 1: Fall		
Fundamentals of Survey and Data Science	Research Design	6
Introduction to Real World Data Management	Data Curation/Storage	4
Year 2: Spring		
Questionnaire Design	Data Generating Process	4
Modern Workflow in Data Science	Data Curation/Storage	4
<i>Elective*</i>	Any (see list below)	2
Year 2: Summer		
Introduction to Record Linkage with Big Data Applications	Data Generating Process	4
Ethical Considerations for Data Science Research	Data Output/Access	2
<i>Introduction to Official Statistics</i>	<i>Data Output/Access</i>	2
Year 2: Fall		
Generalized Linear Models	Data Analysis	4
Sampling I	Data Generating Process	4
<i>Advanced Topics in Official Statistics</i>	<i>Data Output/Access</i>	2
Year 3: Spring		
Introduction to Data Visualization	Data Output/Access	2
Project Consulting Course	All areas except Research Design	12
Project Report based on your obligatory traineeship in official statistics	-	10
Year 3: Summer/Fall		
Final Exams	-	
Master-Project in official statistics	-	20

Table 2: MDM EMOS Electives Catalogue (EMOS students choose one course)

Course	Focus Area	ECTS
Introduction to Python and SQL	Data Curation/Storage	2
Web Scraping and APIs	Data Generating Process	2
Introduction to Machine Learning and Big Data	Data Analysis	2
Usability Testing for Survey Research	Data Generating Process	2
Item Nonresponse and Imputation	Data Analysis	2
Multiple Imputation – Why and How	Data Curation/Storage	2
Sampling II	Data Generating Process	2
Survey Design and Implementation in International Contexts	Data Generating Process	2
Practical Tools for Survey Weighting	Data Analysis	2
Good Practices for Managing Data	Data Curation/Storage	2
Data Confidentiality and Statistical Disclosure Control (self-paced)	Data Output/Access	2

2.2 Mandatory Traineeship in Official Statistics

Traineeships are a great opportunity to get insight into the real data work in official statistics. Thus, for EMOS students, a traineeship at a national statistical institute or other producers of official statistics is an obligatory part of the EMOS program.

Students have the option to complete their traineeship in official statistics at the institution of their choice. Furthermore, Mannheim Business School has established cooperation with three prestigious producers of official statistics. This cooperation guarantees that EMOS trainees will be able to put into practice their knowledge acquired during their studies at Mannheim Business School. If you wish to conduct your traineeship at other institutions of official statistics, please check with your program management team.

The three cooperation partners of Mannheim Business School are:

Institution	Description
Deutsche Bundesbank	The Deutsche Bundesbank is the central bank of Germany (NCB) and as such part of the European System of Central Banks (ESCB).
Institute for Employment Research (IAB)	IAB is the Research Institute of the German Federal Employment Agency and conducts research in the field of official statistics, specifically on the labour market in order to advise political actors at all levels in a competent manner.
Statistical Office Baden-Wuerttemberg	The Statistical Office of Baden-Wuerttemberg is one of the largest information service providers in Baden-Württemberg. It makes comprehensive data material on economic and social development in the state publicly available and offers individual advice on handling data.

Based on your work experience and projects as an official statistics trainee, you must submit a Project Report. The Project Report equals 10 ECTS credit points and has to be submitted four weeks before you take your oral exams. The content and formal requirements of the Project Report are stated in the MDM exam regulations.

2.3 Master-Project in Official Statistics

The MDM Master-Project (20 ECTS) is a team project and consists of a written part (master's thesis) and an oral part (colloquium). Working on such a project in a team of two to five participants benefits your competence portfolio. The Master-Project is replicating the characteristics of data science projects in real-life, which are usually conducted as team projects.

To acquire the EMOS certificate, your Master-Project must be a research topic relevant to official statistics. Similarly to the traineeship, our cooperation partners can provide you with such a topic and support you.

The Master-Project is organized under close supervision, to allow you to plan this project as best as possible and accommodate it to your work schedule and other time commitments. You will have a Master-Project supervisor, which supports you with insight into your specific topic. Additionally, you will work closely with the examiner to track the process of your Master-Project. This process allows the examiner to evaluate each group member's individual work and grade accordingly.

Your Master-Project begins with the submission of the project proposal, where you specify which skills are needed for this project and which team member will take over which tasks. After starting the project, you are asked to report your progress regularly in two ways: You will submit a deliverable on the learning platform as well as present the status of the project and current tasks of each member to the examiner in an online meeting. This will also provide you with the opportunity to discuss certain challenges and secure the project's success.

With the final submission of the thesis, you must also provide an individually signed 'Statement of Contribution' (template provided), which details the specific tasks involved in the Master-Project and what percentage of work each group member contributed.

After submission of your thesis, your project group will be examined in the colloquium by the examination board. The examination board evaluates the performance of each participant in the colloquium with an individual grade. Following the colloquium, the examiner sets the final grade for each participant of the Master-Project – the basis of the determination are the individual assessments of the written or practical part and the colloquium.

3. Other EMOS-related activities and services

As an EMOS student, you benefit from various activities organized by the EMOS network of participating universities as well as national statistical institutes and other producers of official statistics.

3.1 EMOS master's thesis competition

The purpose of the EMOS master's competition is to reward outstanding master's theses amongst the network of EMOS labelled programs in nearly 20 countries. It seeks to highlight official statistics as a research topic and to put forward young talents with innovative contributions. The winners of the competition will have the possibility to present their master's thesis in the New Techniques and Technologies for Statistics (NTTS), an international biennial scientific conference series, organized by Eurostat. Authors of master's thesis and their supervisors will receive an "Honors Diploma". The master's theses will be published on the NTTS and EMOS homepages.

For more information: https://ec.europa.eu/eurostat/cros/content/master-thesis-competitions_en

3.2 EMOS Workshops, Webinars and Study Visits to Eurostat

The EMOS workshops and webinar series offer a relevant mix of skills and knowledge for tomorrow's official statisticians. Study visits to Eurostat provide an insight into official statistics at European level considered attractive by the students.

For more information: https://ec.europa.eu/eurostat/cros/content/what-do-we-do_en