

Teaching and Examination Regulations 2022-2023 Master's degree programme Medical Pharmaceutical Sciences

Appendix I Learning outcomes of the degree programme (art. 3.1)

A graduate Medical Pharmaceutical Sciences (MPS) is able to:

- 1 Explain in detail the major underlying principles within the field of Medical and Pharmaceutical Sciences and integrate knowledge of etiology and pathophysiology of disease to design and develop more effective and safer drugs (knowledge).
- 2 Identify new developments within the field of Medical Pharmaceutical Sciences and can become familiar with these developments (Lifelong learning skills)
- 3 Critically appraise the results of research in 'medical pharmaceutical sciences' and/or in the dedicated specialisms 'drug toxicology and translational technology', 'pharmaceutical design and engineering' or 'pharmacoepidemiology and pharmacoconomics' (knowledge and judgement).
- 4 Formulate hypotheses, design and conduct scientific research, manage and interpret data and demonstrate proficiency in statistical analyses for Medical Pharmaceutical Sciences (application).
- 5 Systematically organize his/her work in scientific research and formulate realistic and original solutions to complex problems (application).
- 6 Critically evaluate scientific data from experiments or literature, and offer sound arguments to justify a position (judgment and communication).
- 7 Work independently as well as in a team to solve scientific and societal challenges related to medical pharmaceutical sciences (application).
- 8 Effectively communicate scientific concepts to specialists as well as to a lay audience through oral and written presentations (communication).
- 9 Identify societal and ethical implications of Medical Pharmaceutical Research and acts according to the scientific code of conduct (judgement).
- 10 Evaluate and reflect on personal capabilities and motivation for a (international) scientific, policy or business career, and has knowledge and skills to develop their own career (lifelong learning skills).

Appendix II Tracks of the degree programme (art. 3.6)

1. Within the degree programmes, the student chooses one of the Research-tracks written below (R-track), or one chooses the **Science, Business and Policy**-track ("SBP-track"), which prepares for professions in a societal, political and/or commercial context.
2. Within the degree programme Medical Pharmaceutical Sciences, the general R-track **Medical Pharmaceutical Sciences Research** track, provides students training as a researcher in various fields of medical pharmaceutical sciences.
3. Within the degree programme Medical Pharmaceutical Sciences, the R-track **Drug Toxicology and Translational Technology**, provides students training as a researcher mainly in the field of adverse drug reactions.
4. Within the degree programme Medical Pharmaceutical Sciences, the R-track **Pharmacoepidemiology and Pharmacoconomics**, provides students training as a researcher in the area of pharmacovigilance, database research, observational and trial intervention methodology and utilization studies with specific attention to the role of pharmaceuticals in healthy ageing.
5. Within the degree programme Medical Pharmaceutical Sciences, the R-track **Pharmaceutical Design and Engineering**, provides students training as a researcher in the areas of target identification, drug design, biologics, biotechnology, and innovative drug and dosage forms.

Appendix III. Content of the degree programme (art. 3.8)

The degree programme Medical Pharmaceutical Sciences offers the following Research tracks (R-track): Medical Pharmaceutical Sciences Research, Drug Toxicology and Translational Technology, Pharmacoepidemiology and Pharmacoconomics and Pharmaceutical Design and Engineering as well as a Science, Business and Policy track (SBP-track).

General requirements for all MPS R-Tracks:

Course unit	ECTS	Course code	Practical	Entry requirements
research project (RP)	40	WMMP901-XX	x	Safe Microbiological Technique certificate [#]
research project (RP)	30	WMMP902-XX	x	Safe Microbiological Technique certificate [#]
colloquium	5	WMMP001-05	x	
essay	5	WMMP002-05	x	-
Drug Development: from Design to Evaluation	5	WMMP006-05		
Academic Skills	5	WMMP012-05	x	
track-specific mandatory courses	≥ 15-18*		see app. IV	see appendix IV
electives	≤ 12-15*		see app. IV	see appendix IV

[#] Students who have not obtained a Safe Microbiological Technique certificate (VMT in Dutch) have to include the MBS course in the first year of their study programme.

* Depending on the chosen track.

General requirements for the SBP-track:

Course unit	ECTS	Course code	Practical	Entry requirements
research project (RP)	30	WMMP901-XX	x	Safe Microbiological Technique certificate [#]
colloquium	5	WMMP001-05	x	
Drug Development: from Design to Evaluation	5	WMMP006-05		
Academic Skills	5	WMMP012-05	x	
Science & Business	10	WMSE001-10	x	-
Science & Policy	10	WMSE002-10	x	-
work placement SBP	40	WMSE902-40	x	RP, course units S&B and S&P
electives	≤ 15		see app. IV	see appendix IV

[#] Students who have not obtained a Safe Microbiological Technique certificate (VMT in Dutch) have to include the MBS course in the first year of their study programme, unless the student will conduct a research project that does not involve any laboratory work.

The following rules apply to all tracks:

- the first research project must be performed at the Faculty of Science and Engineering (FSE) or the University Medical Center Groningen, under supervision of one of the appointed examiners. The grade of the first research project must be registered before a second research project or the SBP-internship can be started.
- the student chooses or is assigned a study mentor from the list to advise and discuss the contents of the individual degree programme, before sending a signed programme proposal for approval to the Board of Examiners.
- The tracks Drug Toxicology and Translational Technology, Pharmacoepidemiology and Pharmacoeconomics and Pharmaceutical Design and Engineering have designated mentors, as mentioned on the student portal.
- all elements of the individual programme must be approved by the Board of Examiners before their start. The research projects, colloquium and essay must deal with different research subjects, and must be supervised by different examiners appointed for MPS. The subject of the SBP-track internship must be clearly related to the scientific domain of MPS (see Appendix I). To conduct an SBP-internship, you will need 1. an SBP-examiner, and 2. a 'non-SBP MPS examiner'. The colloquium cannot be done in the Science & Society group or under supervision of an SBP-examiner in case you follow the SBP-variant.
- electives can be:
 - o an extension of a research project. The research project can be registered as 30, 35, 40, 45 or 50 ECTS project. Propositions for extensions of 10-15 ECTS must be requested before the start of the research project. Arrangements for extensions of 5-10 ECTS may also be made during the midterm evaluation. The research project cannot exceed 50 ECTS.
 - o extra course units (see appendix IV).
 - o a research assignment of 5 or 10 ECTS.

Track-specific requirements for Medical Pharmaceutical Sciences:

The course units Drug Development: from Design to Evaluation and Academic Skills are mandatory for all MPS students.

Additional requirements for the general research track Medical Pharmaceutical Sciences Research:

- 30 ECTS of electives chosen from the elective courses as listed in appendix IV.

Additional requirements for the research track Drug Toxicology and Translational Technology:

- the subject of one research project (≥ 40 ECTS) and the subject of either the essay or the colloquium is chosen in the field of Toxicology and/or advanced translational models for drug testing.
- 15 ECTS track-specific courses are filled with the following courses:

a. Track-specific mandatory courses (10 ECTS):

Course unit	ECTS
Molecular Toxicology	5
Advanced Pharmacokinetics	5

b. A minimum of 5 ECTS from the following list:

Course unit	ECTS
Pharmacovigilance (biennial, runs in 2022/2023)	5
Animal Experimentation	5
Reproductive Toxicology and Epidemiology	5
Nanomedicine and Nanosafety	5
Clinical Toxicology	5

- 15 ECTS of electives chosen from the elective courses as listed in appendix IV.

Additional requirements for the research track Pharmacoepidemiology and Pharmacoeconomics:

- the subject of one research project (≥ 40 ECTS) and the subject of either the essay or the colloquium is chosen in the field of Pharmacoepidemiology and/or Pharmacoeconomics.
- 18 ECTS track-specific courses are filled with the following courses:

Course unit	ECTS
Basics in Medicine	8
Clinical Pharmacoepidemiology*	5
Pharmaco-epidemiology in Practice OR Pharmacoeconomics **	5

* students who accomplished the equivalent course phar-epi (= pharmacoepidemiology (EN)/ farmacoepidemiologie (NL)) in their bachelor programme will be exempted from this requirement. The remaining 5 ECTS should be considered as 5 ECTS extra electives in their master programme.

** Students who did Introduction to Pharmacoeconomics in their Bachelor could also only take Advanced Pharmacoeconomics.

- ≤ 12 ECTS of electives chosen from the elective courses as listed in appendix IV. Recommended courses in this elective space are:

Course unit	ECTS
Advanced Pharmacoeconomics	5
Pharmacovigilance (biennial, runs in 2022/2023)	5
Reproductive Toxicology and Epidemiology	5

Additional requirements for the research track Pharmaceutical Design and Engineering:

- the subject of one research project (≥ 40 ECTS) and the subject of either the essay or the colloquium is chosen in the field of target identification, drug design, biologics, biotechnology, or innovative drug and dosage forms.
- 15 ECTS master courses are filled with the following courses:
 - a. Track-specific mandatory courses (10 ECTS):

Course unit	ECTS
Pharmaceutical Biotechnology	5
Pharmaceutical Design and Engineering	5

- b. A minimum of 5 ECTS from the following list:

Course unit	ECTS
Molecular Toxicology	5
Translational Research in Respiratory Disease	5

- 15 ECTS of electives chosen from the elective courses as listed in appendix IV. Recommended courses in this elective space are

Course unit	ECTS
Advanced Imaging Techniques	5
Nanomedicine and Nanosafety	5
Medicinal Natural Products	10

Appendix IV Electives (art. 3.9.1)

Table 1 and 2 below list study elements that can be chosen as electives in MPS.

Additional knowledge may be required in specific course units. These requirements will be published on Ocasys. For up to date information regarding the courses, such as assessment, entry requirements and learning objectives, Ocasys is leading.

After consultation with the study mentor and approval of the Board of Examiners, students may also choose from options available from other departments, other universities in the Netherlands or even abroad.

Table 1: Elective courses organised by Medical Pharmaceutical Sciences or other master programmes

Course	ECTS
Advanced Imaging Techniques	5
Advanced Light Microscopy	5
Advanced Pharmacoeconomics	5
Advanced Pharmacokinetics	5
Advanced Statistics	6
Animal Experimentation	5
Applied statistics and modeling	5
Behavioural Pharmacology	5
Big Data & Applications in biomedicine	5
Clinical Pharmacoepidemiology *	5
Clinical Toxicology	5
DNA Micro-array Analysis	5
From Big Data to Personalised Medicine	5
iGEM (International Genetically Engineered Machine competition) **	20
Introduction to the Pharmaceutical Industry	6-12
Lerarenopleiding: Basiscursus ^	5
Lerarenopleiding: Masterstage 1^	5
Medicinal Natural Products	10
Microbiological Safety	1
Molecular Toxicology	5
Nanomedicine and Nanosafety	5
Neurobiology of Psychiatric Disorders	5
Orientation on International Scientific Careers	5
Pharmaceutical Biotechnology	5
Pharmaceutical Design and Engineering	5
Pharmacoeconomics	5
Pharmaco-epidemiology in Practice	5
Pharmacology of Chronic Diseases and Ageing	5
Pharmacovigilance (biennial, runs in 2022/2023)	5

Programming C++ for Biologists	5
Quantitative Bioanalysis	5
Radioisotopes in Experimental Biology	5
Reproductive Toxicology and Epidemiology	5
Science & Business	10
Science & Policy	10
Skills in Science Communication (2a)	5
Solving Problems in Product Technology	6
Tools and Approaches of Systems Biology	5
Translational Research in Respiratory Disease	5

* students who accomplished the equivalent course phar-epi (= pharmacoepidemiology (EN)/ farmacoepidemiologie (NL)) in their bachelor programme are not allowed to take this course.

** Selection for this competition takes place in winter time, an advertisement about application details will be announced via the student portal during the academic year. Maximum of 10 ECTS of the available 20 ECTS can be registered within elective space, the rest will be extracurricular credits.

^ Course unit offered in Dutch only.

Table 2: Elective courses organised by The Donald Smits Center for Information Technology:

Course (max 2 ects per individual programme^)	Half day unit^
Access basic	5
Excel basic	5
Excel module draaitabellen	1

^ A minimum of 5 half day units is required for a study load of 1 ECTS, for 2 ECTS 11 units are needed. These courses have additional costs (low student tariff), which are at the student's own expenses. These courses are not available in Ocasys. Please consult the Center for Information Technology for further information, time schedules, language of instruction and enrolment details.

Appendix V Entry requirements and compulsory order of examinations (art. 4.4)

Course unit	Entry requirement
Research project	Safe Microbiological Technique certificate
Research project 2	Research project + Academic Skills
Work placement Science Business & Policy	Research project + courses Science & Business and Science & Policy

Appendix VI Admission to the degree programme

(art. 2.1A.1 + 2.1B.1)

1. Requirements for admission to the master degree in Medical Pharmaceutical Sciences

Holders of the following Bachelor's degrees from the University of Groningen are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Medical Pharmaceutical Sciences on that basis:

- a Bachelor's degree in Pharmacy.
- a Bachelor's degree in Life Science & Technology (old curriculum, prior to 2020/2021) with one of the following majors:
 - > Biomedical Sciences with the minor Pharmacy (or a similar approved programme in the area of Pharmacy) including the following course units:
 - > 1. Medicine Groups: Endocrine System and Digestive and Respiratory Tract
 - > 2. Medicinal Chemistry & Biophysics
 - > 3. Organic & Biosynthesis OR Medicine Group: Circulatory Tract
 - > 4. Pharmaceutical Technology & Biopharmacy 1
 - > 5. Pharmacokinetics
 - > 6. Metabolism & Toxicology.
 - > Molecular Life Sciences with the minor Pharmacy (or a similar approved programme in the area of Pharmacy) including the following course units:
 - > 1. Medicine Groups: Endocrine System and Digestive and Respiratory Tract
 - > 2. Medicinal Chemistry & Biophysics
 - > 3. Organic & Biosynthesis OR Medicine Group: Circulatory Tract
 - > 4. Pharmaceutical Technology & Biopharmacy 1
 - > 5. Pharmacokinetics
 - > 6. Metabolism & Toxicology.
- a Bachelor's degree in Biology with one of the following majors
 - > Biomedical Sciences with the minor Pharmacy (or a similar approved programme in the area of Pharmacy) including the following course units:
 - > 1. Medicine Groups: Endocrine System and Digestive and Respiratory Tract
 - > 2. Medicinal Chemistry & Biophysics
 - > 3. Organic & Biosynthesis OR Medicine Group: Circulatory Tract
 - > 4. Pharmaceutical Technology & Biopharmacy 1
 - > 5. Pharmacokinetics
 - > 6. Metabolism & Toxicology.
 - > Molecular Life Sciences with the minor Pharmacy (or a similar approved programme in the area of Pharmacy) including the following course units:
 - > 1. Medicine Groups: Endocrine System and Digestive and Respiratory Tract
 - > 2. Medicinal Chemistry & Biophysics
 - > 3. Organic & Biosynthesis OR Medicine Group: Circulatory Tract
 - > 4. Pharmaceutical Technology & Biopharmacy 1
 - > 5. Pharmacokinetics
 - > 6. Metabolism & Toxicology.
- A Bachelor's degree in Life Science & Technology (new curriculum from 2020/2021 onwards) with the following courses:
 - > Pharmacokinetics
 - > Metabolism and Toxicology
 - > Biostatistics
 - > Pharmacoepidemiology
 - > One from:
 - MG: Endocrine System and Digestive and Respiratory Tract
 - MG: Circulatory Tract
 - MG: Infectious Diseases and Oncology
 - Collected Medicine Groups
 - Drugs for the Central Nervous System
 - > A Bachelorproject in a field suitable for MPS

- A Bachelor's degree in Chemistry with:
 - > Chemistry of Life track
 - > The following courses in their minor:
 - Medicinal Chemistry 1
 - Pharmacokinetics
 - Metabolism & Toxicology
 - Medicine Groups: Infectious Diseases and Oncology

Students lacking one or two of the above mentioned courses, may sometimes be admitted on the condition of including these courses within the electives of the master programme.

Students with a Bachelor's degree in a discipline closely related to pharmacy from another Dutch or foreign university may also qualify for admission. The respective bachelor program will be evaluated for relevant courses in molecular and cellular biology, biochemistry/organic chemistry, pharmaceutical sciences, chemical analysis, statistics, practical lab skills in medical pharmaceutical sciences and proof of academic scientific writing skills. The completeness and compatibility of the individual admission files is independently evaluated by two members of the Admission Board upon which a common decision for admission or rejection is reached. Both admission and rejection decisions have as a primary aim to warrant the interest of the student.

It is possible to appeal to the decision of the admission board via standardized procedures at the University of Groningen.

Appendix VII Transitional provisions (art. 7.1)

Changes 2022-2023 MPS

Tracks

- SBP-track's requirement for a Research Project of at least 40 ECTS has been changed to a Research Project of at least 30 ECTS. This also increases the elective space in the SBP-track from 5 ECTS to 15.
- For all tracks the entry requirement of having finished a Research Project before doing the Colloquium has been dropped.

Courses

- Pharmacovigilance runs biennially. It will run again in 2022/2023.

Schedule

- Advanced Pharmacoeconomics has moved to block 1B1
- Advanced Pharmacokinetics has moved to block 1A3
- Academic Skills has moved to block 1A2
- Clinical Pharmacoepidemiology has moved to block 1A3
- Molecular Toxicology has moved to block 1A1

We recommend first year students start with Drug Development and Academic Skills. If you have mandatory track courses or electives that run during 1A1 or 1A2, you can follow those in your second year.

Appendix VIII Additional Requirements Open degree Programmes (Art. 3.10)

Students wishing to pursue an open degree programme should file a request with the Board of Examiners.

Appendix IX

Application and decision deadlines for admission

(art. 2.7.1 and 2.7.3)

Programmes starting on 1 September 2022

Programme	Deadline of Application	Deadline of decision
Behavioural and Cognitive Neurosciences	1 May 2022	1 June 2022
Biology	1 May 2022	1 June 2022
Biomedical Engineering	1 May 2022	1 June 2022
Biomedical Sciences	1 May 2022	1 June 2022
Biomolecular Sciences	1 May 2022	1 June 2022
Computational Cognitive Science	1 May 2022	1 June 2022
Ecology and Evolution	1 May 2022	1 June 2022
Energy and Environmental Sciences	1 May 2022	1 June 2022
Marine Biology	1 May 2022	1 June 2022
Mechanical Engineering	1 May 2022	1 June 2022
Medical Pharmaceutical Sciences	1 May 2022	1 June 2022
Nanoscience: for non-EU/EEA students	1 February 2022	1 June 2022
Nanoscience: for EU/EEA students	1 May 2022	1 June 2022
Science Education and Communication	1 May 2022	1 June 2022

Programmes starting on 1 September 2022 and 1 February 2023

Programme	Deadline of Application for 1 September	Deadline of decision for 1 September	Deadline of Application for 1 February	Deadline of decision for 1 February
Applied Mathematics	1 May 2022	1 May 2022	1 May 2022	1 May 2022
Applied Physics	1 June 2022	1 June 2022	1 June 2022	1 June 2022
Artificial Intelligence	15 October 2022	15 October 2022	15 October 2022	15 October 2022
Astronomy	15 November 2022	15 November 2022	15 November 2022	15 November 2022
Chemical Engineering	1 May 2022	1 May 2022	1 May 2022	1 May 2022
Chemistry	1 June 2022	1 June 2022	1 June 2022	1 June 2022
Computing Science	15 October 2022	15 October 2022	15 October 2022	15 October 2022
Farmacie	15 November 2022	15 November 2022	15 November 2022	15 November 2022
Industrial Engineering and Management	1 May 2022	1 May 2022	1 May 2022	1 May 2022
Mathematics	1 June 2022	1 June 2022	1 June 2022	1 June 2022
Physics	15 October 2022	15 October 2022	15 October 2022	15 October 2022