Assessment plan for the curriculum of the Master's degree programme in Medical Pharmaceutical Sciences, 2024-2025

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The assessment plan for the curriculum consists of the following parts:

1. Introduction
2. Objectives of the study program
3. Vision on assessment;
4. Assessment guidelines;
5. Learning outcomes of the degree programme;
6. Overview of assessment methods, test moments for course units, and examiners.

Appendix 1: List of Examiners for Medical Pharmaceutical Sciences

1. Introduction

This assessment plan is a systematic description of the testing and assessment modes for all study components in the curriculum of the Master's degree programme in Medical Pharmaceutical Sciences (MPS), 2024-2025. The plan is based on the assessment policy of the Faculty of Science and Engineering, as set out in the 2013 version of the FSE Quality Assurance Manual (Chapter 6: Assessment) and the protocol setting out the duties and powers of the Faculty's Board of Examiners (December 2013).

The study components are described in the Appendix to the Teaching and Examination Regulations 2024-2025 for the degree programme in Medical Pharmaceutical Sciences. The content of each study component is described in Ocasys, the online course catalogue (http://www.rug.nl/ocasys/).

2. Objectives of the study program

The field of Medical Pharmaceutical Sciences (MPS) is interdisciplinary, focusing on molecular intervention of disease by drugs, and covering all discipline fields from drug design and synthesis, molecular modelling of drug/target interactions, pharmacology, drug disposition, drug safety, drug formulation to pharmaco-epidemiology, and pharmaco-economics. Proper knowledge of molecular pathology combined with fundamental understanding of the mechanisms of actions of drugs and of their development result in the generation of new paradigms in drug development. The MPS master programme prepares students for a career in pharmaceutical research, policy or business in academia, non-profit or commercial organisations.

3. Vision on assessment

1. Assessment guides and evaluates students' understanding of 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.
2. Assessment guides and evaluates students to formulate hypotheses, design and conduct scientific research, manage and interpret data and demonstrate proficiency in statistical analyses to prepare for a career in Medical Pharmaceutical Sciences.
3. Assessment guides and evaluates students in the generation and analysis of scientific data from experiments or literature.
4. Assessment guides and evaluates students in the creation of new idea's in data interpretation and experimental research.
5. Assessment guides and evaluates students in written or oral communication skills for both lay and specialized audiences.
6. Assessment guides and stimulates reflection on personal skills and development.

4. Assessment guidelines

1. Formative assessment for learning objectives that include knowledge, understanding and application of simple procedures is organized by providing at least one opportunity for students to self assess before summative assessment,
2. The students are assessed by a variety of assessment methods in the different course units to practise with different situations.
3. Assessment of presentations and reports includes the formulation of personalised feedback to stimulate the development of the students.
4. Students design their own study programme tailored to their interests in consultation with their study mentor. The Board of Examiners must approve each individual programme.
5. The major part of the master's degree programme consists of individual course units such as research project(s), colloquium, essay and/or work placement. The course units are graded by by examiners appointed by the Board of Examiners (Appendix 1).

6. Learning outcomes of the degree programme

	Learning Outcome *At the end of the programme, the graduate 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 pharmacoeconomics' (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 her/his 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 act 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).

7. Overview of assessment methods, test moments for course units, and examiners

The curriculum consists of a compulsory part (table 1), track course units (table 2, 3 and 4) and non-track course units (table 5). At the beginning of their program students can choose based on their preferences and interests from the following tracks:

- Pharmaceutical Design and Engineering (PDE)
- Pharmaco-epidemiology and Pharmacoeconomics (PP)
- Science, Business and Policy (SBP)

If the students change their track during their program they need to match the track requirements of their final choice at the end of their master.

The master's programme has one administrative track in Sustainable Drug Discovery (S-DISCO) to accommodate students from the International master in Sustainable Drug Discovery. Students can enter the administrative track Sustainable Drug Discovery via the International master in Sustainable Drug Discovery.

For the Pharmaceutical Design and Engineering (PDE) track students do:

- Compulsory course units (45-50 ECTS):
    - Drug Development, Academic skills, Colloquium and research project 1 in a PDE related topic.
- PDE track course units (50-60 ECTS):
    - 4 out of 6 PDE track electives and research project 2
- Non track course units (10-25 ECTS)

For the Pharmaco-epidemiology and Pharmacoeconomics (P&P) track students do:

- Compulsory course units (45-50 ECTS):
    - Drug Development, Academic skills, Colloquium and research project 1 in a P&P related topic.
- P&P track course units (50-60 ECTS):
    - 4 out of 7 P&P track electives and research project 2
- Non track course units (10-25 ECTS)

For the Science, Business and Policy (SBP) track students do:

- Compulsory course units (45-50 ECTS):
    - Drug Development, Academic skills, Colloquium and research project 1
- Non track course units (10-15 ECTS)
- SBP track course units in year 2 (60 ECTS)
    - Introduction Science and Business, Introduction Science and Policy and SBP Work Placement

Table 1. Compulsory course units

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1	1a1	Drug Development from Design to Evaluation	5	WE,AST	TBD	Presentation towards end of the course Exam week	Prof. Dr. P. Olinga	Prof. Dr. B.N. Melgert
1	1a2	Academic Skills	5	WE, P, R	TBD	Presentations towards end of the course Exam week	Prof. Dr. E. Hak	Dr. S. Mubarik
1/2	-	Colloquium	5	R,P	No	Assessment at the end	Appointed examiner	Appointed examiner
1	-	Research project 1	30,35	PR,P,R	Yes	Midterm Continual feedback during lab work	Appointed examiner	Appointed examiner

Table 2. PDE track course units

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1/2	1a3	Advanced Pharmacokinetics	5	WE,AST	No	Daily assignments Exam week	Dr. C. Åberg	Prof. Dr. D.J. Touw

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1/2	1b1	Green Chemistry	5	P	No	Presentation at end of the course	Dr. P. Fodran	Dr. S. Schmidt
1/2	1a3	Introduction to Vaccines and Vaccinology	5	WE	No	Exam week	Dr. M. Balogh	Dr. K. Rafie
1/2	1a1	Molecular Toxicology	5	WE, P, Ast	TBD	Two presentations during course Exam week	Dr. Ir. I.A.M. de Graaf	Prof. Dr. A. Salvati
1/2	1b2	Nanomedicine and Advanced Pharmaceutics	5	WE, P	Yes	Symposium halfway Exam in 2nd week Presentation at the end of the course	Prof. Dr. A. Salvati	Prof. Dr. H.W. Frijlink
1/2	1b3	Quantitative Bioanalysis	5	WE	Yes	Exam week	Prof. Dr. N.C. van de Merbel	To be announced
1/2	1a2	Sustainable Drug Design and Engineering	5	P, AST	Yes	Assessment via assignments Presentation at the end of the course	Dr. F.J. Dekker	H.W. Frijlink, R. Gosens M.R. Groves, A. Nagelkerke, K. Haslinger, G. Lageveen-Kammeijer, M. Schmidt

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
2	-	Research project 2	30, 35, 40	PR,P,R	Yes	Midterm Continual feedback during lab work	Appointed examiner	Appointed examiner

Table 3. P&P track course units

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1/2	2a1	Clinical Pharmacoepidemiology	5	WE, MC, R, P	Yes	Interim test in week 2 and 3	Prof. Dr. E. Hak	Dr. S. Mubarik
1/2	1a2	Clinical Toxicology	5	WE, P, AST	Yes	Presentations during course Exam week	Prof. Dr. D.J. Touw	Dr. Ir. I.A.M. de Graaf
1/2	1a3	Introduction to Vaccines and Vaccinology	5	WE	No	Exam week	Dr. M. Balogh	Dr. K. Rafie
1/2	1a3	Pharmacoeconomics	5	WE, R, P, PR	TBD	Interim test Presentation halfway through course	Dr. T.L. Feenstra	Dr. A.D.I. van Asselt

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
						Presentation at the end of the course Exam week		
1/2	1a1	Pharmacoepidemiology in Practice	5	R, P, PR,	No	Presentation at the end of the course	Dr. C.C.M. Schuiling-Venninga	Prof. Dr. E. Hak
1/2	1b3	Pharmacovigilance	5	MC, AST	TBD	Presentation halfway through the course Exam week	Prof. Dr. E.P. van Puijenbroek	Drs. R. van Eekeren-Buiten
1/2	1b1	Reproductive Toxicology & Epidemiology	5	WE, R, P	Yes	Presentation towards the end of the course Exam week	Dr. A.P. Nagelkerke	Dr. C.C.M. Schuiling-Veninga
2	-	Research project 2	30, 35, 40	PR,P,R	Yes	midterm	Appointed examiner	Appointed examiner

Table 4. SBP track course units

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
2	1a1/1a2	Introduction Science and Business	10	WE, R, P, PR, Ast	Yes	Exam halfway through Presentations halfway through Continual feedback during project	Drs. S. Grooters	M.J. van den Nieuwenhof-Schilstra, MSc
2	1a3/1b1	Introduction Science and Policy	10	WE,R, P, PR, Ast	Yes	Exam halfway through Presentations halfway through Continual feedback during project	Drs. S. Grooters	Drs. J. Zevenberg
2	-	SBP Work Placement	40	R,P,PR,AST	Yes	Continual feedback during project Midterm	Appointed examiner	Appointed examiner

Table 5. Non-track course units

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1/2	1a/1b	Microbiological Safety	1	MC, PR	Yes	Test at the end Continual feedback during practical	Drs. B.L. Waarts	Dr. M. Sol
	-	Essay	5	R		Assessment at the end	Appointed examiner	Appointed examiner
		Courses organized by the other master programmes from within FSE.	5					

The abbreviations for the relevant teaching methods are explained in the legend of the table.
Examples of assessment methods include:

- *Written Exam (WE)*
- *Multiple Choice (MC)*
- *Oral Exam (OR)*
- *Report (R)*
- *Presentation (P)*
- *Practical Work (PR)*
- *Assignment (AST)*

8. Relationship between course units and details of the learning outcomes

		Learning outcomes of the degree programme										
		1	2	3	4	5	6	7	8	9	10	
Period	**Course**	**Year 1/2 –compulsory course units**										
1a1	Drug Development from Design to Evaluation	x	x				x	x		x		
1a2	Academic Skills			x	x	x	x	x	x	x		
-	Colloquium		x	x	x	x	x	x	x	x		
-	Research project 1		x	x	x	x	x	x	x	x	x	
Period	**Course**	**Year 1/2 PDE track course units**										
1a3	Advanced Pharmacokinetics	x		x	x		x		x			
1b1	Green Chemistry				x	x	x	x	x	x		
1a3	Introduction to Vaccines and Vaccinology	x	x							x		
1a1	Molecular Toxicology	x	x	x			x	x	x			
1b2	Nanomedicine and Advanced Pharmaceutics	x	x	x			x	x	x			
1b3	Quantitative Bioanalysis	x	x	x								
1a2	Sustainable Drug Design and Engineering		x	x			x	x	x			
	Research project 2		x	x	x	x	x	x	x	x	x	
Period	**Course**	**Year 1/2 P&P track course units**										
1b2	Clinical Pharmacoepidemiology	x	x	x	x							
1a2	Clinical Toxicology	x				x	x	x	x			

		Learning outcomes of the degree programme										
1a3	Introduction to Vaccines and Vaccinology	x	x							x		
1a3	Pharmacoeconomics		x	x	x		x	x	x	x	x	
1a1	Pharmacoepidemiology in Practice			x	x	x	x	x	x	x		
1b3	Pharmacovigilance	x		x	x		x		x	x	x	
1b1	Reproductive Toxicology & Epidemiology	x	x	x		x	x		x			
	Research project 2		x	x	x	x	x	x	x	x	x	
Period	**Course**	**Year 2 SBP track course units**										
1a1-1a2	Introduction Science and Business	x		x		x	x	x	x	x		
1a3-1b1	Introduction Science and Policy	x		x		x	x	x	x	x		
	SBP Work Placement		x	x			x	x	x	x	x	
Period	**Course**	**Non-track course units**										
1a/1b	Microbiological Safety									x	x	
	Essay		x	x	x	x	x	x	x	x		

Appendix 1 - List of Examiners for Medical Pharmaceutical Sciences

- The Board of Examiners can appoint new examiners during the academic year. Their names and (other) revisions of the list of Examiners will be published on the Student Portal and FSE Infonet.
- The Board of Examiners can also appoint one-time examiners to a specific individual project.
- The Board of Examiners has also appointed examiners who can assess courses, but not individual projects.

It should be noted that most SBP- track staff members are appointed as Examiner for the modules science and business, science and policy and the internship of the SBP-track only.

Table 6 List of Examiners

Name	Initials	Department	Track -mentor
Åberg	P. H. C.	Pharmaceutical Analysis	
Baarsma	H.A.	Lecturers Team	
Balogh	M.	Molecular Pharmacology	
Berg, van den	J.H.M.	Pathology & Medical Biology - Pathology	
Bock, de	G.H.	Epidemiology	
Boven, van	J.F.M.	Clinical Pharmacy & Pharmacology	
Burgess	J.K.	Pathology and Medical Biology	
Daemen	C.A.H.H.	Medical Microbiology - Molecular Virology	
Deelman	L.	Clinical Pharmacy & Pharmacology	
Dekker	F.J.	Chemical and Pharmaceutical Biology	
Denig	P.	Clinical Pharmacy & Pharmacology	
Dolga	A.M.	Molecular Pharmacology	
El Aidy	S.	Immunology, Microbiology	
Faber	K.N.	Gastrointestinal and Liver Diseases	
Feenstra	T.L.	PharmacoTherapy, -Epidemiology and -Economics	
Fodran	P.	Chemical and Pharmaceutical Biology	Yes (S-DISCO)
Frijlink	H.W.	Pharmaceutical Technology and Biopharmacy	
Gosens	R.	Molecular Pharmacology	

Graaf, de	I.A.M.	Lecturers Team	Yes (PDE)
Groves	M.R.	Chemical and Pharmaceutical Biology	
Hak	E.	PharmacoTherapy, -Epidemiology and -Economics	Yes (P&P)
Haslinger	K.	Chemical and Pharmaceutical Biology	
Heeringa	P.	Pathology & Medical Biology - Medical Biology	
Heijink	H.I.	Pathology & Medical Biology - Medical Biology	
Henning	R.H.	Clinical Pharmacy & Pharmacology	
Hinrichs	W.L.J.	Pharmaceutical Technology and Biopharmacy	
Horvatovich	P.L.	Analytical Biochemistry	
Huckriede	A.L.W.	Medical Microbiology - Molecular Virology	
Ijzendoorn, van	S.C.D.	Biomed. Sciences of Cells and Systems - Membrane Cell Biology	
Jansman	F.G.A.	PharmacoTherapy, -Epidemiology and -Economics	
Kampinga	H.H.	Biomed. Sciences of Cells and Systems	
Kamps	J.A.A.M.	Pathology & Medical Biology - Medical Biology	
Klont	F.	PharmacoTherapy, -Epidemiology and -Economics	
Kosterink	J.G.W.	Clinical Pharmacy and Pharmacology	
Kruyt	F.A.E.	Medical Oncology	
Lageveen-Kammeijer	G.S.M.	Analytical Biochemistry	
Lambers-Heerspink	H.J.	Clinical Pharmacy & Pharmacology	
Melgert	B.N.	Molecular Pharmacology	
Mian	P.	Clinical Pharmacy and Pharmacology	
Merbel, van de	N.C.	Analytical Biochemistry	
Mol	P.G.M.	Drug Regulatory Science	
Molema	G.	Pathology & Medical Biology - Medical Biology	
Mubarik	S.	PharmacoTherapy, -Epidemiology and -Economics	
Nagelkerke	A.P.	Pharmaceutical Analysis	Yes (P&P)
Olinga	P.	Pharmaceutical Technology and Biopharmacy	
Poelarends	G.J.	Chemical and Pharmaceutical Biology	

Poelstra	K.	Nanomedicine and Drug Targeting	Yes (SBP)
Puijenbroek, van	E.P.	PharmacoTherapy, -Epidemiology and -Economics	
Rafie	K.	Molecular Pharmacology	
Quax	W.J.	Chemical and Pharmaceutical Biology	
Salvati	A.	Nanomedicine and Drug Targeting	
Schmidt	M.	Molecular Pharmacology	Yes (PDE)
Schmidt	S.	Chemical and Pharmaceutical Biology	
Schuiling-Veninga	C.C.M.	Lecturers Team	
Szymanski	W.C.	Medicinal Chemistry, Photopharmacology and Imaging	Yes (PDE)
Taxis	K.	PharmacoTherapy, -Epidemiology and -Economics	
Touw	D.J.	Clinical Pharmacy and Pharmacology	
Trombetta Lima	M.	Pharmaceutical Technology and Biopharmacy	
Verpoorte	E.M.J.	Pharmaceutical Analysis	
Woerdenbag	H.G.	Pharmaceutical Technology and Biopharmacy	
Zuhorn	I.S.	Drug Delivery, Biomedical Engineering	

Table 7. Examiners who can assess courses but not individual projects

Name	Initials	Department	Course
Eekeren, van	R	PharmacoTherapy, -Epidemiology and -Economics	Pharmacovigilance
Sol	M.	UMCG	Microbiological Safety
Waarts	B.L.	UMCG / Medical Microbiology and Infection Prevention	Microbiological Safety

Table 8. SBP supervisors

Berger	M.	Science and Society
Boer, de	M.K.	Science and Society
Euverink	G.J.W.	Science and Society
Graver	J.C.	Science and Society
Grooters	S	Science and Society
Krooneman	J.	Science and Society
Laugs	G.A.H	Science and Society
Nieuwenhof-Schilstra, van den	M.J.	Science and Society
Rijssel, van	M.	Science and Society
Zevenberg	J.	Science and Society