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Curriculum for the Master's Programme in Microbiome Science

On January 23, 2025, the Senate approved the curriculum for the Master's programme in Microbiome Science in the following version, as decided by the competent Curriculum Committee established under § 25 paragraph 8 Z 3 and paragraph 1 Z 10a of the Universities Act 2002 on January 13, 2025.

The legal basis is the Universities Act 2002 and the Statutes of the University of Vienna, Section on Academic Regulations, as amended.

§ 1 Study Objectives and Qualification Profile

(1) Microbial communities play a crucial role in the functioning of complex ecological systems, the global environment, and human health. The objective of the Master's programme in Microbiome Science at the University of Vienna is to educate a new generation of experts in the interconnected fields of molecular biology, biochemistry, and genomics of microorganisms, microbial ecology, microbial symbiosis and pathogenesis, as well as environmental biosciences. Students will deepen their knowledge in research areas represented at the University of Vienna, such as molecular microbiology, microbiome research, evolution of microorganisms and viruses, environmental microbiology, and microbial ecology. They will be able to independently address complex molecular, biomedical, and environmental research questions and present their findings at an international scientific level. Additionally, students will develop advanced skills in the conceptual understanding of microbiology and microbiome research, practical work in molecular microbiological laboratories, experimental design, quantitative data analysis, and both written and oral scientific communication.

(2) Graduates of the Master's programme in Microbiome Science at the University of Vienna will possess advanced competencies beyond a Bachelor's degree, enabling them to independently address complex questions in these fields using state-of-the-art techniques. They will acquire all the necessary qualifications to conduct successful research in an international environment. This includes the ability to competently present research findings to a specialist audience and contribute to the drafting of scientific publications. Due to their scientific education, graduates meet the requirements for professional activities in the following fields/institutions:

- Academic career in private and public higher education and research institutions (in biological and medical fields)
- As employees in biological, chemical, pharmaceutical, and industrial research projects
- In science management, laboratory organization, and quality control

- Public administration in the environmental and medical sectors (e.g., in risk assessment, genetic engineering, and infection biology)
- Product development, production, and quality control in the pharmaceutical industry (microbiome-targeted therapeutics, prebiotics, and probiotics)
- Product management for biomedical and pharmaceutical companies
- Microbiological biotechnology
- Molecular biological analysis, medical and environmental diagnostics (industry, clinics, private companies)
- Science communication
- Consulting
- Subject-specific teaching at post-secondary educational institutions
- Technical professions requiring a high level of analytical skills
- Patent law (national/international organizations and companies)

Students engage in courses covering content and methods aligned with the current state of research in their respective fields. The focus is on scientifically grounded reflection, oriented towards the latest scientific developments. The Master's programme builds on and deepens the competencies and content acquired during the Bachelor's programme.

§ 2 Duration and Scope

(1) The workload for the Master's programme in Microbiome Science comprises 120 ECTS credits, which corresponds to a standard duration of four semesters.

(2) The programme is considered complete when students have successfully earned 90 ECTS credits according to the compulsory modules, 25 ECTS credits for the Master's thesis, and 5 ECTS credits for the Master's examination.

§ 3 Admission Requirements

(1) Admission to the Master's programme in Microbiome Science requires the completion of a relevant Bachelor's programme or another equivalent programme at an equivalent higher education level at a recognized national or international post-secondary educational institution.

(2) The Bachelor's programme in Biology (with a focus on Microbiology and Genetics, Molecular Biology, or Ecology) at the University of Vienna is considered a relevant qualification.

(3) To compensate for significant academic differences, supplementary courses may be required, which must be completed by the end of the second semester of the Master's programme. The Rectorate may specify which of these supplementary courses are prerequisites for taking examinations specified in the Master's curriculum.

(4) If the significant academic differences under point 3 exceed 30 ECTS credits, the programme is not considered relevant, and admission will not be granted.

(5) The Master's programme in Microbiome Science is offered exclusively in English. Admission requires English language proficiency at level B2 (Common European Framework of Reference for Languages). The regulations of the University of Vienna apply for evidence of language proficiency.

(6) Student selection is conducted through an admission procedure. Detailed regulations regarding the admission procedure are published in an ordinance of the Rectorate of the University of Vienna in the university bulletin.

§ 4 Academic Degree

Graduates of the Master's programme in Microbiome Science are awarded the academic degree “Master of Science” (abbreviated MSc). If used, this academic degree is to be placed after the holder's name.

§ 5 Structure – Modules with ECTS Credit Allocation

(1) Overview

Master’s in Microbiome Science	
MMIC 1. Compulsory module I: Fundamentals of Microbiome Science	30 ECTS
MMIC 2. Compulsory module II: Advanced Primary Literature and Project Planning in Microbiome Science	5 ECTS
MMIC 3. Compulsory module III: Advanced Laboratory Skills in Microbiome Science	10 ECTS
MMIC 4. Compulsory module IV: Advanced Topics in Microbiome Science	15 ECTS
MMIC 5. Compulsory module V: Interdisciplinary and Complementary Skills for Microbiome Scientists	15 ECTS
MMIC 6. Compulsory module VI: Scientific Practice	15 ECTS
Master's Thesis and Master's Examination	30 ECTS

(2) Module Descriptions

MMIC 1	**Compulsory module I: Fundamentals of Microbiome Science**	**30 ECTS points**
Participation requirement	none	
Module goals	Graduates are familiar with fundamental and quantitative concepts of microbiome science, which	

	form the basis for further studies and expand and complete their previous competencies. They possess knowledge about the origin, biodiversity, and physiology of microorganisms, the interactions between microorganisms, as well as between microorganisms and their hosts, and the genetics, gene regulation, and genomics of microorganisms in pure culture and in the environment. Graduates also have a solid foundation in the quantitative understanding of biological processes relevant to microbiome research, such as microbial growth, enzyme kinetics, and population genetics. They have developed basic programming skills. Upon completion of this module, students are familiar with standard scientific laboratory practices in microbiome science and acquire specialized laboratory techniques associated with various disciplines. Participants understand the current practical requirements and topics within the broader research field of microbiome science.
Module structure	VU Fundamental Concepts in Microbiome Science, 10 ECTS, 6 SSt* (continuous assessment) VU Quantitative Skills in Microbiome Science, 10 ECTS, 6 SSt (continuous assessment) UE Practical Skills in Microbiome Science, 10 ECTS, 6 SSt (continuous assessment)
Proof of performance	Successful completion of all courses with continuous assessment (pi) provided in the module with a total of 30 ECTS.

MMIC 2	**Compulsory module II: Advanced Primary Literature and Project Planning in Microbiome Science**	**5 ECTS points**
Participation requirement	none	
Module goals	Upon completion of this module, graduates have gained an in-depth understanding of specific topics in microbiome science. They are able to independently analyze and present the latest literature in this field and develop a concept for a research project.	

* SSt = Hours per week per semester (also known as Semesterwochenstunden “SWS”)

Module structure	PS Introductory Seminar: Proseminar Microbiome Science, 5 ECTS, 3 SSt (continuous assessment)
Proof of performance	Successful completion of the courses with continuous assessment (pi) provided in the module with a total of 5 ECTS

MMIC 3	**Compulsory module III: Advanced Laboratory Skills in Microbiome Science**	**10 ECTS points**
Participation requirement	Compulsory module I	
Module goals	Upon completion of this module, graduates have acquired a deeper insight into specific topics of microbiome science. Through practical work, they have engaged with research questions related to microbiome science and possess the ability to conceptually and methodologically solve problem-oriented questions.	
Module structure	UE Advanced Practical Course in Microbiome Science, 10 ECTS, 6 SSt (continuous assessment)	
Proof of performance	Successful completion of the courses with continuous assessment (pi) provided in the module with a total of 10 ECTS	

MMIC 4	**Compulsory module IV: Advanced Topics in Microbiome Science**	**15 ECTS points**
Participation requirement	none	
<u>Recommended</u> Participation requirement	Compulsory module I	
Module goals	Graduates gain a detailed understanding of specific topics in microbiome science and related areas of molecular biology and ecology. Simultaneously, they are capable of independently exploring the latest literature in their respective field.	
Module structure	Students select courses with continuous (pi) and/or non-continuous (npi) assessment totalling 15 ECTS credits. The selection must be approved in advance by the study program director. The director must approve the completion of courses if they reasonably complement the Microbiome Science program according to the module objectives, taking into account the specific interests of the students. The study program	

	director publishes a list of courses associated with the module in the course directory (Vorlesungsverzeichnis) of the University of Vienna, completing these courses is generally considered approved.
Proof of performance	Successful completion of all module-specific courses with non-continuous assessment (npi) and/or course with continuous assessment (pi) with a total of 15 ECTS

MMIC 5	**Compulsory module V: Interdisciplinary and Complementary Skills for Microbiome Scientists**	**15 ECTS points**
Participation requirement	none	
<u>Recommended</u> Participation requirement	Compulsory module I	
Module goals	Graduates possess knowledge from various scientific disciplines and general skills that complement their master's degree studies.	
Module structure	Students select courses with continuous assessment (pi) and/or courses with non-continuous assessment (npi) courses totaling 15 ECTS credits. Recommended are: 1. Modules not yet completed from biological master's programs and other scientific disciplines, particularly in the areas of genetics, molecular biology, immunobiology, plant sciences, chemistry or biological chemistry, physics or biological physics, environmental sciences, ecology, and ecosystems. 2. The acquisition of additional qualifications, such as skills in teamwork, presentation and language, scientific English & writing, data collection, management, analysis, and presentation, planning and management of scientific projects, transdisciplinary and popular science communication of scientific content and public relations, as well as basic legal and ethical competencies. The selection must be approved in advance by the study program director. The study program director must approve the completion of courses if they reasonably complement the Microbiome Science program	

	according to the module objectives, taking into account the specific interests of the students. The study program director publishes a list of courses associated with the module in the course directory (Vorlesungsverzeichnis) of the University of Vienna, completing these courses is generally considered approved.
Proof of performance	Successful completion of all module-specific courses with non-continuous assessment (npi) and/or course with continuous assessment (pi) with a total of 15 ECTS

MMIC 6	**Compulsory module VI: Scientific Practice**	**15 ECTS points**
Participation requirement	none	
Module goals	Upon completion of this module, students are familiar with standard scientific laboratory practices in microbiome research, enabling them to conduct their own research as part of their master's thesis. Students are aware of the current scientific topics being addressed by the participating research groups. Graduates are capable of preparing a research project proposal on a scientific topic. They can present and discuss the project both orally and in written form. The research proposal may serve as a basis for the master's thesis. An internship can be completed, subject to availability, in the same laboratory where the practical work for the master's thesis will be conducted.	
Module structure	PR Scientific Practice in Microbiome Science, 15 ECTS, 2 SSt. (continuous assessment)	
Proof of performance	Successful completion of the courses with continuous assessment (pi) provided in the module with a total of 15 ECTS.	

§ 6 Master's Thesis

(1) The master's thesis serves as proof of the ability to independently address scientific topics in a methodologically sound and content-driven manner. The topic of the master's thesis must be chosen so that students can reasonably complete it within six months.

(2) The topic of the master's thesis must be taken from one of the compulsory modules. If another topic is chosen or if there is uncertainty regarding the assignment of the

selected topic, the academic body responsible for study regulations will decide on its eligibility.

(3) The master's thesis is worth 25 ECTS credits.

§ 7 Master's Examination

(1) Admission to the master's examination requires the successful completion of all prescribed modules and examinations as well as the positive assessment of the master's thesis.

(2) The master's examination is a defense (“Defensio”) consisting of the presentation of the master's thesis and an examination of its scientific context. Assessment is carried out in accordance with the provisions of the university's statutes.

(3) The master's examination is conducted before an examination board according to the rules outlined in the study regulations section of the statutes of the University of Vienna.

(4) The master's examination is worth 5 ECTS credits.

§ 8 Mobility in the Master's Program

The recognition of academic achievements completed abroad is carried out by the body responsible for academic regulations. Students are advised that compulsory modules III and IV are particularly well-suited for this purpose.

§ 9 Classification of Course Types

(1) Continuously assessed (pi) Courses are offered in the following formats:

- **Lecture with Exercise (VU):** The lecture part provides basic, advanced, in-depth, and/or methodological knowledge. This knowledge is applied, practiced, and refined in the exercise part. The "Lecture with Exercise" constitutes a continuous assessment process throughout the entire course duration and includes at least two partial assessments (oral or written).
- **Exercises (UE):** Exercises focus on practicing skills necessary for mastering the course material (e.g., laboratory work, methods, analytics). This is achieved through concrete tasks and problem-solving. Students complete assignments or create and use application programs during class time. They receive guidance in smaller groups, where the instructor predominantly supervises and directs activities. Participants must submit a written report in the form of a lab protocol. The exercise involves a continuous assessment process over the entire course, including at least two partial assessments (oral or written).

- **Proseminars (PS):** Proseminars aim to teach scientific topics. Students are encouraged to gain in-depth knowledge of a relevant problem by studying academic literature and data sources, acquire specialized knowledge in specific fields, and develop approaches to solutions and research questions.
- **Practical Courses (PR), pi:** Practical courses help students acquire skills that prepare them for their master's thesis and future professional practice. Building on theoretical and practical knowledge, students independently address specific questions. This teaching/learning format is structured in terms of time, systematically organized in content, and oriented towards detailed learning objectives. Practical courses represent a continuous assessment process throughout the entire course and include at least two partial assessments. Students must maintain a work protocol, supplemented by a written summary.

(2) For courses integrated from other curricula, the course type descriptions specified in the respective curriculum apply.

§ 10 Admission Restrictions and Registration Procedures

(1) The following general admission restrictions apply to the specified course types:

Exercises (UE) in Module I: 20 participants
Exercises (UE) in other modules: 12 participants
Lectures with Exercises (VU): 40 participants
Seminars (SE): 24 participants
Proseminars (PS): 24 participants
Practical Courses (PR): 4 participants

(2) The procedures for registering for courses and examinations, as well as the allocation of course places, are governed by the regulations of the university's statutes.

§ 11 Examination Regulations

(1) Performance Assessment in Courses
The course instructor is responsible for making the required announcements in accordance with the university's statutes.

(2) Examination Material
The scope of the material relevant for exam preparation and execution must correspond to the designated ECTS credits. This also applies to module examinations.

(3) Examination Procedure
The examination procedure is governed by the provisions of the university's statutes.

(4) Prohibition of Double Recognition and Double Use

Courses and examinations that have already been completed as part of a previous study program required for admission can only be recognized in the Master's program if there is no significant difference between the learning outcomes of the Master's program and those of the Bachelor's program. Courses and examinations that fulfill specific qualitative admission requirements and serve as a foundation for the Master's program cannot be recognized due to substantial differences in the competencies acquired. Courses and examinations already completed for another compulsory or elective module of this program cannot be reused in a different module of the same program. This also applies to recognition procedures.

(5) Achieved examination results must be assigned to the corresponding module with the announced ECTS value. Splitting these credits across multiple assessments is not permitted.

§ 12 Effective Date (“Inkrafttreten”)

This curriculum will come into effect on October 1, 2025, following its publication in the University of Vienna's official bulletin (“Mitteilungsblatt”).

§ 13 Transitional Provisions (“Übergangsbestimmungen”)

(1) This curriculum applies to all students who begin their studies in the winter semester of 2025.

(2) If, during the course of the study program, courses that were mandatory according to the original study plans or curricula are no longer offered, the body responsible for academic regulations at the University of Vienna, in accordance with organizational guidelines, must either officially (through an equivalence regulation) or upon the student's request determine which courses and examinations must be completed instead.

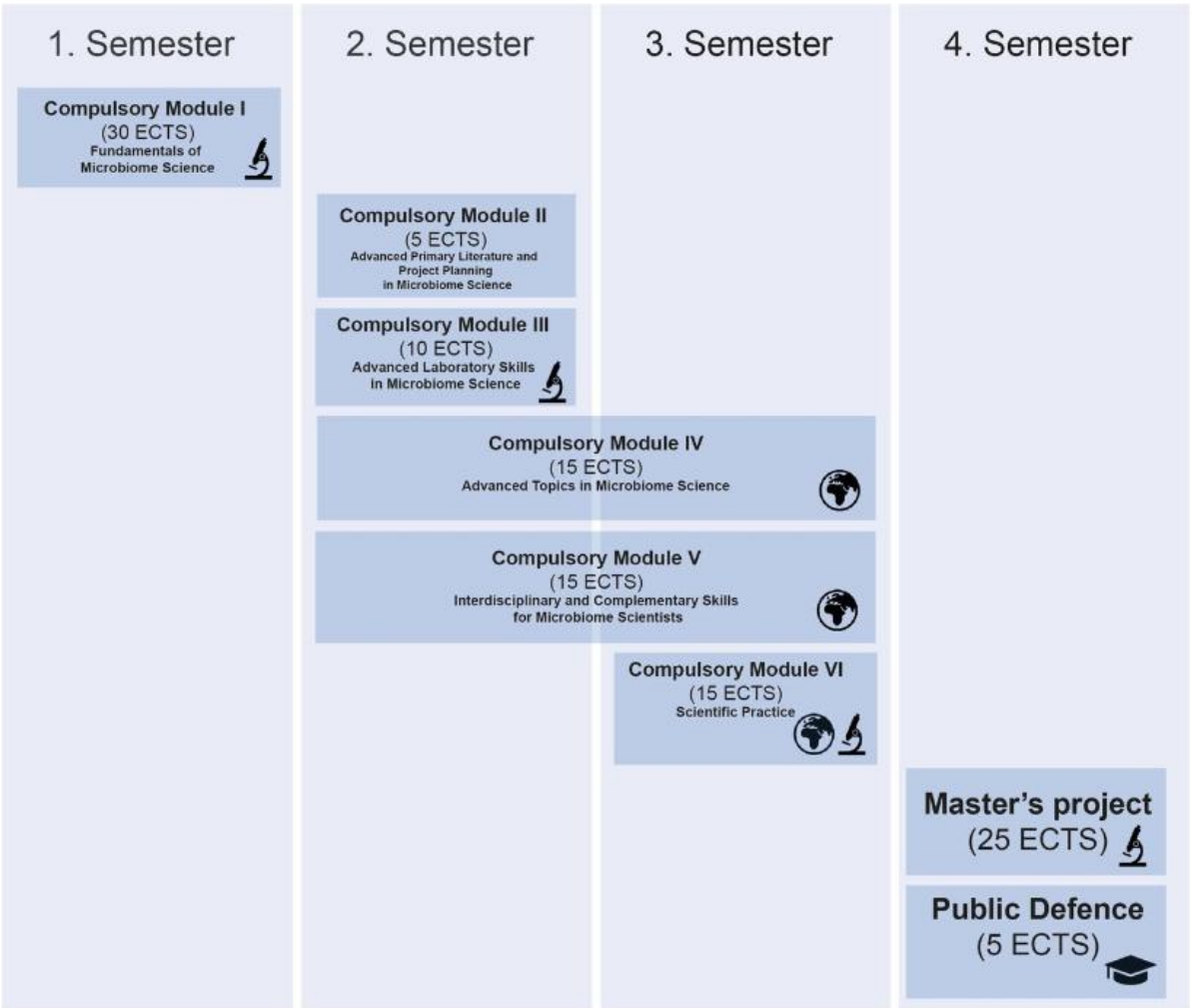
(3) The body responsible for academic regulations, in accordance with the organizational guidelines, is authorized to determine, either generally or in specific cases, which previously completed courses and examinations can be recognized for this curriculum.

Appendix

Recommended Study Path:

Semester	Module	Course	ECTS	Σ ECTS
1.	**I**	VU Fundamental Concepts in Microbiome Science	10	
		VU Quantitative Skills in Microbiome Science	10	

		UE Practical Skills in Microbiome Science	10	
				30
2.	**II**	PS Introductory Seminar: Proseminar Microbiome Science	5	
	III	UE Advanced Practical Course in Microbiome Science	10	
	IV + V	Students choose courses with continuous assessment (pi) and/or courses with non-continuous assessment	15	
				30
3.	**IV + V**	Students choose courses with continuous assessment (pi) and/or courses with non-continuous assessment	15	
	VI	PR Scientific Practice in Microbiome Science	15	
				30
4.		Master's Thesis	25	
		Defensio (Public Defence)	5	
				30
Total				**120**



On behalf of the Senate:
The Chair of the Curriculum Committee
S t a s s i n o p o u l o u