

# **Guidelines for the Master’s Degree in Infection Biology and Epidemiology**

(English Version 2005; in case of dispute the revised German version is valid)

## **1. General and permission (acceptance into the program)**

These guidelines give a description of the Master level studies program in Infection Biology and Epidemiology offered by the Swiss Tropical Institute (STI). They describe and complete the rules and requirements dated 11 February 2003 for Master’s level in the Science Department of the University of Basel.

The degree of "Master of Science in Infection Biology and Epidemiology" normally requires 3 semesters of Master level studies supplementary to Bachelor level studies. The Infection Biology and Epidemiology degree can be completed with specialisation in one of two possible areas: the “Major in Infection Biology” centres mainly on laboratory based work, while the “Major in Epidemiology” requires the pursuit of an epidemiological research topic must such as basic research, population-based clinical or interventions research and analysis. All courses and lab work will be in English.

Admission to this course of studies is as follows: students that have a Bachelor’s of Science (BSc) degree from the University of Basel in biology, are automatically qualified to participate in the Master studies in Infection Biology and Epidemiology. Qualification of students from other universities is regulated by the regulations for Master level studies of the University of Basel.

## **2. Study goals**

### 2.1 Overall goals

This Master’s degree program builds upon the main topics of the block course “Infection Biology and Epidemiology (IBE)“, which is offered in Year 3 of the Bachelor in biology (5 main learning objectives see frameworks). At the Master level, these topics are further explored. In addition a new component in the form of an independent work is added to sharpen competences to plan and carry out research projects, to implement them independently and to present the results in verbal and written form. When they have successfully completed the Master studies students are then qualified to carry out Doctoral level work in the respective fields and sub disciplines of this activity. They are able for an interdisciplinary dialogue between biologists and epidemiologists.

Graduates of the block course IBE of the Bachelor’s degree should:

- Understand the phenomena of infection from both biological and epidemiological viewpoints and be able to describe them from the molecular to the population level
- Recognize the meaning of infections for individuals and for society and be qualified for interdisciplinary co-operation with the medical profession or health services specialists
- Understand host- parasite relationships and be able to suggest control measures
- Have received an overview of molecular, cellular and epidemiological methods for the analysis of host -parasite relations
- Understand research questions in the areas of infection biology and epidemiology and be able to analyze, critically judge, and present results of research

## 2.2 Subject and methodological competencies

At the beginning students select one of the two options (“Majors”) in this Master level curriculum. A common core of teaching and training are shared by both. This promotes the dialogue between laboratory science and epidemiological research.

With a “Major in Infection Biology”, parasite/host relationships are examined more thoroughly, in particular the technical and methodological knowledge of molecular and cellular interactions through special training, meetings and, usually, by a Master level experimental work.

With a “Major in Epidemiology” the technical and methodological knowledge of epidemiology, biostatistics and health services are deepened, in order to be able to analyze and understand the occurrence and development of infections at population level in different social, cultural and ecological settings.

## 2.3 Social competencies

The students develop a sense of responsibility in relation to their own scientific activity. They will recognize ethical aspects in the research and in the application of research results. The interdisciplinary questions require good teamwork between specialists of many diverse disciplines. This will be practised in seminars and during the completion of the Master’s thesis.

## 2.4 Subsequent fields of activity

Students majoring in “Infection of Biology” can expect to work subsequently mainly in research institutes and laboratories of biotechnology / pharmaceutical industry; i.e. in fields of activity that require immunological, molecular-genetic, micro-biological, cell biological and parasitological knowledge and methods.

Students majoring in Epidemiology will mainly work in institutes that perform basic epidemiological research, in public health organizations or in the pharmaceutical industry.

### **3. Studies**

The curriculum for the Master’s in Infection Biology and Epidemiology comprises in-depth specialized studies, a thesis and an oral final examination. The M.Sc. course usually lasts 3 full semesters and begins in the winter semester.

#### Credit point system

The Master’s study is based on the ECTS (European Credit Transfer System) co-ordinated credit point system. To obtain a “Master of Science in Infection Biology and Epidemiology” students need 90 credit points (cp). Cps are given for successfully completed courses (pass grade). The criteria for achieving a pass grade are specific to each course, and may involve completion of assignments and/or written or oral examinations. A failed course can be repeated once. The number of given cp depends on the time of completion of the training and corresponds to the University lecture list (Vorlesungsverzeichnis) of this semester.

The Master’s degree in Infection Biology and Epidemiology can be completed with **two possible majors**:

When majoring in Infection Biology, the research thesis is focused around lab work which is usually carried out at the STI under a member of the teaching staff associated with the University of Basel.

When majoring in Epidemiology the M.Sc. thesis focus on epidemiological field studies, bibliographic research, analysis of existing epidemiological databases, or epidemiological modelling. This work is also supervised by a professor or lecturer associated with the University of Basel. With projects carrying out fieldwork overseas, local supervision is provided by external experts.

Formal responsibility to the Faculty of Science for the Master degree in Infection Biology and Epidemiology belongs to the faculty representatives of the STI

They can delegate this responsibility also to a member of the teaching staff or to an expert/ project leader at the STI (in the following referred to as “supervisors”).

The responsible persons advise students through their studies and take the responsibility for the Master’s thesis and its evaluation as well as for the Master degree examination.

#### Responsibility to the University Faculty and Supervision

The Faculty representatives of the STI are formally responsible to the Faculty of Science to the University of Basel for the Masters studies in Infection Biology and Epidemiology. They provide advice to the students about the curriculum, and take overall responsibility for Masters projects and for the final examination. Responsibility for the day-to-day supervision of each individual Masters projects can be delegated to a supervisor who may be any qualified lecturer at the University of Basel or to a Project Leader in the STI. A locally-based expert may also be co-opted to provide additional supervision for those students who carry out fieldwork abroad.

## **Swiss Tropical Institute / University of Basel**

Guidelines (“Wegleitung”) for M.Sc. studies in Infection Biology & Epidemiology

### **3.1 Specialized studies (30 cp)**

For each semester the lectures in the list of lectures with the obtainable credit points are indicated. A list of the mandatory and optional courses is specified in the appendix (table 1). This table is updated each winter semester.

As in specified the guidelines of the Master curriculum, at least 18 cp out of 30 cp should be taken from the program of the Master in infection biology and epidemiology of the STI. The choice for the remaining courses is free, but should be agreed upon with the supervisor for the Master’s Thesis.

In order to reach the aims of the Master degree and to ensure the multidisciplinary, certain courses are mandatory for students with a Bachelor’s degree in biology from the Basel University.

A personalized program will be arranged individually for students who already have a different Bachelor’s or a Master’s degree. The Learning contents of the undergraduate block course “Infection Biology and Epidemiology” may need to be repeated (through course attendance or by independent completion of assignments using the appropriate learning software).

Mandatory for both majors are:

(WS: in winter semester; SS: Summer semester, SWS: hours per week)

- Project work, (WS) Preparing own MSc. project (3 cp)
- Biostatistics 1 (WS) 3 SWS and exercises (4 cp)
- STI Research seminar (with own lecture) (2<sup>nd</sup> WS) 1 cp
- Interdisciplinary seminar (WS) 1 cp
- Tutorial (individually; during Master’s Thesis) 1 SWS during 2 terms 2 cp for a major in infection biology are additionally required:

For infection biology major, the following are also obligatory:

- Advanced Molecular Parasitology (WS) 2 SWS (2 cp)
- Immunology of Infection (WS) 2 SWS (2 cp)
- Topics in Host-Parasite Interactions (SS) 3 SWS (3cp)

For epidemiology major, the following are also obligatory:

- Key Topics in International Health (WS) 2 SWS (2 cp)
- Epidemiological methods (WS) 3 SWS (3 cp)

### **3.2 Master’s Thesis (50 cp)**

The Master’s thesis (including preparation for the final master examination) usually takes 1 year. 50 cp are credited for an accepted master’s thesis. The topic of the thesis must have been approved by one of faculty representatives at the STI.

Within the first two months of the work on the project the students can choose to change the topic of their Master thesis. A later decision is considered as failure to complete the thesis, as long as prolongations have not been granted due to sickness or accidents.

The thesis is evaluated and graded by the faculty representative together with the supervisor of the master’s project. The examination is graded on a scale from 1 (worst) to 6 (best) on a scale of integers and half-integers. If the resulting grade is either a fail (< 4) or conversely, 6, an additional person from the faculty of the University of Basel who is not directly involved with the project, must give an independent expert assessment of the thesis.

### **3.3 Examination (10 cp)**

The final examination is a verbal test covering the topic of the thesis, spanning over the technical literature concerning the thesis as well as the field of science connected with the thesis. It lasts 60 minutes.

Examiners are the faculty representatives or the thesis supervisor and a second person from the faculty of STI who serves as a Chairman. In an agreement between the student and the supervisor, an additional examiner can also be involved.

The master’s examination can be taken when the thesis is accepted and 30 cp from the specialized studies have been accumulated. The examination can be held at any time during the term. The examination is graded on a scale from 1 (worst) to 6 (best) on a scale of integers and half-integers. If the examination is deemed to be passed (grade of 4 or more) the student earns 10 cp.

### **3.4 Completion of the Master’s Degree in Infection Biology and Epidemiology**

The degree is completed, if the following credit points (cps) are acquired:

- a) 50 cp from the thesis work
- b) 30 cp from the specialized studies, whereby at least 17 cp result from components of the Master’s program of the STI (table 1, A)
- c) 10 cp from the final examination.

The master’s grade is calculated by averaging the grade of the examination (weight 1/3) and the grade of the thesis (weight 2/3).

The Master certification contains data concerning the topic and the grade, the topic or the topics and grade of the examination as well as the acquired points of credit from the thesis work.

## **4. Program responsibility und University advisory service**

The following people are responsible for the Master’s degree in Infection Biology and Epidemiology at the University of Basel:

- Prof. Marcel Tanner, Director STI, for questions on the „Major in Epidemiology“ (e-mail: [Marcel.Tanner@unibas.ch](mailto:Marcel.Tanner@unibas.ch)) und
- Prof. Niklaus Weiss, Head Department of Medical Parasitology and Infection Biology, M.Sc. course coordinator, available for questions on the „Major in Biology of Infection“ (e-mail: [Niklaus.Weiss@unibas.ch](mailto:Niklaus.Weiss@unibas.ch)).

For those interested in undertaking a Master’s thesis at STI, information about possible topics can be obtained from STI’s faculty and project leaders.

**Table 1: Course list for Master in Infection Biology and Epidemiology**

Programme	Major in Biology of Infection		CP	Major in Epidemiology		CP
<b>A. Mandatory</b>	<b>Project Work</b> (preparation of Master thesis and seminar)	WS1	<b>3</b>	<b>Project Work</b> (preparation of Master thesis and seminar)	WS1	<b>3</b>
	<b>Biostatistics I</b> 3 SWS and exercises	WS1	<b>4</b>	<b>Biostatistics I</b> 3 SWS and exercises	WS1	<b>4</b>
	<b>Interdisciplinary Seminar</b> (Control of Infectious Diseases) 1 SWS	WS2	<b>1</b>	<b>Interdisciplinary Seminar</b> (Control of Infectious Diseases) 1 SWS	WS	<b>1</b>
	<b>Research Seminar in Infection Biology and Epidemiology</b> (1 KP for own presentation)	WS/S S	<b>1</b>	<b>Research Seminar in Infection Biology and Epidemiology</b> (1 CP for own presentation)	WS/ SS	<b>1</b>
	<b>Tutorial (accompanying Master Thesis)</b> 1 SWS (during 2 semesters)	SS/ WS2	<b>2</b>	<b>Tutorial (accompanying Master Thesis)</b> 1 SWS (during 2 semesters)	SS/ WS2	<b>2</b>
	<b>Advanced Molecular Parasitology</b> 2 SWS (A7 of Biozentrum)	WS1	<b>2</b>	<b>Epidemiological Methods</b> 4 SWS	WS1	<b>4</b>
	<b>Immunology of Infection</b> 2 SWS	WS1	<b>2</b>	<b>Key Issues in International Health</b> 2 SWS	WS1	<b>2</b>
	<b>Topics in Host-parasite interactions</b> 3 SWS	SS	<b>3</b>			
	<b>Subtotal</b>		<b>18</b>	<b>Subtotal</b>		<b>17</b>
<b>B. Options</b>	*Assignments in Advanced Molecular Parasitology 2 SWS	WS1	2	*Concepts in Epidemiology 2 SWS	WS1	2
<b>*highly recommended</b>	*Assignments in Immunology of Infection 2 SWS	WS1	2	*Immunology of Infection 2 SWS	WS1	2
	*Concepts in Epidemiology 2 SWS	WS1	2	Biostatistics II 3 SWS and exercises	SS	4
	Epidemiological Methods 3 SWS	WS	3	Special Topics in Epidemiology 1 (2 semi-weeks)	WS1	2
	Key Issues in International Health 2 SWS	WS	2	Special Topics in Epidemiology 2 (2 semi-weeks)	WS1	2
	Special Topics in Epidemiology (1 – 4)	WS	8	Special Topics in Epidemiology 3 (2 semi-weeks)	WS2	2
	A3: Molecular Virology (2 SWS)	WS	2	Special Topics in Epidemiology 4 (2 semi-weeks)	WS2	2
	A5: Mechanisms of microbial pathogenesis (2SWS)	WS	2	African Ecology 2 SWS	WS	2
	Clinical Virology	WS	1	Advanced Molecular Parasitology 2 SWS	WS	2
	Drug Discovery and Drug Development 2 SWS	WS	2			
	Molecular Epidemiology 2 weeks	SS	4			
	Research Seminar	SS	1	Research Seminar	SS	1
	A4: Microbial Cell Structures and Drug Targets (1 SWS)	SS	1	Molecular Epidemiology 2 weeks	SS	4
	A6: Microbial Diseases and Vaccine Development (2 SWS)	SS	2	Drug Discovery and Drug Development 2 SWS	WS	2
	<b>Subtotal</b>		<b>34</b>	<b>Subtotal</b>		<b>27</b>
<b>C. Other options</b>	To be discussed with thesis supervisors			Lectures in Social sciences and ethnology in agreement with thesis supervisor		

CP: Credit points SWS: Hours per week SS: Summer semester WS1: 1<sup>st</sup> Winter semester WS2: 2<sup>nd</sup> Winter semester