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### **Faculty of Agricultural Sciences:**

According to the decision of the faculty council of the Faculty of Agricultural Sciences on 25.06.2020, the presidential board of the Georg-August-Universität has approved the fourth amendment of the examination and study regulations for the consecutive master course of study "Integrated Plant and Animal Breeding" on 12.08.2020 in the version published on 12.02.2019 (Official Announcements No 7/2019, page 60), as last amended by decision of the presidential board on 21.01.2020 (Official Announcements I No. 5/2020 page 103), (§ 44 section 1 sentence 2 NHG in the version published on 26.02.2007 (Nds. GVBl. p. 69), last amended by Article 1 of the Act dated 11.09.2019 (Nds. GVBl. page 258); § 37 section 1 page 3 No. 5 b), § 44 section 1 page 3 NHG).

## **Examination and study regulations for the consecutive master course of study "Integrated Plant and Animal Breeding" at Georg-August-Universität Göttingen.**

### **§ 1 Scope**

(1) For the consecutive master course of study "Integrated Plant and Animal Breeding" of the Georg-August-University Göttingen, the provisions of the "General examination regulations for Bachelor and Master courses of studies as well as other courses and degrees offered at the University of Göttingen" (APO) shall apply in their respective valid version.

(2) <sup>1</sup>These regulations regulate the further provisions for the completion of the Master's programme. <sup>2</sup>The special degree programme requirements are listed in the attachments.

### **§ 2 Objective of the academic programme; occupational fields; objective of the tests/examinations**

(1) The foremost goal of the Master's academic programme is to enable graduates to pursue in-depth scientific work. The basis for this is the expertise and methodology acquired during the courses, the problem-related scientific application of which is proven as part of the master thesis.

(2) <sup>1</sup>The aim of the master course of study "Integrated Plant and Animal Breeding" is to better qualify students for international specialist and management tasks or to prepare them in a more purposeful way for corresponding foreign-related research activities, thereby making

them more competitive in international competition. <sup>2</sup>Foreign students from industrialised, emerging, developing and transition countries will be offered an internationally competitive continuing education system that meets their qualification needs.

(3) <sup>1</sup>The objective of the scholarship programme of the consecutive master course of study "Integrated Plant and Animal Breeding" is to impart the basic theories, methods, procedures and questions of breeding in the agricultural and forestry sciences in an interdisciplinary approach. <sup>2</sup>Graduates of the academic programme gain knowledge about the peculiarities, limitations, applicable terminologies and doctrines of "Integrated Plant and Animal Breeding". <sup>3</sup>In doing so, the students acquire the qualification for scientific work and scientifically sound analysis in the subject disciplines of the academic programme. <sup>4</sup>This knowledge and understanding forms the basis for the development and/or application of independent ideas for solving problems in breeding research and even in new and unfamiliar situations that are in a broader or multidisciplinary context.

(4) The general and subject-related goals of the course of study include, among other things, the acquisition

- the acquisition of a dedicated knowledge of animal and plant breeding, its methods and procedures;
- the ability to apply advanced academic/scientific-analytical laboratory methods or technical methods or qualitative and quantitative survey methodology and to interpret their results;
- the ability to process and demonstrate complex analytical and other data using agricultural sciences and bioinformatics;
- the ability to use and evaluate scientific literature, statistics and other documentation at a scientific level;
- the ability to present test results in writing, and in oral and graphic form;
- the ability to execute largely independent research or application-oriented projects and
- the ability to view and evaluate the effects of animal and plant breeding taking social, scientific and ethical aspects into account.

(5) Graduates of the master course of study can thereby integrate knowledge and handle complexity, and also make scientifically sound decisions based on incomplete or limited information.

(6) In addition, the academic programme enables the development of key competencies such as networked thinking, foreign languages, presentation techniques, which enables the student(s) to impart appropriate conclusions and the underlying information on the current state of research and application to professionals and laypersons and to communicate motivations in a clear and unambiguous manner.

(7) The Master of Science (abbreviated M.Sc.) examination determines whether the candidates to be examined have acquired the necessary specialised knowledge for the transition to professional practice, review the subject-related interrelationships and understand it as an expert, in order to apply scientific methods and knowledge.

(8) The knowledge imparted in the consecutive master course of study "Integrated Plant and Animal Breeding" should prepare the students for their subject-specific or scientific occupational field.

(9) Agricultural scientists with the university degree "Master of Science" (abbreviate "M.Sc.") in "Integrated Plant and Animal Breeding" can act as managers

- in companies engaged in animal and plant breeding,
- in operations of the agriculture and food industry,
- in specialised consultants in the areas of breeding and production technology,
- in national and international agricultural industry,
- in service industries, e.g., as experts, consultants,
- in the public sector, e.g., at agriculture chambers, ministries and departmental research
- in international organisations,
- at universities and in research institutions.

(10) The course of study also qualifies for admission to doctoral studies.

(11) The master examination in the research-oriented degree programme is intended to ascertain whether the examination candidates have acquired the fundamental specialised knowledge required to transition into professional practice, possess a grasp of the specialist contexts and understand, as experts, how to apply more advanced scientific methods and insight in order to work as scientists in a specialist occupational field.

### **§ 3 University degree**

After passing the master examination, the university awards the university degree "Master of Science", abbreviated "M.Sc.".

### **§ 4 Structure of the academic programme**

(1) The academic programme starts in the winter semester.

(2) <sup>1</sup>The standard course length is 4 semesters. <sup>2</sup>The course of study is not suitable for students studying part-time.

(3) The academic programme includes 120 credits (ECTS credits; abbreviated: C) that are awarded as follows:

- a) on the subject study 78 C,
- b) on the area of professionalisation (key competencies) 12 C,
- c) on the master thesis (including a colloquium for master thesis) 30 C.

(4) Admission of modules of related master courses of studies is made at the proposal of the student by the examination board.

(5) <sup>1</sup>The study and examination components should be completed in elective compulsory modules. The number, type and scope of the modules to be completed successfully are regulated by the module overview (appendix I). <sup>2</sup>To find a proposal for the academic programme structure, please refer to the enclosed sample curricula (appendix II). <sup>3</sup>The module index is published separately. It is part of this regulation as far as the modules are listed in the module overview (appendix I).

### **§ 5 Teaching and learning forms; admission to courses with limited number of seats**

(1) <sup>1</sup>Modules can consist of different types of courses: Lectures, seminars, exercises, internships and project work or combinations of these types of events. <sup>2</sup>Additional courses are offered to consolidate the material.

(2) <sup>1</sup>Certain courses are offered with a limited number of participants. <sup>2</sup>These include:

- a) Field internships,
- b) Field trips,
- c) Exercises, internships and seminars.

<sup>3</sup>The teachers of these courses will inform the students about the intended number of participants.

(3) <sup>1</sup>In the case of courses with a limited number of participants, priority is given to those students who have to attend this course to register for a module examination. <sup>2</sup>In this, the students in the highest subject semester, and who prove that they possess appropriate entry requirements or are not responsible for a delay of the academic programme, will have priority.

<sup>3</sup>The selection of students with equal entitlement to admission is decided by a draw. <sup>4</sup>A deferment because of missing proof under sentence 2 is permitted no more than twice.

### **§ 6 Subject-specific examination types**

(1) A module examination can also be designed as project work, portfolio or short tests in addition to the forms of examination components according to APO.

(2) <sup>1</sup>In a project work, the person to be examined should demonstrate that he or she has mastered the independent processing of a complex problem in which independent solutions are developed on the basis of scientific methods. <sup>2</sup>This may relate to case studies, empirical surveys or similar matters. <sup>3</sup>The examination consists of an oral presentation and/or an elaboration of the results in a text form.

(3) <sup>1</sup>In a portfolio the student documents and reflects his or her work and study results during the course of the semester by handing in work results or submitting them online. <sup>2</sup>Such a

portfolio may include: Learning journal, learning diary, project work, work assignments in text form (e.g. report, commentary, protocol) or oral work assignments (e.g. presentation, speech).

<sup>3</sup>Further details are governed by the module description.

(4) <sup>1</sup>Short tests especially certify course-related achievements in exercises and laboratory courses. <sup>2</sup>The person to be examined should demonstrate that he or she is able to apply the taught knowledge and/or practice subject-specific methods. <sup>3</sup>The performance review takes place continuously either before, during or right after finishing the concerned module course.

<sup>4</sup>The examination consists of regular short oral tests or tests in text form concerning the subject matter. <sup>5</sup>Further details are governed by the module description.

### **§ 7 Admission to the master thesis**

(1) Elective compulsory modules of the course of study amounting to 72 C must be passed as a prerequisite for admission to the master thesis.

(2) <sup>1</sup>A written application for admission to the master thesis must be submitted to the responsible examination board. <sup>2</sup>The following material must be enclosed with the application:

- a) the fulfilment of the preconditions referred to in section 1
- b) the proposal of topic for the master thesis,
- c) a proposal for the first academic advisor or the second academic advisor,
- d) a written confirmation from the first supervisor and the second supervisor,
- e) a declaration specifying that the master examination has not been failed definitively or registered as definitively failed in the same or comparable master degree programme at a domestic or foreign university.

<sup>3</sup>The proposal according to letters b) and c) and the proof according to letter d) can be dispensed with if the student assures that he has not found any supervisors. <sup>4</sup>In this case, the responsible examination board will assign the supervisors and decide the topic of the master thesis.

(3) <sup>1</sup>The examination board decides on admission. <sup>2</sup>This should be rejected if the qualifications for entry are not fulfilled or the master examination in the same or similar Master's Programme at a domestic or foreign university has been definitively failed or regarded as having been definitively failed.

### **§ 8 Master thesis**

(1) With the written master thesis, the candidate should prove that he or she is able to use the methods of his or her subject area to work on a problem within the defined period of time, to develop an independent, scientifically justified judgement, to be able to make scientifically sound statements, and to present the results in a linguistic and formal sense.

(2) <sup>1</sup>The master thesis can be written in German or English. <sup>2</sup>If the request is justified, one of the other official languages of the EU may be accepted.

(3) <sup>1</sup>The preliminary topic of the master thesis must be agreed upon with the supervisor to be proposed from the area of the specialisation selected and must be presented to the relevant examination board with a confirmation from the second supervisor to be proposed. <sup>2</sup>If the candidate does not find a supervisor, a supervisor and a topic will be appointed by the relevant examination board. <sup>3</sup>The candidate's view should be considered in choosing the topic. <sup>4</sup>The right to make a proposal for the choice of topic does not constitute a legal right. <sup>5</sup>The relevant examination department will assign the topic of the master thesis. In this context, it must observe the procedure issued by the faculty council in this respect. <sup>6</sup>The time of issue must be recorded.

(4) <sup>1</sup>The processing time of the master thesis is 26 weeks. <sup>2</sup>At the candidate's request, the relevant examination board can extend the processing time by a maximum of 6 weeks, if there is an important reason for doing so, for which the candidate is not responsible, with the agreement of the supervisor. <sup>3</sup>Important grounds usually apply in the event of illness which must be reported immediately and documented by a medical certificate. <sup>4</sup>In the event that deadlines are not adhered to without any important reason according to sentence 2, the master thesis shall be assessed as "failed" (5.0); a new topic shall be issued if there is an important reason, according to clause 2 in case of the expiry of the maximum deadline extension.

(5) <sup>1</sup>The topic can be returned only once and only within the first ten weeks of the processing time. <sup>2</sup>A new topic must be agreed upon immediately, but no later than within 4 weeks. <sup>3</sup>If the Master thesis is repeated, it is only permissible to return the topic under sentence 1 if the examinee did not make use of this option in their first attempt.

(6) <sup>1</sup>The master thesis must be submitted within the due period to the relevant examination office in duplicate. Additionally, a text version must be submitted in the format of a commonly used word processing program or in PDF format (unprotected) and it must be ensured that the written version and the supplementary version submitted match each other. <sup>2</sup>The time of submission must be put on record. <sup>3</sup>Upon submission, the candidate should declare in writing that he or she has independently compiled the work and has not used any sources and tools other than those specified.

(7) <sup>1</sup>The examination board will assign the master thesis to the supervisor as reviewer. <sup>2</sup>At the same time, it will also appoint another expert to be appointed from the circle of authorised examiners. <sup>3</sup>The candidate's view should be considered before appointment. <sup>4</sup>Each reviewer will award a grade.

(8) The duration of the evaluation procedure should not exceed 6 weeks.

## **§ 9 Colloquium for the master thesis**

(1)<sup>1</sup>In the colloquium, the examination candidate has to prove in a short, introductory lecture about his or her master thesis that he or she is capable of processing independently the subject and problem-related questions on a scientific basis and is able to classify the entire field of animal and plant breeding. <sup>2</sup>The duration of the colloquium is approximately 60 minutes.

(2) All admission requirements must be fulfilled for admission to the colloquium and the master thesis must have been graded at least "sufficient".

(3) The colloquium should be completed within six weeks after submission of the master thesis.

(4) <sup>1</sup>The colloquium is jointly conducted by the reviewers of the master thesis as an examination. <sup>2</sup>The examination board can appoint up to two examiners for the colloquium for interdisciplinary subjects, in agreement with the examiner.

(5) The colloquium is open to internal university members.

### **§ 10 Evaluation of the master thesis and the colloquium on the master thesis**

(1) <sup>1</sup>If the reviewers cannot agree on the assessment of the master thesis, a third reviewer or a third reviewer will be appointed by the relevant examination board to assess the master thesis. <sup>2</sup>This person may opt for one of the proposed assessments or for an intermediate assessment.

(2) The grade of the master thesis colloquium is the arithmetic mean of the evaluation of the both the reviewers.

(3) <sup>1</sup>For the master thesis and the colloquium for the master thesis, a common grade is calculated. <sup>2</sup>This corresponds to the weighted arithmetic mean of the grades of the master thesis as well as the colloquium of the master thesis. The grade of the master thesis is hereby weighted with 80 per cent, the grade of the colloquium on the master thesis with 20 per cent. <sup>3</sup>With the weight of 30 C, the joint grade is included in the overall result of the master examination.

### **§ 11 Repeatability of examination components**

(1) Failed module examinations can be repeated twice, and the colloquium for the master thesis can be repeated once.

(2) If module examinations consist of several partial module tests, only those examinations must be repeated that have been graded as "not sufficient" or "failed".

(3)<sup>1</sup>Repeat examinations for required elective compulsory modules must be taken within a reasonable period. <sup>2</sup>They should be taken in the next examination period, but at the latest within one year after the unsuccessful examination. <sup>3</sup>If the deadline is exceeded, the corresponding test will be deemed failed if the student is responsible for it. <sup>4</sup>If there are important reasons, especially in the case of illness, the examination board may grant a reasonable extension of the deadline. <sup>5</sup>The examiner receives information about the possibility

of repeating the failed examination components, taking into account the time limit according to sentences 1 and 2.

(4) A master thesis which is graded "not sufficient" can be repeated once.

(5) Repetition of passed examinations for the purpose of improving the grade is excluded.

### **§ 12 Examination board**

(1) <sup>1</sup>The examination board consists of five members appointed by the respective group representatives on the faculty council, in particular, three members of the professorial group, one member of the staff group and one member of the student group. <sup>2</sup>One deputy must also be nominated from each group.

(2) The examination board elects its chairperson and the deputy from the group of university professors.

(3) The Dean forms part of the commission in an advisory capacity.

(4) The examination board takes the place of the faculty council in decisions regarding the appointment of authorised examiners as per § 11 section 1 sentence 1 APO.

### **§ 13 Total grade and peremptory failure**

(1) The master examination is considered passed if at least 120 C have been acquired and all the required module examinations as well as the master thesis (including the master thesis colloquium) are passed.

(2) The overall grade of the final examination is calculated as the arithmetic weighted average according to credits from the grades of all graded modules as well as the common grade of the master thesis and the master thesis colloquium.

(3) <sup>1</sup>The entitlement to sit the examination is withdrawn finally when, at a university in Germany or abroad, in this course of study or in a comparable master degree programme,

- a) Elective compulsory modules can no longer be passed to the required minimum extent,
- b) The master thesis has not been passed in the second attempt or is regarded as failed,
- c) the master thesis colloquium was failed or was considered as failed in the third attempt,
- d) if this results from the provisions of the module overview,
- e) by the end of the 4th subject semester, at least 60 credits have not been acquired or
- f) by the end of the 8th subject semester, all credits that are required to pass the master examination have not been acquired.

<sup>2</sup>In this case, the master examination is regarded as definitively failed. <sup>3</sup>The deadlines mentioned under letters e) and f) can be exceeded if the student is not responsible for it. <sup>4</sup>The examination board decides on this at the request of the student, who has to show an important reason.

(4) A decision shall be issued on the final failure of the master examination, which will be accompanied by a declaration of appeal.

(5) The overall result "With distinction" will be awarded if the master thesis has been assessed with a grade of 1.0 and the grade point average of the other examination prerequisites is at least 1.5.

### **§ 14 Periods of studies with semester abroad**

(1) Students can spend one semester abroad on field research for the master thesis.

(2) If the master thesis is written abroad, supervision of the master thesis is regulated by means of learning agreements with the supervisor there.

**§ 14a Double-Degree-Option within the framework of the programme “European Master of Animal Breeding and Genetics”**

(1) <sup>1</sup>The University of Natural Resources and Life Sciences, Vienna, Austria (BOKU, leading coordinator), the Wageningen University, Netherlands (WU), the Institut des sciences et industries du vivant et de l’environnement, AgroParisTech, France (APT), the Norwegian University of Life Sciences, Norway (NMBU), the Swedish University of Agricultural Sciences, Sweden (SLU) and the Georg-August-Universität Göttingen (henceforth: partner universities) jointly conduct the programme “EMABG – European Master of Animal Breeding and Genetics” (short: “EMABG”). <sup>2</sup>The provisions of these examination and study regulations shall apply, provided that the following regulations do not specify otherwise. <sup>3</sup>Modules offered by any of the partner universities are regulated exclusively by the respective examination and study regulations of the partner institution.

(2) Students of the consecutive master programme “Integrated Plant and Animal Breeding” are entitled to participate in courses as well as study and examination components of the EMABG programme according to the following regulations.

(3) <sup>1</sup>The application for consideration in the EMABG programme must be submitted at the same time as the application for admission to the master degree programme “Integrated Plant and Animal Breeding”. <sup>2</sup>Requirements for entry to modules of the first year of study are the commitment/admission by one of the partner universities that a place of study is available to the applicant in the second year of study. <sup>3</sup>If the first year of study was completed at the University of Göttingen, the second year of study must be completed at one of the partner universities (with the exception of the Wageningen University, Netherlands [WU]).

(4) <sup>1</sup>Notwithstanding § 4 Sections 3, 4 and 5, students participating in the EMABG programme must complete examination and study achievements according to the regulations specified in Appendix I Letter B; the full study and examination programme is conducted in English. <sup>2</sup>Examination and study achievements completed at one of the partner universities within the EMABG programme are recognised without equivalence assessment.

(5) <sup>1</sup>In the event of failed module examinations, the repeat examinations must be offered in such a way that at least one repeat examination may be taken before the end of the respective academic year. <sup>2</sup>Repeat examinations for failed module examinations may also be taken in the following academic year. <sup>3</sup>In this case, the examination regulations of the university offering the module remain valid; the assessment is conducted by examiners from the university offering the module.

(6) <sup>1</sup>The completion of the master thesis is regulated exclusively by the examination regulations of the partner university at which the student spends his or her second year of study. <sup>2</sup>At least one supervisor shall be a member or associate of the partner university at which the first year of study was conducted. <sup>3</sup>If an eligible examiner from the University of Göttingen is involved in

an examination procedure at one of the partner universities, his or her official appointment will be conducted, after consultation with the partner university, by the Examination Office of the Faculty of Agricultural Sciences.

(7) <sup>1</sup>After successful completion of the master's degree examination, those partner universities at which the student successfully completed his or her study and examination requirements within the EMABG programme with an overall worth of at least 60 C will award their customary academic degree; the University of Göttingen awards the academic degree "Master of Science" (M.Sc.); a further requirement for receiving the master's degree by the University of Göttingen is the joint supervision of the master thesis according to the regulations given in Section 6 Sentence 2. <sup>2</sup>The master degree certificate of the University of Göttingen may be issued in German or English and contains the supplement that the master's degree was acquired as part of a double degree programme and that the certificate is only valid in conjunction with the certificate of the other partner university granting the degree. <sup>3</sup>The two awarded academic degrees may be carried separately. <sup>4</sup>If both degrees shall be joined together, they are to be joined by means of a slash. <sup>5</sup>This also applies to the abbreviated form.

### **§ 15 Study consultation and management of studies**

(1) <sup>1</sup>First-year students are introduced to the academic programme and course of study as part of an orientation unit. <sup>2</sup>It is conducted parallel to a semester or as a block course. <sup>3</sup>Its implementation is the responsibility of all the faculty members.

(2) <sup>1</sup>Continuous study consultation is offered in addition to the orientation unit. <sup>2</sup>Its tasks include:

- Advising students on planning and conducting their course of studies;
- Receiving suggestions for improving teaching methods;
- Advice on recognition and admission issues;
- Support service for international students;
- Organising the exchange of lecturers,
- Initiation, administration and maintenance of international relations;
- Organisation of imports and exports in teaching;
- Assistance in the organisation of student congresses and workshops locally.

(3) The students are to receive study consultation, especially in the following cases:

- for exams failed twice;
- for deviations from the standard course length;
- in the case of a change in the focus of study, course of study or university;
- before a planned foreign period of studies,

### **§ 16 Entry into Force; interim regulations**

(1) These examination and study regulations shall come into force after their publication in the Official Announcements I of the Georg-August-University Göttingen on 01.10.2018.

(2) <sup>1</sup>Students who entered their studies prior to the entry into force of an amendment of the current examination and study regulations and who have since been enrolled continuously within this degree programme, will be examined according to the examination and study regulations in the version dated before the entry into force of the new amendment. <sup>2</sup>In the case of pending examinations, this does not apply to module overviews and descriptions, unless the legal entitlements of a student calls for a different decision by the examination board. <sup>3</sup>A deviant decision is possible especially in such cases where an examination requirement may be repeated or where a compulsory or elective compulsory module has changed significantly or been cancelled. <sup>4</sup>The examination board may formulate general regulations for such cases. <sup>5</sup>Examinations according to the examination and study regulations dated before the entry into force of an amendment will be valid for the last time in the fourth semester following the entry into force of the amendment. <sup>6</sup>Students affected by Sentence 1 may submit an application if they wish to be examined on the basis of the amended regulations.

## Appendix I Module directory

### A. Master degree programme "Integrated Plant and Animal Breeding"

Achievements amounting to 120 C must be completed successfully.

#### 1. Block A - Compulsory modules

The following four compulsory modules worth overall 27 C must be successfully completed.

M.iPAB.0001	Quantitative genetics and population genetics	(6 C, 6 WLH)
M.iPAB.0002	Breeding schemes and programs in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0003	Statistical genetics, breeding informatics and experimental design	(6 C, 4 WLH)
M.iPAB.0004	Internship	(9 C, 6 WLH)

#### 2. Block B – Elective compulsory modules A

Out of the following elective compulsory modules at least four modules worth overall at least 21 C must be successfully completed.

M.iPAB.0005	Poultry breeding and genetics	(6 C, 4 WLH)
M.iPAB.0006	Breeding informatics	(6 C, 4 WLH)
M.iPAB.0008	Molecular and biotechnological methods in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0009	Genetic resources	(6 C, 4 WLH)
M.iPAB.0010	Legal issues in plant and animal breeding	(3 C, 2 WLH)
M.iPAB.0011	Seed marketing	(6 C, 4 WLH)
M.iPAB.0012	Journal Club: Key papers in animal and plant breeding	(6 C, 4 WLH)
M.iPAB.0014	Data Analysis with R	(3 C, 2 WLH)
M.iPAB.0015	Applied Machine Learning in Agriculture with R	(6 C, 4 WLH)
M.iPAB.0016	Applied effective R programming in animal breeding and genetics	(3 C, 2 WLH)
M.iPAB.0017	Applied Bioinformatics with R	(6 C, 4 WLH)
M.iPAB.0018	Introduction to the molecular genetic analysis of plant genetic resources	(6 C, 4 WLH)
M.iPAB.0019	Scientific Project: scientific methods, procedures and practical skills of animal and plant breeding	(9 C, 6 WLH)
M.iPAB.0021	Plant in vitro Cultures and Somatic Cell Genetics	(6 C, 4 WLH)
M.iPAB.0022	Molecular Genetics and Genomics	(6 C, 4 WLH)
M.Agr.0020	Genome analysis and application of markers in plant breeding	(6 C, 4 WLH)

M.Agr.0114	Safety evaluation of bio-technological processes in plant breeding	(6 C, 4 WLH)
M.Cp.0004	Plant diseases and pests in temperate climate zones	(6 C, 4 WLH)
M.Cp.0016	Practical statistics and experimental design in agriculture	(6 C, 4 WLH)
M.FES.324	Environmental biotechnology and forest genetics	(6 C, 4 WLH)
M.SIA.A02M	Epidemiology of international and tropical animal infectious diseases	(6 C, 4 WLH)
M.SIA.A14	Organic livestock farming under temperate and tropical conditions	(6 C, 4 WLH)
M.SIA.A15M	Scientific writing in natural sciences	(6 C, 4 WLH)
M.SIA.E11	Socio-economics of rural development and food security	(6 C, 4 WLH)
M.SIA.E13M	Microeconomic theory and quantitative methods of agricultural production	(6 C, 4 WLH)
M.SIA.I14M	GIS and remote sensing in agriculture	(6 C, 4 WLH)
M.SIA.P13	Agrobiodiversity and plant genetic resources in the tropics	(6 C, 4 WLH)

### **3. Block C – Elective compulsory modules B**

Five additional modules worth overall at least 30 C must be successfully completed. Students can earn the credits through elective modules from any master study programme at the faculty of agriculture, University of Goettingen, from other institutions participating in the programme, or from other agricultural faculties or similar study programmes at other universities.

### **4. Block D – Key competencies**

The following two compulsory modules worth overall 12 C must be successfully completed.

M.iPAB.0007	Biotechnology and molecular genetics in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0013	Selection theory, design and optimization of breeding programs	(6 C, 4 WLH)

### **5. Master thesis**

Completion of the Master's thesis is worth 24 Credits.

### **6. Colloquium for master thesis**

Successful completion of the colloquium for the Master's thesis is worth 6 Credits.

## **B. Double-Degree Programme “European Master of Animal Breeding and Genetics”**

Modules worth overall 120 C must be successfully completed. Modules worth 60 C must be completed following the regulations of the University of Goettingen. Another 60 C, including the Master’s thesis, must be earned and completed at one of the partner universities.

### **1. Block A – Compulsory modules**

The following five compulsory modules worth overall 33 C must be successfully completed:

M.iPAB.0001	Quantitative genetics and population genetics	(6 C, 6 WLH)
M.iPAB.0002	Breeding schemes and programs in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0007	Biotechnology and molecular genetics in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0013	Selection theory, design and optimisation of breeding programs	(6 C, 4 WLH)
M.iPAB.0020	Breeding Lab Internship	(9 C)

### **2. Block B – Elective compulsory modules**

At least four modules worth overall at least 27 C must be successfully completed. From these at least two modules worth overall at least 9 C must be completed from a particular study track (letters a-c).

#### **a. Study area “Integrative Biology”**

M.iPAB.0006	Breeding informatics	(6 C, 4 WLH)
M.iPAB.0008	Molecular and biotechnological methods in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0014	Data Analysis with R	(3 C, 2 WLH)
M.iPAB.0016	Applied effective R programming in animal breeding and genetics	(3 C, 2 WLH)
M.iPAB.0017	Applied Bioinformatics with R	(6 C, 4 WLH)
M.Cp.0016	Practical Statistics and Experimental Design in Agriculture	(6 C, 4 WLH)

#### **b. Study area “Genomic selection”**

M.iPAB.0003	Statistical genetics, breeding informatics and experimental design	(6 C, 4 WLH)
M.iPAB.0006	Breeding informatics	(6 C, 4 WLH)
M.iPAB.0008	Molecular and biotechnological methods in plant and animal breeding	(6 C, 4 WLH)
M.iPAB.0014	Data Analysis with R	(3 C, 2 WLH)

M.iPAB.0016 Applied effective R programming in animal breeding and genetics (3 C, 2 WLH)

**c. Study area “Biological and societal context of breeding”**

Only one of the modules M.SIA.E11 and E13M can be chosen.

M.iPAB.0003 Statistical genetics, breeding informatics and experimental design (6 C, 4 WLH)

M.iPAB.0010 Legal issues in plant and animal breeding (3 C, 2 WLH)

M.iPAB.0014 Data Analysis with R (3 C, 2 WLH)

M.iPAB.0016 Applied effective R programming in animal breeding and genetics (3 C, 2 WLH)

M.SIA.E11 Socioeconomics of Rural Development and Food Security (6 C, 4 WLH)

M.SIA.E13M Microeconomic Theory and Quantitative Methods of Agricultural Production (6 C, 4 WLH)

**d. Other modules**

M.iPAB.0003 Statistical genetics, breeding informatics and experimental design (6 C, 4 WLH)

M.iPAB.0005 Poultry breeding and genetics (6 C, 4 WLH)

M.iPAB.0006 Breeding informatics (6 C, 4 WLH)

M.iPAB.0008 Molecular and biotechnological methods in plant and animal breeding (6 C, 4 WLH)

M.iPAB.0010 Legal issues in plant and animal breeding (3 C, 2 WLH)

M.iPAB.0012 Journal Club: Key papers in animal and plant breeding (6 C, 4 WLH)

M.iPAB.0014 Data Analysis with R (3 C, 2 WLH)

M.iPAB.0015 Applied Machine Learning in Agriculture with R (6 C, 4 WLH)

M.iPAB.0016 Applied effective R programming in animal breeding and genetics (3 C, 2 WLH)

M.iPAB.0017 Applied Bioinformatics with R (6 C, 4 WLH)

M.iPAB.0019 Scientific Project: scientific methods, procedures and practical skills in animal and plant breeding (9 C, 6 WLH)

M.Cp.0016 Practical Statistics and Experimental Design in Agriculture (6 C, 4 WLH)

M.SIA.A02M Epidemiology of international and tropical animal infectious diseases (6 C, 4 WLH)

M.SIA.E11 Socioeconomics of Rural Development and Food Security (6 C, 4 WLH)

M.SIA.E13M Microeconomic Theory and Quantitative Methods of Agricultural Production (6 C, 4 WLH)

#### **e. Alternative modules**

In place of the modules listed above, it is also possible to complete other modules (alternative modules) in compliance with the following regulations. As a prerequisite for the consideration of an alternative module, the student must submit a written application addressed to the Studiendekan or Studiendekanin (dean of studies) at the faculty of agriculture. The student must submit the application before attending the respective module. The decision over the notification of acceptance or rejection will be made by the Dean of Study from the faculty of agriculture. Before reaching a decision, he or she will request a written statement from the teaching staff of the respective study programme, on the basis of which to judge the adequacy of requested replacement of modules. The student's application can be rejected without any explicit declaration of reasons; the student possesses no legal claim with respect to the permission of alternative modules.

## Appendix II Sample curricula

### A. Master degree programme “Integrated Plant and Animal Breeding”

Sem. Σ C*	Subject modules					Key compe- tency modules
	Module	Module	Module	Module	Module	Module
1. Σ 30 C	Compulsory module Block A M.iPAB.0001 Quantitative genetics and population genetics 6 C	Compulsory module Block A M.iPAB.0002 Breeding schemes and programs in plant and animal breeding 6 C	Integrated Plant and Animal Breeding, Block B Elective compulsory module 1 6 C	Integrated Plant and Animal Breeding, Block B Elective compulsory module 2 6 C		Compulsory module Block D M.iPAB.0007 Biotechnolog y and molecular genetics in plant and animal breeding 6 C
2. Σ 30 C	Compulsory module Block A M.iPAB.0003 Statistical genetics, breeding informatics and experimental design  6 C	Integrated Plant and Animal Breeding, Block B Elective compulsory module 3 6 C	Integrated Plant and Animal Breeding, Block C Elective compulsory module 1 6 C	Integrated Plant and Animal Breeding, Block C Elective compulsory module 2 6 C		Compulsory module Block D M.iPAB.0013 Selection theory, design and optimisation of breeding programs 6 C
3. Σ 30 C	Integrated Plant and Animal Breeding, Block B Elective compulsory module 4 3 C	Integrated Plant and Animal Breeding, Block C Elective compulsory module 3 6 C	Integrated Plant and Animal Breeding, Block C Elective compulsory module 4 6 C	Integrated Plant and Animal Breeding, Block C Elective compulsory module 5 6 C	Compulsory module Block A M.iPAB.0004 Internship 9 C	
4. Σ 30 C	Master thesis 24 C				Colloquium for master thesis 6 C	
Σ 120 C	78 C + (24 C/6 C)					12 C

**B. Double-Degree Programme “European Master of Animal Breeding and Genetics”**

Sem. Σ C*	Modules					
	Module	Module	Module	Module	Module	Module
1. Σ 30 / 27 C	Block A Quantitative genetics and population genetics 6 C	Block A Biotechnology and molecular genetics in plant and animal breeding 6C	Block A Breeding Lab 6 C	Block B Elective module 1 6 C or 3 C	Block B Free elective module 1 6 C	Block A Welcome course and orientation week Event
2. Σ 30 / 33 C	Block B Elective module 2 6 C	Block A Selection theory, design and optimization of breeding programs 6 C	Block B Free elective module 2 6 C or 3 C	Block B Free elective module 3 6 C	Block A Breeding schemes and programs in animal breeding 3 C	Block A Internship Animal Breeding 6 C
3. Σ 30 C	Module at respective partner university 6 C	Module at respective partner university 6 C	Module at respective partner university 6 C	Module at respective partner university 6 C		Summer school at respective partner university 6 C
4. Σ 30 C	Master thesis and defense Σ 30 ECTS at respective partner university					Graduation ceremony at summer school Event
Σ 120 C						