

## Toegepaste dierlijke genetica (1002935)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 5.0**

**Study time 150 h**

**Course offerings in academic year 2024-2025**

**Lecturers in academic year 2024-2025**

**Offered in the following programmes in 2024-2025**

**crdts**

**offering**

### Teaching languages

Dutch

### Keywords

Animal genetics, farm animals, quantitative genetics, breeding programs, breeding value estimation, selection, genomics

### Position of the course

The aim of this course is to gain insight into the different elements of breeding programs in farm animals and their interrelationships. The emphasis is on the application of principles of genetics in models and methods for the genetic adaptation of quantitative traits in farm animals. In addition, practical aspects of breeding programs and new developments in this area (use of molecular genetics) are also discussed.

### Contents

In the lectures, theory and exercises are dealt with interactively. Theoretical aspects are introduced and are subsequently elaborated making use of calculation exercises with small datasets. The contents are progressively dealt with, whereby each chapter builds upon or makes use of the previous chapters.

1. Population genetics
2. Genetic relationships
3. Qualitative and quantitative traits, genetic models
4. Estimation of genetic parameters
5. Breeding value estimation
6. Selection, crossbreeding, inbreeding, breeding programs
7. Use of molecular genetics in animal breeding

Guest lectures are given by representatives from breeding organisations.

There is a paper reading and discussion task on a hot topic.

### Initial competences

Have basic knowledge of genetics, statistics and animal production.

### Final competences

- 1 Have insight in breeding programmes that are applied to farm animals, and in the constituent elements (a.o. breeding value estimation, selection, crossbreeding)
- 2 Have insight in genetic models that are used in breeding of farm animals for estimating genetic parameters and breeding values.
- 3 Link the various elements of genetic improvement.
- 4 Apply the calculation models that are used in animal breeding.
- 5 Know the developments in the field of quantitative and molecular genetics, and how this affects animal breeding.

**Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

**Conditions for exam contract**

This course unit cannot be taken via an exam contract

**Teaching methods**

Lecture, Independent work

**Extra information on the teaching methods**

In the lectures, theory and plenary exercises are dealt with interactively. Theoretical aspects are first introduced and are subsequently elaborated making use of calculation exercises with small datasets. Some exercises have to be prepared independently. The plenary exercises are coached and are partly performed on PC.

**Study material**

None

**References**

Groen Kennisnet (2017), Textbook animal breeding and genetics (HBO-EN)  
Falconer D.S. (1989). Introduction to Quantitative Genetics, 3rd ed. Longman Group UK, Harlow, England  
Griffiths A.J.F., Miller J.H., Suzuki D.T., Lewontin R.C., Gelbart W.M. (1996). An Introduction to Genetic Analysis, 6th ed. W.H. Freeman and Company, New York  
Hammond K., Graser H.-U., McDonald C.A. (1992). Animal Breeding. The Modern Approach. University of New England, Armidale, Australia  
Mrode R.A. (1996). Linear Models for the Prediction of Animal Breeding Values. CAB International, Wallingford, Oxon, UK

**Course content-related study coaching**

The students are actively involved in the calculation exercises and the lectures. During the contact hours, the lecturer is available for questions. Additional information can always be requested via e-mail.

**Assessment moments**

end-of-term and continuous assessment

**Examination methods in case of periodic assessment during the first examination period**

Oral assessment, Written assessment

**Examination methods in case of periodic assessment during the second examination period**

Oral assessment, Written assessment

**Examination methods in case of permanent assessment**

Oral assessment, Participation

**Possibilities of retake in case of permanent assessment**

not applicable

**Extra information on the examination methods**

Period-aligned evaluation:

Oral exam with written preparation. The written part consists of 1/ 4-6 closed book questions that are a combination of short open and multiple choice questions for evaluating basic knowledge, and 2/ 2-3 open book questions that are calculation exercises aiming at evaluating insight. The lecturer discusses the written part with the student (= oral examination part).

Non-period-aligned examination:

Participation to the exercises, paper reading and discussion, and the guest lectures.

**Calculation of the examination mark**

Period-aligned evaluation: 80% of the final score. The open book and closed book questions have approximately equal weight.

Non-period-aligned evaluation: 20% of the final score. Participation to the paper reading and discussion, and the guest lectures is obligatory.