



# Appendix SER 1

Norwegian School of Veterinary Science

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## Appendix 1: Strategic plan 2011-2013

The Norwegian School of Veterinary Science (NVH) is the only institution in Norway to offer higher education in veterinary science and has in this capacity a national responsibility for the development of medicine, research and education in the field of veterinary science. This in turn means that NVH acts as a national knowledge centre for veterinary medicine for the whole country. The quality of NVH's activities must be compared to that of equivalent educational institutions abroad and NVH must therefore be an internationally orientated institution.

The Ministry of Education and Research's status report for the higher education sector in 2009 describes NVH as follows: *The Norwegian School of Veterinary Science is in a class of its own when it comes to student progression. Together with NHH, NVH is the most attractive institution of higher education in Norway. Furthermore, NVH achieves high scores for all the research indicators used in the classification.*

The purpose of this strategic plan is to establish a common framework for NVH's different areas of activity and to inform students, employees and society at large of NVH's intended development plans. In addition, it focuses on NVH's designated tasks and chosen courses of action.

In the period 2011-2013, NVH will prepare the establishment of the new university at Ås, in collaboration with the Norwegian University of Life Sciences (UMB) and NVH/UMB's Joint Board. The new university will take over responsibility for veterinary medicine and it is important to continue and further improve NVH's qualities within the framework of the new university. The strategic plan will ensure that the various disciplines in the field of veterinary science are strengthened by the establishment of new, functional buildings in a modern and progressive university environment.

### **Vision**

The need for new knowledge and the requirements candidates in veterinary medicine are expected to fulfil are changing. We are facing national and international challenges as regards both animal health (land animals and fish) and animal welfare. Threatening, serious and infectious animal diseases and diseases that can be transmitted from animals to humans are on the increase, also in our part of the world. The supply of safe food is a precondition for good public health.

In order to help meet these challenges, NVH's vision is to be counted amongst the leading and most progressive institutions of veterinary medicine in Europe as regards research, education and the distribution of knowledge.

### **Fundamental values**

NVH's fundamental values are based on the Norwegian acronym "RAUS", meaning "generous", where the four letters stand for the following values:

**R** Respectful

We shall always strive to see the value of others' experience, work and professional point of view. We shall respect the intrinsic value, character and needs of animals. We shall be generous in all our internal and external communication.

#### **A Ambitious**

Our activities shall be clearly targeted, defined and open to new impulses and thinking. Society at large shall never be in doubt as to what NVH stands for and works for. In all our fields of activity, we shall set ourselves high objectives and standards of quality and ethics.

#### **U Independent**

Research, teaching and all other activities at NVH shall be free and independent. Our knowledge shall contribute towards the promotion of good health and a high standard of welfare for both animals and people – unaffected by political and economic interests.

#### **S Collaboration**

Collaboration presupposes a high degree of openness, tolerance and interaction between colleagues and the outside world. NVH shall motivate skilful employees and students. A spirit of common commitment paves the way for a vibrant working environment, exciting research findings and fruitful interpersonal relations.

#### **Academic profile**

Due to the high quality of its educational programmes and research, NVH has a key role in addressing and solving important social challenges related to animal health and welfare, both as regards animals bred for food and animals used in sports and as pets. Another of NVH's major roles is to help to promote good public health by means of research and education in the field of zoonoses (diseases transmitted between animals and humans), food safety and related environmental issues.

Aquaculture (aquafarming) is by far the most important field of animal production in Norway. NVH has a special responsibility for maintaining good levels of health among fish and for helping to promote a sustainable aquaculture. Since Norway is a leading international aquaculture nation, NVH aims to be the international leader in the field of medical research and education related to aquaculture.

We are facing a high global growth in population and in order to produce enough food and necessary proteins for the earth's population, it is expected that the number of domestic animals will double during the next decades. Increased trade in animals and animal products, population mobility and climate changes will pose great challenges when it comes to the spreading of animal diseases, zoonotic diseases and food safety. As many as 75% of new infectious diseases in humans are thought to come from either wild or domestic animals. In order to face these challenges, interaction between medicine, veterinary medicine, agriculture and social science will be essential – a so-called "one world – one health" approach. NVH will play its part in solving these global issues by collaborating with other national and international educational and research institutions.

## Education

### Objectives

- NVH aims to educate candidates to a high international level of competence so that they are able to address national and international tasks in the fields of veterinary and biomedicine and animal care.
- NVH shall offer research-based study programmes which comply with Norwegian and European accreditation requirements and qualification standards.
- NVH shall provide students with a good physical and mental learning environment.
- NVH shall, in connection with the establishment of the new university at Ås, plan buildings and facilities which will allow the veterinary study programme to acquire American accreditation.
- Educate diplomats at international level in the field of veterinary medicine.

NVH is especially committed to:

1. Drawing up good descriptions of learning outcomes for the various disciplines and for the whole veterinary and animal care study programme, in line with national and international professional requirements (day-one skills).
2. Adjusting the content of the study programmes and their corresponding teaching and evaluation methods so that these promote and make sure candidates acquire a good level of competence beneficial to society (day-one skills).
3. An on-going dialogue with the authorities, the animal trade sector and animal owner and consumer organisations in order to ensure that our study programmes meet current needs.
4. Establishing biomedical research as an integral part of the study programme in veterinary medicine.
5. Continuing plans to develop the animal care programme into a bachelor degree programme.
6. Exploiting the potential for establishing interdisciplinary and progressive study programmes within the field of aquaculture, in collaboration with UMB.
7. Recruiting students from a wide sphere of interests, from all parts of the country and from both genders.
8. Educating international diplomats in prioritised areas and drawing up an escalation plan for recruitment in these areas.

In addition, NVH will continue to work to achieve the following:

1. International student mobility based on bilateral collaboration agreements with prestigious education institutions.
2. Further and continuing education programmes in NVH's field of activity, which will enable participants to acquire up-to-date knowledge so that they are able to undertake the tasks that need to be addressed.
3. Improvement of the learning environment and ongoing evaluations.

## **Research and postgraduate education**

### Objectives

- NVH aims to conduct veterinary and biomedical research of a high quality and high ethical standard.
- NVH aims to educate PhD candidates of a high international calibre.

The research carried out at NVH shall be:

- internationally leading in the field of aquamedicine
- of a high international standard in NVH's other disciplines:
  - Food safety in the production chain/veterinary community medicine
  - Animal health and animal welfare
  - Causes and mechanisms of diseases pertaining to veterinary medicine and comparative medicine
  - Preventive medicine

NVH's clinical activities shall be conducted in such a way that they can contribute towards research projects.

NVH is especially committed to:

1. Working to establish a new Centre for Advanced Research in Aquamedicine.
2. Developing "Life Science" and "One world – one health" as a common area of investment for NVH, UMB and the University of Oslo (UiO).
3. Improving the quality of postgraduate education and student supervision.

In addition, NVH will continue to work to achieve the following:

1. Strong research groups with inspiring and lucid project leaders.
2. A larger number of research projects financed externally by business and national and international sources of financial support. NVH will focus especially on acquiring more financial support from international, and in particular, European arenas.
3. NVH's research groups shall participate in national and international fora where professional priorities for the future are determined.
4. NVH's research groups will listen to, and collaborate with, the business sector in order to achieve progressive and relevant research collaborations and knowledge development.
5. Develop animal testing at NVH with a greater focus on research and in compliance with the three R's: (Reduction, Refinement, Replacement).

## **Innovation**

### Objectives

- NVH shall utilise the innovation potential of research results in order to further develop knowledge applicable to business development and added value for the benefit of society at large.

NVH is especially committed to:

1. Strengthening the culture and motivation for innovation.
2. Encouraging collaboration with relevant business partners.
3. Collaborating with the best TTO (technology transfer office) in the region.

## **Dissemination**

### Objectives

- NVH aims to be a visible and well-respected disseminator of useful research-based knowledge which arouses curiosity and promotes understanding for veterinary and biomedicine.
- NVH also aims to arouse the general public's interest in, and understanding for, animals.

NVH is especially committed to:

1. Drawing up a communication strategy.
2. Improving know-how as regards dissemination.
3. Creating a profile for NVH so that we can recruit students with a wide sphere of interests, from all parts of the country and from both genders.

In addition, NVH will continue to work to achieve the following:

1. Dissemination activities such as Research Days, Researchers' Night, Open Day etc
2. The use of channels targeted at young people, such as TV, film and social media
3. Play an active role in the public debate related to our fields of interest.

## **Clinical operations**

### Objectives

- In order to be able to offer a good education in veterinary science, NVH shall offer high-quality diagnostic and clinical services that comply with international accreditation requirements in the field of teaching and research.

NVH is especially committed to:

1. Assessing and determining an efficient clinic organisation.
2. Developing a clinical service and planning clinical facilities that will heighten NVH's competitive strength when it moves its operations to Ås. These activities must to a greater extent be developed as a referral hospital, but must also provide teaching in:
  1. Primary cases
  2. Acute medical cases
  3. Referred patients
3. Drawing up a long-term plan for acquiring state-of-the-art diagnostic equipment.
4. Developing a service-oriented culture vis-à-vis animal owners and referring veterinary surgeons.

In addition, NVH will continue to work to achieve the following:

1. Clinical training shall be a closely integrated part of the teaching and research programme.
2. A diagnostic service that will increase the quality and expertise of the clinic.

### **Management, organisation and infrastructure**

#### Objectives

- NVH aims to have an efficient management and administration that supports and promotes a progressive development of the core activities of the School.
- NVH aims to be a safe workplace with a good psychosocial working environment.

NVH is especially committed to:

1. Evaluating its managerial structure and implementing management courses for all staff managers.
2. Giving higher priority to the development of ICT with a view to supporting the core activities of the administration.
3. Providing its employees with access to necessary infrastructure of an international standard.
4. NVH's management shall be proactive with regard to providing adequate internal information and participation until the merger with UMB has been completed. NVH will consistently seek to find solutions to future organisational challenges after discussions with our partner, the NVH/UMB Joint Board, and with the employee organisations.
5. NVH will give higher priority to financial management and draw up longer-term budgets and plans.

In addition, NVH will continue to work to achieve the following:

1. A clearly defined HR policy that safeguards each individual employee's competence and development potential. During the whole strategic period, NVH will address the issues facing employees as a result of the move to Ås.
2. Ensure that the working environment is safe by means of HSE (health, safety and environment) work and that NVH's operations are carried out in an environment-friendly way. Particular attention will be paid to the working environment in connection with the move to Ås.
3. Increase the proportion of women in professorships by means of a moderate use of gender quotas.

### **NVH's regional activities**

#### Objectives

- NVH shall further develop activities at the Høyland Field Station, in line with the Parliamentary Report, and develop a Section for Arctic Veterinary Medicine at the High North Research Centre for Climate and the Environment (Fram Centre) in

Tromsø, in collaboration with the Norwegian Veterinary Institute. These regional operations must be based on NVH's core areas of activity and be an integrated part of NVH's teaching and research programmes. NVH's regional operations must be rooted in the strategy of the NVH/UMB Joint Board.

### Sandnes

NVH is especially committed to the following in the Sandnes region:

1. Establishing teaching and research activities in the field of livestock medicine and livestock hygiene at Høyland, in collaboration with the relevant academic departments in Oslo.
2. Carrying out a large proportion of the clinical teaching at Høyland, in line with the increase in the number of students to 70.
3. Building a hall of residence for students at Høyland.
4. Actively participating in the work involved in establishing an experimental surgery department, in collaboration with the University Hospital in Stavanger.

In addition, NVH will continue to work to achieve the following in Sandnes:

1. Further develop NVH's collaboration with the Norwegian Veterinary Institute.
2. Exploit the potential of regional opportunities for collaboration and financing.

### Tromsø

NVH is especially committed to the following in the Tromsø region:

1. Working to move the Section for Arctic Veterinary Medicine to the Fram Centre, in close collaboration with the Norwegian Veterinary Institute.
2. Increasing teaching and supervision tasks in collaboration with relevant academic departments in Oslo.
3. Evaluating the activities of the Section for Arctic Veterinary Medicine in 2011.

In addition, NVH will continue to work to achieve the following in Tromsø:

1. Increase externally financed research activities linked to High North Research relating to animal health, climate and the environment.
2. Further develop collaboration with research groups in the region, especially with other academic communities seeking to establish themselves at the Fram Centre.

## **Appendix 2: Report from the formal meeting once a year between the school leaders and the Ministry of Education and Research. (Management and dialogue meeting)**

### **Report from the yearly management and dialogue meeting between the NVH and the Ministry of Education and Research 2013**

#### Management and dialogue meeting

Date and time:	12 June 2013, 9 am
Location:	Ministry of Education and Research
Participants from NVH:	Chair of the Board, Rector Yngvild Wasteson Board member Kjersti Brøndbo Wettre Board member Trine L'Abée-Lund Board member Jonas Einarsson Board member Eystein Skjerve Prorector Halvor Hektoen Director General Birger Kruse
Participants from the Ministry:	Head of Department Rolf L. Larsen Head of Department Lars Vasbotten Special adviser Erling W. Wist Senior adviser Kristian Hegertun Senior adviser Jorunn Nakken Senior adviser Erling H. Dietrichson

#### ***Feedback on profile, priorities, ambitions and challenges***

The Ministry refers to the discussion during the management and dialogue meeting regarding NVH's profile, priorities, ambitions and challenges. NVH has Norway's only veterinary medicine and veterinary nurse education, and a marked academic profile with clearly defined activity measures that reflects its social goals. NVH has a clear goal structure which is in line with the institution's uniqueness. NVH shows self-awareness and is critical in its assessment of its goal attainment, both in the report for 2012 and the plans for 2013. This was further emphasized in the dialogue during the meeting.

The Ministry of Education and Research noted that the School Board finds that the most important task in 2013 for NVH is to hand over NVH to NMBU in the best condition possible. The Ministry encourages NVH to actively use their experience with planning and to make use of their own management tools to further work with the NMBU.

The Ministry of Education and Research recognizes NVH's meticulous work with the quality of education, as further specified in a separate annual report on this.

## ***Feedback on objectives and results***

### **Sector goal 1: Universities and colleges shall provide education of high international quality in accordance with the needs of society.**

The Ministry of Education and Research notes that NVH shows excellent results on the indicators degree of program completion and program completion time. The share of graduates admitted to the doctoral program six years earlier is also on a satisfactory level. The Ministry notes that NVH still has a very good level of student recruitment.

The Ministry of Education and Research notes that the number of drop outs during the first academic year is somewhat larger than before, as well as large differences in the number attending further education courses. NVH should bear this in mind in the future.

### **Sector goal 2: Universities and colleges shall, in keeping with their distinct character, conduct research, and artistic and academic development of high international quality.**

The Ministry of Education and Research notes that NVH obtains excellent results on indicators such as number of publications and doctoral degrees, but shares NVH's concern for the decline in external funding from the EU and the Norwegian Research Council (NRC). The Ministry expects that NVH now, and later as a part of NMBU, works closely with, among other, the National Veterinary Institute and other research institutions in order to produce strong applications, especially for EU funding. The Ministry finds it positive that NVH has been given funding for an EU adviser by the NRC, to be shared with the Veterinary Institute.

The Ministry of Education and Research expects NVH to continue its commitment to a high quality in research and education before the merger and co-location to Ås, but that investment in the structures at the existing premises are limited to what is necessary in order to maintain the accredited study programs and good research.

### **Sector goal 3: Universities and colleges should be clear actors in society and contribute to knowledge dissemination, international, national and regional development, innovation and the creation of added value.**

NVH's online publication degree, including at forskning.no, has increased a lot. The Ministry of Education and Research acknowledges that NVH disseminates results and is visible in various forums.

It is positive that NVH has dealt with the challenges of the increasing the volume of activities related to education beyond qualification, and the Ministry looks forward to the results of this work.

NVH has a significant potential for increasing its activity in innovation and commercialization. The framework of the new university as well as a closer collaboration with the researchers at Ås should provide a good basis for clarifying the ambitions within the disciplines that NVH is responsible for today.

### **Sector goal 4: Universities and colleges shall have an efficient management of the activities, expertise and resources in accordance with their role in society.**

The Ministry of Education and Research notes that NVH is aware of its strengths and weaknesses, which measures to take and priorities to make, and what will be difficult to implement. The Board has

predicted the long-term economic development, and shows what NVH can do to improve the situation. The Ministry sees this as important prerequisites for the further development of the field of veterinary medicine.

The pre-contract with the University of Tromsø concerning the transfer of the Section of Arctic Veterinary Medicine (SAV) shows a willingness of both institutions to cultivate their respective fields. It is further positive that the research community in Tromsø sees this transfer as an opportunity. Several user groups involved with the equipment for the new university have already been started and others are being set up. This is an important and crucial factor as it is the main cost unit for the next funding that is needed for NMBU. A commitment to sobriety, sharing and reuse are essential factors and the Ministry of Education and Research expects them to be at the heart of the process.

## ***Other feedback***

### **Working hours and second jobs**

The Ministry of Education and Research considers it important and desirable that university- and college staff are allowed to have additional posts and second jobs at other institutions. However, it is necessary that additional posts and proprietary interests do not conflict with the employee's main position, so that confidence in the employee's independence is impaired. The institutions must consider whether, in addition to ethical guidelines, it is necessary to establish their own guidelines for external work.

### **Temporality**

It remains a goal for the Government to reduce the share of staff on temporary contracts in the higher education sector, see among others white paper St. 18 (2012-2013) "Long lines - knowledge gives opportunities". In this area, the results of NVH are still not up to par. Several comparable institutions show far better results, and NVH should examine whether there is anything that it can learn from them. Given the poor results the Ministry instructs NVH to prepare an action plan with binding measures that can help reduce the amount of temporary contracts of the institution. One of the measures in the action plan should be to set a specific target for what the institution overall and the individual entity shall achieve in the short and medium term. The plan should be submitted to the Ministry as soon as possible and at the latest by the end of 2013.

### **Equality**

The Gender Equality Act requires all public institutions to work actively with gender equality and to report on the actual state of things in this area.

Appendix 3: Study plan and subject description June 2013

# **Study Plan and Subject Description**

## **Veterinary Programme Norwegian School of Veterinary Science**

**Academic Year of 2013/14**

The veterinary programme is of 5 ½ to 6 year's duration.  
It leads to the title of:

***Cand.Med.Vet***

Revised in June 2013

Study Plan of 2002, with later adjustments of 2006 and 2011

The Board 15.12.2011

**Definitions:**

Block Leader: The person who organizes and manages the blocks from 1<sup>th</sup> to 7<sup>th</sup> semester.

Examination Coordinator: The person who organizes and administers the examination subjects in 8<sup>th</sup> and 9<sup>th</sup> semester. These may also be called Teaching Coordinator for managing the entire subject area.

Course Coordinator: The contact person for specific courses, modules or periods. They are often teaching coordinators for the key aspects of a subject area.

Hippocampus: Student Intranet Website.

**Study Plan****Duration, scope and level**

Norwegian School of Veterinary Science (NVH) is a specialized university institution, which works to promote justifiable, ethical animal husbandry, animal health and hygienic and good-quality nutrition for humans and animals.

The veterinary programme is a professional degree programme that leads to the title *Cand.Med.Vet* (Candidatus medicinae veterinariae). The veterinary programme is five and a half to six years in duration, and divided into 11 semesters with a total of 330 ECTS credits. NVH is located in Oslo, but has two sub-units located in Tromsø and Sandnes. NVH is the only institution of veterinary education in Norway.

**Admission Requirements**

See the brochure for veterinary medicine students.

**Recommended previous knowledge**

It will be beneficial for students to have knowledge on Biology 1 and 2 levels from high school. In terms of Population Medicine (statistics part), it will be an advantage to have basic skills in mathematics on Math R2 level or equivalent.

**Educational + professional goals****Career Opportunities****New goals of the veterinary study:**

*NVH will educate veterinarians who*

*- have good basic knowledge and skills in veterinary medicine so that they can work to*

*improve animal health, public health and animal welfare.*

*-understand both the meaning of the terms "one health - one world" and "animal's own value" and act ethically in line with this.*

*-have a broad understanding of the nature of scientific issues and are able to identify, formulate and solve complex problems within the veterinary field of work and research.*

*- have the ability to communicate in an understandable, efficient and respectful manner with clients, the public, colleagues and responsible authorities.*

*-know their professional limitations, and safeguard professional liability through further education, training and professional development throughout life.*

The programme qualifies candidates for a wide spectrum of jobs within the veterinary profession, and other work requiring competence in medical science and biology - e.g. private practice with production animals, companion animals and horses, and food safety/public health work, fish health, animal welfare, slaughter house management, pharmaceutical industry, teaching, research etc.

## **Course structure**

The first six semesters cover preclinical studies and are organized in blocks. Each block is completed before the next block begins. This allows students to concentrate on the course content of the block, without also having to read parallel courses.

7<sup>th</sup> semester is an introduction to diagnostic work and propaedeutic clinical work. Students take mixed clinical rotations in semesters 8 + 9 within the fields of Food Safety, Pathology, Professional Ethics, Epidemiology, State Veterinary Medicine and Fish Health.

In semester 10 (11) and 11 (12) students follow one of five differentiations. The admission is at the end of 8<sup>th</sup> semester. At the same time it is determined when the final clinical exams should be taken (see below). In the differentiation year students will also work with a thesis.

It may be admitted students to the following differentiation directions:

Production Animal Clinical Science and Food Safety: 35 seats

Small Animal Medicine: 25 seats

Equine Medicine: 10 seats

Aquatic Medicine: 12 seats

Research project: Varies with access projects

Students can choose to be autumn or spring graduates within specified limits (the distribution: max 45/25). Those who wish to be spring candidates (getting a diploma after 12th semester) will not take the 2 final clinical exams in 9th semester, but will wait with these until the spring in 10th semester. In 10th semester, they no longer follow courses at NVH. (See section on Differentiation).

During the years of study, students must expect: A lot of obligatory courses, weekend and night shifts, placement to other parts of the country, four weeks practice with a Veterinary

Surgeon which the students must provide themselves, four weeks of husbandry practice during the first summer.

Autumn Semester begins on the first Monday on or after 14<sup>th</sup> August and lasts for 18 weeks. Spring Semester begins on the first Monday on or after 4<sup>th</sup> January and lasts for 22 weeks + Easter Week. The re-scheduled examination periods are usually the last week before semester start.

## Course structure of the Veterinary programme (with changes as from 2006)

### First Year

#### First Semester

##### Block 1: **Animal Biology**

Animal Biology: 5 weeks, 7.5 ECTS Credits

##### Block 2: **Cell Biology** (13 weeks in 1st Semester)

18 weeks, 27 ECTS Credits

#### Second Semester

##### Block 2: **Cell Biology** continues.

(5 weeks in 2th Semester)

27 ECTS Credits

##### Block 3: **Population Medicine**

6 weeks, 9 ECTS Credits

##### Block 4: **Integrated Anatomy and Physiology**

24 weeks, 36 ECTS Credits

(11 weeks in 2th Semester)

(partial examination)

Introduction day for summer practice

### Second Year

4 weeks of husbandry practice in the summer

#### Third Semester

##### Block 5: **Animal Nutrition**

5 weeks, 7.5 ECTS Credits

##### Block 4: **Integrated Anatomy and Physiology**

continues.

(13 weeks in 3th Semester)

36 ECTS Credits

#### Fourth Semester

##### Block 6: **Principles of Immunity and Disease**

14 weeks, 21 ECTS Credits

##### Block 7: **Veterinary Microbiology and Parasitology**

16 weeks, 24 ECTS Credits

(8 weeks in 4<sup>th</sup> Semester)

(partial examination)

### Third Year

#### Fifth Semester

##### Block 7: **Veterinary Microbiology and Parasitology**

continues.

(8 weeks in 5<sup>th</sup> Semester)

24 ECTS Credits

##### Block 8: **Veterinary Pharmacology and Toxicology**

10 weeks, (year group 2010 and 2011: 15 ECTS

Credits)

#### Sixth Semester

##### Block 9: **Food Safety**

16 weeks, (year group 2010 and 2011: 24 ECTS

Credits)

##### **Preliminary course in clinical sciences, Part 1**

(year group 2010: 4 ECTS)

Propaedeutic course

Clinical work e.c.

##### **Block 10: Animal Welfare, Animal Housing and Laboratory Animal Science**

3 weeks, 5 ECTS Credits

### Fourth Year

#### Seventh Semester

**Introduction to diagnostic work** continues.

18 weeks, 27 ECTS Credits including year group 10,

#### Eighth Semester

(parallel courses, rotations)

**Diseases in Wildlife and Semi-Domesticated**

31 ECTS Credits as from year group 2011

### **Pathology**

**Reindeer** (block)  
1 week, 1.5 ECTS Credits

**Eighth Semester mixed clinical rotations:**  
**Small Animal Medicine and Equine Medicine**  
(rotation)  
(5 weeks in 8th Semester)  
9 weeks total (8th + 9th Semester), 16.5 ECTS Credits  
Including some weekend and night shifts  
**Production Animal Clinical Science**  
(Rotation, poultry, flocks placement)  
(5 weeks in 8<sup>th</sup> Semester)  
9 weeks total (8<sup>th</sup> + 9<sup>th</sup> Semester), 16.5 ECTS Credits  
Including some weekend and night shifts

**Aquatic Animal Medicine and Fish Health**  
(Lectures, mixed block rotation, 1 week placement in Hjelmeland)  
6 ECTS Credits

**Pathology** (mixed clinical rotation, demonstrations and lectures)  
15 ECTS Credits

Tuition-free weeks in 7th-11th (12th) semester may be used for carrying out 4 weeks of obligatory practice with a veterinarian.

### **Fifth Year**

#### **Insemination of Production Animals**

Obligatory course for those students taking the differentiation in production animals.  
1 week, 1.5 ECTS Credits

#### **Ninth Semester (parallel courses, rotations)**

#### **State Veterinary Medicine**

3 weeks, 4.5 ECTS Credits  
Joint teaching for the entire year group first week of 9th semester. 3 days of internship (in groups) at the Norwegian Food Safety Authority in the mixed block rotation + 1 day group assignment associated with disease control.  
The course ends in 10th or 11th semester. (2 weeks in 9th Semester)

#### **Food and Meat Inspection**

Mixed block rotation: Field work at Sandnes 1 week in 9th Semester 9 + practical Food Inspection in rotation in Oslo  
3 ECTS Credits

#### **Epidemiology**

Mixed block rotation  
1 week, 1.5 ECTS Credits

**Small Animal Medicine and Equine Medicine**  
continues (rotation)

#### **Differentiation- First semester (Tenth or Eleventh Semester)**

**Individual education plan consisting of obligatory courses in their chosen direction of differentiation, elective courses and work with a thesis.**

(4 weeks in 9th Semester)  
Including some weekend and night shifts

**Production Animal Clinical Science** continues  
(rotation)

(4 weeks in 9th Semester)

Including some weekend and night shifts

Examinations in the courses **Production Animal clinical Science** and **Small Animal Medicine and Equine Medicine** are taken at the end of 9th Semester. Alternatively, students may choose to have a tuition free semester in the 10th Semester and take these exams at the end of 10th Semester.

Examination: Production Animal Clinical Science  
(16.5 ECTS Credits)

Examination: Small Animal Medicine and Equine Medicine (16.5 ECTS Credits)

- Partial examination: Equine Medicine
- Partial examination: Small Animal Medicine

### **Sixth Year**

#### **Differentiation- Second Semester (Eleventh and Twelfth Semester)**

Individual education plan consisting of obligatory courses in their chosen direction of differentiation, elective courses and work with a thesis.

## **Conditions for further study and forfeiture of admission as of year group 2006**

In accordance with the Regulations for Admission, Studies and Examinations at NVH § 5.4 may the curriculum set requirements for ECTS Credits production for continuing on with the course. Below, it is specified the number of credits that must be produced per year in order to continue in the year group, as of 2006. Lack of credit production causes the student to be moved to the year group underneath, and may result in forfeiture of admission. Further terms and conditions of forfeiture of admission are found in § 5.4 of the Regulation. The Regulation sets an upper limit on the amount of time that students can study at NVH. This limit is 8 years for the veterinary programme.

Courses are interdependent. In order to present oneself for an examination in a course, students must have passed the previous examinations that according to the Study Plan should have been taken earlier in the programme. This is considered so that the student will be allowed to complete the academic year and retake the examination in the re-scheduled examination period in August. After this period, the under sketched requirements must be achieved.

For external candidates apply that the same competence as the curriculum specifies up to the relevant exam must be approved and documented in order to take the exam as an external candidate.

**Date for re-scheduled examinations\* and requirements for ECTS credit production\*\*:**

### **First Year**

August (last week before the autumn semester):

- Cell Biology
- Population Medicine
- Integrated Anatomy and Physiology (partial examination)

Requirements to continue after the exam period in August: 30 ECTS credits. This means that the student must have passed all the exams that give you credits, with the exception of either Animal Biology or Population Medicine to continue the programme. There is no requirement to pass the partial examination in Integrated Anatomy and Physiology as it does not give you credits before the main exam next fall. (See the course description for detailed rules regarding Integrated Anatomy and Physiology). Students can get dispensation to take the mandatory husbandry practice the following summer.

## **Second Year**

Beginning of January

- Animal Nutrition

August (last week before the autumn semester):

- Integrated Anatomy and Physiology
- Principles of Immunity and Disease
- Veterinary Microbiology and Parasitology (partial examination)

Requirements to continue after the exam period in August: 50 ECTS credits and any fail exams from the first academic year. This means that the student must have passed all the exams that give you credits, with the exception of Animal Nutrition to continue the programme. There is no requirement to pass the partial examination in Veterinary Microbiology and Parasitology as it does not give you credits before the main exam next fall. (See the course description for detailed rules regarding Veterinary Microbiology and Parasitology).

## **Third Year**

August (last week before the autumn semester):

- Veterinary Pharmacology and Toxicology
- Food Safety
- Animal Welfare, Animal Housing and Laboratory Animal Science

Beginning of January

- Veterinary Microbiology and Parasitology (oral examination)

Requirements to continue after the exam period in August: 60 ECTS credits and any fail exams from the second academic year. This means that the student must have passed all the exams that give you credits, with the exception of Animal Welfare, Animal Housing and Laboratory Animal Science to continue the programme.

## **Fourth Year**

August

- Preliminary course in clinical sciences and Pathology
- Aquatic Animal Medicine and Fish Health
- Pathology (written examination)

- Pathology (practical examination/oral examination)

Requirements to continue after the exam period in August: 40 ECTS credits and any fail exams from the third academic year. This means that the student must have passed all the exams that give you credits, with the exception of either the exam in Aquatic Animal Medicine and Fish Health or one of the partial exams in Pathology to continue the programme.

### **Fifth Year**

At least one of the clinical examinations (either Production Animal Clinical Science or both of the partial examinations in Small Animal Medicine and Equine Medicine) and any fail exams from the fourth academic year must be successfully completed in order to begin the differentiation year. Additional Requirements: Clinical exam/partial exam in the course included in the selected differentiation direction must be passed, i.e. to begin the differentiation in Production Animal Clinical Science, must at least the exam in Production Animal Clinical Science be passed. Similarly partial exam in Small Animal Medicine for the differentiation in Small Animal Medicine, and partial exam in Equine Medicine in the differentiation for Equine Medicine as well as Production Animal Clinical Science, if not both partial exams are passed. It will upon application be considered whether it is professionally acceptable to take courses in thesis writing and undertake the thesis if the progression requirements are not met.

### **Sixth Year**

Course requirements, examination in State Veterinary Medicine and thesis + any fail exams from the fifth year must be completed so that the period of study do not extend over more than 8 years.

\* The Head of Studies may, at the annual adjustment of the curriculum, change next year's continuation arrangement.

\*\*Approved by the Board November 16, 2006.

*The Rector is authorized to deviate the requirements of ECTS credits production if special circumstances exist. Students must submit an application stating the reasons (or with documentation) and implement mandatory conversation with the Head of Studies. Upon consideration of the application whether to continue the current year group, while previous examination (s) must be taken, it is emphasized that the programme seems realistic for that particular student, and that it probably will not affect learning and mandatory activities in the next block. In case of conflicting interests, emphasis is placed on academic and practical / economic conditions for NVH rather than the student's personal circumstances. Sick leave does not automatically provide the right to continue on the current year group.*

## **Compulsory teaching and programme requirements**

This is regulated by the regulations (§ 5.4, 6.2 and 6.3).

*"A student, who without permission cancels the programme for longer than 3 months, loses the right to study at NVH."*

If a student fails to attend exams, or compulsory teaching and do not answer inquiries from the SFA in a period of 3 months, the student is considered to have canceled the programme.

The requirements for the different blocks / topics are described in the curriculum with procedures for the compensation of too much absence. In case of valid absence, medical certificate / other confirmation must be submitted the SFA. The student contacts Block Leader or another person with academic responsibility mentioned in the curriculum and agrees on how compensation of compulsory teaching / programme requirements will be implemented. Block Leader / Examination Coordinator will report before the final exam in the subject which students who still lack approval of the necessary compulsory teaching and programme requirements. The student will either not be able take the exam where the curriculum indicates it, or will not get an approval of the examination before compulsory teaching and programme requirements are compensated as the curriculum describes.

## **Leave of absence and special arrangements of the study situation**

Rules laid down in the regulations § 5.5 and 5.7. Granted leave is in addition to the upper limit of 8 years. Special arrangements of the study situation on the basis of documentation will also give the right to an extended period of study.

## **Specific Recognition**

Previously completed credits in subjects that are considered academically equivalent to courses included in the curriculum at NVH can be accommodated. One can apply for exemption from compulsory teaching and / or examination. The deadline for applications is no later than the 1st month before the start of the block. Detailed rules are given in the regulation § 4.10.

## **Student Exchange**

Students who want to go on an exchange visit are given the opportunity of a 3-month period at a veterinary institution abroad, as far as capacity allows. Exchange to Nordic speaking countries usually takes place in the 8th and 9th semesters, while exchange between non-Nordic speaking countries occurs only in the 8th semester. There is also the possibility for exchange in the differentiation year. The differentiation coordinator will approve that kind of exchange. As international exchange is bilateral, this means that in the same time period, international students will come to Norway. If non-Nordic speaking students are present, teaching takes place in English in the 8<sup>th</sup> semester.

## **Quality Assurance**

NVH has in accordance with the Act Relating to Universities and University Colleges a quality assurance system to ensure and develop the quality of education. Students participate in this partly through established student evaluation systems and participation in councils and committees.

## **Authorization/Student license**

To work as a veterinarian in Norway one must have authorization. It is the Norwegian Food Safety Authority that is the authorized authority. SFA sends the compiled application when the diploma is finished. One can after 9th semester apply for a license as a veterinarian (student license), provided that 3 of the 4 weeks of veterinary practices (Production Animal + Small Animal / Equine) is completed, and all compulsory teaching up to and including 9th semester is approved. Students must normally have passed the previous examinations in the programme. There is no requirement for completed clinical exams, but students must be able

to document that the clinic periods are approved. SFA collects information from clinics and checks the submitted documentation practice with veterinarians. The form and procedure are found at NFSAs website. The form and proof of employment is sent to the SFA, which forwards it to the Norwegian Food Safety Authority.

## **Course descriptions (as of year group 2006)**

This plan is revised each spring by May 31, and the framework applies for the upcoming academic year. Autumn's blocks should be completely planned in regard to content and exams, while blocks starting next spring semester, adjustments in curriculum and exams can be done based on previous execution experiences. Adjustments for the spring semester are made within November 31.

The programme has block organization. This means that the current block will be completed before the next one starts. One of the advantages of the blocks is that one has put them together so that they consist of closely related subjects and that one reads these subjects simultaneously and not separately. The fact that there are fewer, but larger blocks makes it somewhat easier to identify overlap and repetition needed between subjects. Subject boundaries are broken down and thus students are forced to read "across" the old subject boundaries and will thereby have a less fragmented study.

However, it is important that students do not consider the subject as completed after the examination in a block. It is thus in several blocks links to previous and future subjects so that a spiral-shaped learning model is also ensured. There will be examples on how parts of the course are repeated through the education during the course description below.

### **HMS (Occupational Health, Environment and Safety)**

Under each topic, it will be explained briefly what kind of training that will be provided in the block. See the Student Manual on how injuries should be followed up.

Students are encouraged to purchase their own accident insurance. Students are encouraged to attend the annual first aid course.

All students should be vaccinated against tetanus at the start of the study. When exchanging to countries where rabies occurs or where other vaccines are required, students are also asked to do so.

Pregnant women should take special precautions when handling certain agents or animals suspected of suffering from a zoonosis. Pregnant women are encouraged to inform the course coordinator at startup in subjects that may cause a risk. Pregnant students should not take radiographs (See more below the clinical courses).

Follow the block's safety measures and the teacher's instructions.

Read the HMS under each topic. Ask professionals if you are in doubt about the safety.

**Introduction to the veterinary programme:**

Practical information: 2 days

Fire Training (mandatory)

**Block 1: Animal Biology (5 weeks, 7.5 ECTS Credits)****Aim and learning outcomes**

Animal Biology is an introduction to the courses to come. It will give students a common vocabulary, as well as providing all students with basic knowledge in zoology, biology and anatomy and physiology.

After completion of the courses, the students should:

- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.
- Have learned simple terminology, basic Latin and basic features in taxonomy.
- Know the structure and function of unicellular, primitive multicellular molluscs, superior multicellular molluscs, vertebrates with emphasis on mammals.
- Have completed basic dissections of fish, birds and mammals.

**Teaching methods and approach:**

The programme requires that students themselves participate actively in class, are responsible for their own learning and have joint responsibility for conducting examinations. There is an emphasis on group work as teaching/work methods, and examination involves that students assess each other's efforts and knowledge. There are also 2 days of micro - tissues and dissection of fish, birds, mammals. It will be given training in safety and microscopy.

**Teaching materials:**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Recommended previous knowledge**

Biology 1 and 2 (formerly 2BI/3BI) are recommended, but not required.

**Requirements for personal equipment**

No

**HMS**

Biochemistry laboratory: There will be given theoretical and practical training in infection and infection control and procedures at the laboratory before the first lesson. Please see "*the instructions for the laboratory*". It is mandatory with white coats. Individual lab coats are available for students and those are not used by students who have lessons in infection courses. There is a clean and unclean zone by the entrance to the laboratory. Hand wash and coat change is required at entry and exit. The gas is turned off.

Dissection Hall: Dissection coat is required (on loan). There will be training in the use and cleaning of the dissecting instruments and routines in case someone should cut themselves.

**Compulsory teaching and programme requirements:**

None

**Examination**

Presentation of group work

Grading Scale: Pass/Fail

If the group work is not passed or the student does not implement the programme, the student will be given a new task that must be completed before the course is approved. Not completed or submitted task in accordance with the deadline without valid reason, involves a failed grade.

**Contact:**

Block Leader: David Griffiths

Head of Department: Mona Aleksandersen

**Block 2: Cell Biology (18 weeks, 27 ECTS Credits)**

**Aim and learning outcomes**

Cell biology aims to give students an insight into the current perception of life and life processes, starting with the main building block of all life, namely the cell – hence the term cell biology. With the cell as a starting point, students will partly move down towards the molecular and atomic level, and partly up towards the cell in a «social» context, where one will study specialized tissues and organs.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.4, 2.1, 2.2, 2.4, 3.7

After completion of the courses, the students should:

- Have acquired sufficient knowledge and skills in cell biology, including biochemistry, genetics, genetic engineering, histology with cytology and embryology, to embark on the various clinical and para-clinical courses in the veterinary programme.
- Understand how the cell works as a unit, and be able to describe the cell's structure and function on a molecular and atomic level and up to cell's context in specialized tissues and organs.
- Understand how a cell and its cytoskeleton are built, how cell membranes are assembled, the various functions proteins may have, and how molecules and proteins are transported across the cell membrane or into organelles.
- Understand how cells communicate with each other, how molecules outside of a cell can cause signaling inside the cell, and how the signaling results in a change in protein function as well as gene expression.

- Have detailed knowledge of the structure of biological polymers such as carbohydrates, proteins and nucleic acids, as well as a number of other molecules of great importance for cellular functions, including vitamins, lipids, etc.
- Be able to give a detailed description of how living organisms acquire the energy necessary to sustain life processes, and how a number of metabolic reaction sequences are structured and regulated / adapted to the organism variable needs.
- In broad terms be able to explain the embryological development of tissues and apply this knowledge to understand the different tissue's contributions to the development of the organism's basic form.
- Be able to explain the microscopic structure of cells and tissues of mammals, birds and fish, and to identify the various cells and tissues in the light microscope.
- Have acquired sufficient basic knowledge of the flow of information from DNA to protein and the basic principles of genetic doctrine in order to use modern techniques in basic medical research and veterinary medicine.
- Have developed an ethical awareness about biotechnology, biomedicine and bio-production.
- Have gained an understanding of that working with chemicals can cause health hazards and the necessity to show hygienic care.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Content**

- biochemistry
- molecular cell biology
- elements of anatomy,
- elements of physiology
- elements of genetics

### **Cell Biology in relation to future courses:**

The cell biology block affects a number of topics that come later in the programme - in varying scope and level of detail. The basic understanding of cellular, genetic and biochemical processes are essential to good learning of physiology, anatomy, nutrition, general pathology, pathophysiology, pharmacology / toxicology, microbiology, hematology / clinical laboratory diagnostics, reproductive physiology and internal medicine and food hygiene.

### **Teaching methods and approach**

With the cell as a starting point, students will partly move down towards the molecular and atomic level, and partly up towards the cell in a «social» context, where one will study specialized tissues and organs. Around 220 hours are dedicated to teaching, of which 50-60 hours are used for the laboratory course. Organized teaching in colloquium is also used. A seminar on bioethics is arranged within the subject area at the institute.

**Learning materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Recommended previous knowledge**

Based on the terminology established in animal biology  
Biology 1 and 2 (formerly 2BI/3BI) are recommended, but not required.

**Requirements for personal equipment**

Lab coat (must be purchased)

**HMS**

Biochemistry Hall: It is developed routines for the biochemistry hall. A first aid kit, eyewash water and a safety shower are available at all times. It is mandatory to use a lab coat, protective goggles and a closed hood when handling chemicals. There are also rules regarding disposal. The use of risk chemicals in laboratory courses has been significantly reduced in recent years.

Students are given training in these conditions before entering the biochemistry hall. There will also be shown in practice how the chemicals and waste should be handled.

**Compulsory teaching and programme requirements:**

There will be held 15 laboratory courses; 6 in biochemistry, 7 in micro-anatomy and 2 in embryology. The courses are mandatory. This means that students who are absent without valid reasons and lose more than 2 courses, must complete these prior approval of the examination.

Students must attend mandatory evaluation colloquiums approx. every 5 weeks. If valid absences, this may possibly be replaced by a written assignment that must be submitted before the student can take the exam.

**Test Examination (trial exam)**

There will be a test exam. Students are encouraged to attend this.

**Examination**

& hour written final exam (CELLEBIOL2)

Examination support material: None

Grading scale: A-F

**Contact**

Block Leader: Mohasina Syed

Head of Department: Mona Aleksandersen

**Block 3: Population Medicine (6 weeks, 9 ECTS Credits)**

Semester: 2

**Aim and learning outcomes**

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.10, 2.2, 2.3

After completion of the courses, the students should:

Have an understanding of health and production at the population level, including knowing how scientific methodology is used to obtain information about a population, and knowing how one with breeding-related measures can improve properties that are related to health, reproduction and production in our domestic animal populations.

- Be able to use basic statistical methods for data collection; data description.
- Have an understanding of how systematic errors, random errors and incorrect presentation may provide misleading information about the condition of the population.
- Be able to use basic epidemiological methods to measure and assess disease incidence, measure and evaluate the association between factor and disease, and to interpret the results of diagnostic tests.
- Understand and be able to explain the reasons for, and importance of, genetic variation at the population level.
- Understand and be able to explain how the breeding-related measures, i.e. by selection and crossover, can affect favorably the health and other characteristics that are related to the production and reproduction of our domestic animals.
- Know the breeding objectives and how the practical breeding work is organized in Norway today for animal species like cattle, swine, salmon, dog and horse, as well as provide examples of genetic progresses achieved among all these species.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Content**

- Statistics
  - o Probability Distributions and clinical reference values
  - o Estimation and confidence intervals
  - o Hypothesis testing for mean values and the dependence of symbols
  - o Correlation and regression
- Epidemiology
  - o Objectives of the health status of groups and populations
  - o Diagnostic tests
  - o Objectives of the importance of a causal factor for health in populations
  - o Systematic errors
- Animal breeding
  - o Generic animal breeding
  - o Special animal breeding for cattle, swine, fish, dog and horses

### **Teaching methods and approach**

The teaching extends over six weeks.

Specimens of each teaching day (except special animal breeding) are:

- Introduction to the material through lectures.
  - Adaption/understanding of the material through individual reading + exercise solving.
  - Discussions in study groups of topics/questions that are experienced as difficult/unclear.
- The teacher will be present during the study groups.

### **Recommended previous knowledge**

Several of the topics in statistics are familiar from high school. A repetition of this material will be very useful as a basis for teaching.

### **Teaching materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Compulsory teaching and programme requirements**

None

### **Requirements for personal equipment**

Calculator with basic statistical functions

### **HMS**

No specific procedures for this block.

### **Examination and examination results**

5 hour written final exam (POPMED08)

Population medicine consist of two separate partial exams that both must be passed in order to pass the course. These are liquidated on the same day with a 5 hour exam. Students must have at least 50% correct answers on each section to get a pass in the course. The two parts are assessed independently. The student may appeal the grading of each part separately. If a student fails one of the two parts three times, the student will lose their place in the programme.

Examination support material: Private calculator and distributed formulas.

Grading scale: Pass/Fail

Students who fail in one or both of these parts will re-sit the two parts of the exam on the same day before the start of studies in August. Studenter som stryker i en eller begge av delene kontinuerer disse på samme dag før studiestart i august. The length of the exam in such cases will be as specified below.

Partial examination: Statistics of Epidemiology (6 ECTS credits).

If the student just takes partial examinations of population medicine: 4 hours.

Partial examination: Breeding Principles (3 ECST credits).

If the student just takes partial examinations of population medicine: 2 hours.

### **Contact**

Block Leader: Rolf Bjerke Larssen

Head of Department: Olav Reksen, ProdMed

## **Block 4: Integrated Anatomy and Physiology (24 weeks, 36 ECTS Credits)**

**Semester: 2 and 3**

The block is divided into two periods, each of 11 weeks in the spring semester and the subsequent 13 weeks in the autumn semester (after block 5).

### **Aim and learning outcomes**

Anatomy and physiology will give the students insight into the normal physique (anatomy) and function (physiology) in companion animals and fish, with special emphasis on issues of importance to clinical practice and diagnostics, and food safety.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.3, 1.4, 1.10, 2.1, 2.2, 2.4, 3.7, 3.16, 3.17, 3.20

After completion of the courses, the students should:

Have acquired sufficient knowledge and skills in anatomy and physiology, including medical terminology, to embark on the various clinical and para-clinical subjects in the veterinary programme.

- Understand how the animal organism functions as a whole and be able to explain the interaction between the body's various systems in terms of both structure and function.
- Have gained sufficient knowledge about animal physiology to determine whether there is any deviation from the normal physiological state of an animal through a general clinical examination.
- Have gained insight about the tissue's vulnerability to non-physiological handling, and also knowledge of the tissue's robustness under physiological conditions.
- Be able to in broad terms explain the embryological development of organs and tissues and apply this knowledge to understand the different tissue characteristics as well as the organs design and topography.
- Be able to explain the microscopic structure of cells, tissues and organs of mammals, birds and fish, and to identify the different cells, tissues and organs in the light microscope.
- Have acquired sufficient basic knowledge of anatomy of the various domestic animals species to perform clinical examination, surgery and meat inspection.
- Be able to identify and dissect off the various structures, including muscles, vessels, nerves and lymph nodes.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

- Have developed an ethical awareness of the use of animals in teaching and research, which includes showing respect to animals after they are dead.
- Have gained an understanding of that working with dead animals and organs can cause risk of infection and the necessity to show hygienic care.

**Content:**

- Anatomy
- Physiology

**Teaching methods and approach**

The knowledge that students acquire in this block will also form the basis for understanding the mechanisms of disease progression and treatment. Teaching is provided in the form of lectures, demonstrations and laboratory and dissection courses, as well as studies on living animals. In total includes teaching about 350 hours. In addition, students work with colloquium tasks.

**Recommended previous knowledge**

Based on the terminology established in animal biology.

Biology 1 and 2 (formerly 2BI/3BI) are recommended, but not required.

Cell biology is a prerequisite.

**Teaching materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Compulsory teaching and programme requirements**

All laboratory courses in physiology must be taken to get credit for the course. Upon passing the exam, credits are registered only when the requirement is met.

**Requirements for personal equipment at the dissection courses:**

Dissection coat, plastic apron, rubber boots and dissecting instruments. Students shall keep gloves and dissecting instruments (including scalpel blades).

**HMS**

Biochemistry Hall: Risk material is not handled at the physiology courses in the Biochemistry Hall.

Dissection Hall: Dissection coat is required. Training is provided in the animal biology course.

Biochemistry laboratory: There will be given theoretical and practical training in infection and infection control and procedures at the laboratory before the first lesson. Please see the instructions for the laboratory. It is mandatory with lab coats. Individual lab coats are available for students and those are not used by students who have lessons in infection courses. There is a clean and unclean zone by the entrance to the laboratory. Hand wash and coat change is required at entry and exit. The gas is turned off.

**Examination**

**Partial Examination 1 – Written**

Form of examination: Written with multiple choice questions.

Examination at the end of the 2nd semester.

Duration: 3 hours.

Examination support material: None.

There will be arranged a new exam in August for the students who have failed or have valid reasons for absence.

Students, who do not pass the new exam in August, will take the regular examination in June the upcoming year. Students can take the partial exam 2 although the partial exam 1 is failed, but will not get the course approved before partial exam 1 and 2 are passed.

### **Partial Examination 2 – Written**

Form of examination: Written with prose exercises, multiple choice questions and tasks related to the anatomical image.

Upon the block's end.

Duration: 7 hours.

Examination support material: None.

Students who fail will take the next exam the upcoming year (August).

### **Grades in the course:**

Grading scale: Partial examination 1 – pass/fail, partial examination 2 – A-F

### **Appeal about the grading**

Please refer to the Regulations for Admission, Studies and Examinations at NVH.

### **Contact**

Block Leader: Erling Olav Koppang

Head of Department: Mona Aleksandersen

Contact person regarding the absence in laboratory courses in physiology and plenary session for colloquium groups: Johan Jansen Høgset.

## **Husbandry Practice (4 weeks)**

**Semester: Between 2nd and 3rd semester. Summer Practice**

Students will acquire this practice themselves. NVH can assist with obtaining practice herds.

Introduction to the summer practice will be given as a day seminar.

### **Purpose**

Provide the student with practical knowledge and realistic experience with common husbandry production.

### **Content**

This practice should take place on farms and Summer Mountain pastures with production animals, primarily dairy production.

### **Teaching materials**

Guide for writing the report

Relevant literature: Compendium in Animal Housing

### **Requirements for personal equipment**

Work wear

### **Compulsory teaching and programme requirements:**

Practice is mandatory. Everyone shall write a report, including those students who possibly will get previous practice approved. The written report will later be included in the course; Animal Welfare, Animal Housing and Laboratory Animal Science (block 10)

The report must be passed in order to receive credits for the course. If anyone fails the report, it will be processed and re-written until it meets the criteria for passing.

The introduction programme for the summer practice is mandatory. Under special circumstances, summer practice may be postponed until the summer between 3<sup>rd</sup> and 4<sup>th</sup> semester. The student would have to submit an application regarding the postponement.

### **Contact**

Block Leader: Hallgeir Flø

Head of Department: Olav Reksen, ProdMed

## **Block 5: Animal Nutrition (5 weeks, 7.5 ECTS Credits)**

**Semester: 3**

### **Aim and learning outcomes**

Animal Nutrition will provide students with basic knowledge of nutrition and nutritional physiology, as well as specific knowledge about nutrition and feeding of the various domestic animals species. Furthermore, the course will provide a basis for studies in clinical courses and an understanding of the close interaction there is between nutrition and health. Students will also gain an understanding of diseases caused by an imbalance in nutrient supply and inadequate feeding, how these can be prevented and how we can improve the course of disease in nutrition or feeding related support therapy for various diseases (clinical nutrition).

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.3, 1.8, 1.10, 1.11, 2.1, 2.2, 2.3, 2.8, 3.5

After completion of the courses, the students should:

- Have knowledge of the various nutrients and be able to determine nutritional needs of domestic animals and fish under different physiological conditions.
- Recognise the main feedstuff types, assessing their quality and nutritional value, as well as conservation methods for feedstuffs.
- Know how feeding affects production results and performance capabilities.
- Understand the significance of feedstuff for disease development and prevention.
- Be able to assess the quality of feeding schedules and feeding routines and recommend changes if necessary.

- Understand the Feedstuff Legislation and other government regulations relating to the manufacture and sale of animal feed.
- Have acquired a good attitude to the proper nutrition of animals and fish.

### **Content**

- Basic nutritional physiology
- Species-specific nutritional physiology
- Species-specific feeding study, including the links between nutrition and health.

### **Teaching methods and approach**

Teaching takes place in lectures (about 60 hours) and in groups (about 15 hours) with plenary review.

### **Recommended previous knowledge**

Biochemistry, gastrointestinal physiology, energy metabolism.

### **Teaching materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Requirements for personal equipment:**

None

### **HMS**

No specific procedures for this block.

### **Programme requirements: Test**

A test must be passed in order to take the exam in Animal Nutrition. In special cases, in agreement with the Block Leader, the exam may be taken before the test is passed, but the grade will not be valid until the test is passed. The Block Leader will decide when a new test can be conducted in the following semester. If the student fails the test for a second time, he or she may have to wait until the next time the block is implemented.

### **Examination**

4 hour written final exam (ERNÆRI07)

Examination support material: distributed calculator

Grading scale: A-F

### **Contact**

Block Leader: Åshild Krogdahl

Head of Department: Mona Aleksandersen

## **Block 6: Principles of Immunity and Disease (14 weeks, 21 ECTS Credits)**

Semester: 4

### **Aim and learning outcomes**

“Principles of Immunity and disease” is an integration of the disciplines; immunology, general pathology, basic pathophysiology and medical genetics, as well as an introduction to the science of bacteriology, virology and parasitology. This is the veterinary students’ first systematic approach to infection defense and development of disease. “Principles of Immunity and disease” is essential for understanding infection biology, clinical and pathological diagnosis, therapy, immunoprophylaxis and breeding strategies against disease.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.3, 1.4, 1.10, 2.1, 2.2, 2.3, 2.4, 2.5, 2.8, 2.9, 3.6

After completion of the courses, the students should:

- Have acquired a basic understanding of disease development and disease manifestation and the basis for a deeper understanding of the clinical courses.
- Have good knowledge within the field of immunology, general pathology and medical genetics.
- Clarify how immunological and pathogenetic mechanisms and the genetic background influence the individual's response to pathogenic stimuli.
- Clarify how the immune system’s cells function in defense against disease.
- Describe which morphological manifestations and functional changes that various disease processes can provide, and explain the underlying mechanisms.
- Understand the background of vaccination and vaccine response.
- Clarify the genetic basis of immune responses, disease resistance and diseases with hereditary nature / disposal.
- Observe and describe changes that are characteristic of central disease processes in histological sections and make morphological diagnosis.
- Prepare, store and send samples to analytical laboratories and also perform some diagnostic tests themselves.
- Have developed an awareness of ethical issues within the disciplines of immunology, general pathology and medical genetics.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Learning objectives**

At the end of the block, students should understand key issues within fields like immunology, general pathology and medical genetics. They should describe how immunological and pathogenic mechanisms and the genetic background influence the individual response to pathogenic stimuli. They must understand how the immune system’s cells function in defense against disease. They should be able to describe which morphological manifestations and functional changes that various disease processes can provide and explain the underlying

mechanisms. Students should understand the background of vaccination and vaccine response. Students shall understand the genetic basis of immune responses, disease resistance and diseases with hereditary nature / disposal.

### **Skills objectives**

Students should be able to describe the changes that are characteristic of central disease processes in histological sections and make morphological diagnosis. They should be able to prepare, store and send samples to analytical laboratories and shall be able to perform some diagnostic tests.

### **Teaching**

Teaching is provided through lectures, courses, study groups and subsequent review of questions, and integrated study groups including a presentation of the group work.

### **The course is organized into the following sections**

1. Basic pathology and immunity
2. An introduction to bacteriology, virology and parasitology
3. Infectious immunology, immune pathology and pathophysiology, chronic inflammation and regeneration
4. Clinical immunology
5. Medical genetics
6. Tumor Biology
7. Courses in histopathology
8. Courses in Immunology

### **Principles of Immunity and Disease in relation to past and future courses:**

Immunology is first introduced in the anatomy / physiology block when the immune system's organs are taught. To ensure continuity, it is the Block Leader who teaches immunology in this block. A general introduction to genetics is provided in the cell biology block. In the course Principles of Immunity and Disease is then immunology, general pathology, disease, genetics and also some pathophysiology taught in an integrated form. Emphasis is placed on drawing lines to previous lessons and using examples from cell biology and anatomy / physiology classes.

Principles of Immunity and Disease also provide an introduction to the infection subjects which in turn is taught in the next block.

The pathology course and to some extent pathophysiology is taught in the special pathology while immunology is to some extent taught in the clinical subjects to return to the current problems after the students have acquired more clinical knowledge. It has long been taught in immunology in the differentiation in production animal clinical sciences and from 2012 also in the differentiation in equine medicine. Pathophysiology, but also pathology and immunology will also be key subjects in multidisciplinary case presentations intended for clinical students.

### **Recommended previous knowledge**

The course is based particularly on veterinary cell biology, anatomy and physiology.

### **Teaching material**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Compulsory teaching and programme requirements**

Courses in general pathology and immunology are mandatory, a total of 12 teaching days. It is allowed with up to 10 % absence if valid reason. In case of absence beyond this, the student must attend next year's courses.

Integrated study groups with a presentation of the group work are mandatory, totaling 3 days. In case of a single day absence, the student must perform the task to the teacher. In case of absence of more than one day without valid reason (illness), the student must attend next year's study groups and presentation.

Students will normally be allowed to take the exam even though not all mandatory teaching has been approved. The grade will not be valid until the programme requirements are approved. The student is responsible for ensuring that the requirements are met the following year.

### **Requirements for personal equipment**

Lab coats are required during the course teaching in the laboratories (Microbiology Hall). The institute will ensure that coats are available.

### **HMS**

It is considered that there is no risk activity in the block.

Laboratory (Microbiology Hall): Please see "*the instructions for the laboratory*". It is mandatory with lab coats. Individual lab coats are available for students and those are not used by students who have lessons in infection courses. There is a clean and unclean zone by the entrance to the laboratory. Hand wash and coat change is required at entry and exit. The gas is turned off.

### **Examination**

6 hour written final exam (ALMSYKDL) consisting of pathology (ca. 40%), immunology (ca. 40%) and genetics (ca. 20%). The exam is assessed as a whole, and by the lack of knowledge in key areas, the student will be able to fail even though the knowledge in other areas are good.

Examination support material: None

Grading scale: A-F

### **Contact**

Block Leader: Anne Storset

Head of Department: Per Einar Granum

## **Block 7: Veterinary Microbiology and parasitology (16 weeks, 24 ECTS Credits)**

**Semester: 4 and 5**

### **Aim and learning outcomes**

Veterinary Microbiology and Parasitology will provide students with knowledge of micro-organisms (bacteria, fungi, and viruses), parasites and microbial toxins that can cause diseases in animals. Students will develop an understanding of how the host best can protect themselves against an overall infection pressure from all relevant pathogens within the host's environment. Teaching and course-related training will enable the student to schedule a

diagnostic and epidemiological approach toward diseases caused by all agents who have a clinical and administrative importance in veterinary medicine.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.4, 1.6 – 1.12, 2.1 - 2.9, 3.6, 3.8, 3.11, 3.12, 3.14, 3.17, 3.19 and 3.20

After completion of the courses, the students should:

Have good knowledge of micro-organisms (bacteria, fungi, viruses), parasites and microbial toxins that can cause diseases in animals and humans.

- Describe taxonomy used for the characterization of microorganisms and parasites.
- Describe the structure of various types of microorganisms.
- Clarify reservoir, virulence factors and pathogenesis related to important microorganisms.
- Describe the morphology, life cycle and classic symptoms of important parasites.
- Clarify the key principles of infection hygiene.
- Clarify diagnostic methods and extraction of relevant samples from infected individuals and herds / populations.
- Explain and interpret analysis results regarding microorganisms and parasites.
- Clarify policies for the prevention and treatment of infections in animals, including zoonoses.
- Implement selected diagnostic methods in infectious courses.
- Manage infection in a responsible and hygienic manner.
- Have a behavior that helps to prevent infections.
- Show responsibility by a restrictive use of antibiotics and antiparasitic agents.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Content**

- Bacteriology and Mycology
- Virology
- Parasitology

### **Bacteriology in relation to past and future courses:**

Earlier in the programme, students are introduced to the topic through lectures in "Principles of Immunity and Disease". This is followed by the actual bacteriology teaching in the form of lectures, laboratory courses and study groups in the block "Veterinary Microbiology and Parasitology." Bacteriology then comes up again in the courses like Food Safety and Pathology, and also in the clinical studies. In the course in infection in the differentiating year, students will again meet with infectious diseases, including bacteriology.

### **Teaching methods and approach**

The course includes a general description of the major groups of infectious agents, and a more specific and detailed description of selected species / genera / families. In subareas like bacteriology / mycology and virology, comes the general section mainly at the start of the course. For Parasitology, however, which includes several fundamentally different subgroups, comes the general section more dispersed as the first part of the review of each subgroup. After the various groups of agents are reviewed, the teaching will emphasize a comprehensive understanding, by presenting the agents in relation to organ or animal species.

In the general section emphasis issues of importance for disease development due to agents in animals and humans such as hygiene, infection routes, significance of infection pressure, the animal's resistance, and more. The specific part emphasis agents that are involved in disease states in animals, including fish, and agents that can result in diseases in humans by food borne pathogens (after nutriment contamination). The course places special emphasis on the various infectious agents, their pathogenic properties and introduction to practical diagnostics including the basis for disease control in veterinary medicine. Teaching is provided in the form of lectures (72 hours), courses (80 hours) and organized study groups (40 hours).

### **Recommended previous knowledge**

The course is especially based on Principles of Immunity and Disease.

### **Teaching material and teaching objectives**

Recommended literature and teaching objectives are found at the block's home area on Hippocampus.

### **Compulsory teaching and programme requirements:**

All lab courses are mandatory. It is allowed with up to 10 % absence in each of the courses in the subareas bacteriology/mycology, virology and parasitology. In case of absence beyond this, the student must attend next year's courses to get the course-related teaching approved. In some cases, a customized programme can be created. Safety requirements make the introductory course in bacteriology (3 days course) mandatory in order to participate in the rest of the bacteriology course. In case of more than one day's absence, the student must contact the Block Leader (or teacher in charge) for an assessment of the situation. Students will normally be allowed to take the exam even though not all mandatory teaching has been approved. The grade will not be valid until the programme requirements are approved. See subsection; Examination.

### **Requirements for personal equipment:**

Lab coat is mandatory in course-related teaching (on loan at the laboratory).

### **HMS**

Laboratory: Please see "*the instructions for the laboratory*" (Microbiology hall). It is mandatory with lab coats. Individual lab coats in the courses where the students are working

with microbiology. There is a clean and unclean zone by the entrance to the laboratory. Hand wash and coat change is required at entry and exit.

Training in fire protection is provided. It is mandatory with lab coats when working with gas. A first aid kit and an emergency shower are available. Gas plants are centrally controlled with a stopcock. The stopcock is demonstrated to the students at the first visit. The number of gas units is reduced to a minimum. Gas plants are checked prior to the instruction 2 times a year. There are separate fume hoods used where chemicals are used.

Since working with infection subjects represent a real risk of infection, thorough training and a variety of security measures are initiated:

Intro Course (three day course) in infectious learning:

- Provision of security policies to each student (on paper) the first day of class.
- Verbal information is accompanied by a PPT presentation about safety procedures at the first day of the intro course.
- Routines are taught and rehearsed. Demonstrations and practical training, many supervisors present to supervise and guide.
- It is not permitted that students are absent in this part.

Main course in infection learning:

- Safety procedures are repeated. The review of safety procedures in the intro course and in the main course are held by two different people, which is considered to be an advantage when the same points are rendered slightly differently and it sits better with the students afterwards.
- Introduction of discrepancy log - in other words spills and other incidents are logged; what happened, which students were involved and which follow-up were given.

Changes and procedures to prevent zoonoses:

The following measures were introduced 2007-2009, to reduce the risk of laboratory infection in the course in infection learning:

- *Listeria monocytogenes* replaced with *Listeria ivanovii* (*Listeria ivanovii* is not human pathogenic).
- *Salmonella Typhimurium* replaced with *diarizonae Salmonella* (*S. diarizonae* is not human pathogenic).
- Practical execution of the typing of *Salmonella* bacteria is not done anymore (now only demonstrated by the instructor).
- *Streptococcus pneumoniae* (human pathogenic, especially for those with weak immune systems) is not used more.
- Liquid culture has been replaced with *Campylobacter* (human pathogenic) and we have minimized the use of other types of liquid media (cultures in liquid media involves greater risk for spillage than cultures on solid media).

Students with compromised immune systems or who are pregnant are particularly susceptible to infections, and special care must be taken when working with biological agents. This applies particularly to *Listeria monocytogenes*, *Salmonella* pathogenic biovar, and *Streptococcus pneumoniae*. None of these agents are used further in the course in infection teachings.

## Examination

**Partial examination 1 – Written multiple-choice exam**

Examination at the end of the 4th semester

Duration: 2 hours.

Examination support material: None.

There will be arranged a new exam in August for students who have failed, or have valid reasons for absence. Students can take the partial exam 2 although the partial exam 1 is failed, but must then retake the partial exam 1 the next summer. Partial exam 1 must be passed in order to pass the course

**Partial examination 2 – Oral**

At the block's end, students must pass an oral examination in all three disciplines on the same day.

Examination support material: None.

Students with valid absence may, in exceptional cases, if there is availability, take a re-scheduled exam in the same exam period. Application is submitted to the Academic Administration.

Each of the fields of parasitology, virology and bacteriology / mycology is assessed; a grade in each subject area is set, as well as a common grade in the oral exam. This accounts for 70% of the total grade. Students who fail the oral exam in one or more subjects will take a new oral examination in these subjects the next year (January).

**Grades in the course:**

Grading scale: A-E

The grade is calculated on the basis of the grades in partial exam 1 (30%) and 2 (70%).

**Appeals about the grading**

It is not possible to appeal a grade in an oral exam. Appeals about the grading in the multiple choice exam can only be made when the final grade is set. See the regulations.

**Contact**

Block Leader: Mette Myrmel

Head of Department: Per Einar Granum, MatInf

**Block 8: Veterinary Pharmacology and Toxicology (10 weeks, 15 ECTS Credits)**

**Semester: 5 and 6**

**Aim and learning outcomes**

«Veterinary Pharmacology and Toxicology» is a discipline that deals with respectively drugs and toxins' fate and effects in the animal organism. Proficiency in both pharmacology and toxicology is essential to understanding drug therapy in clinical practice in domestic animals and fish, and to make rational therapy selection regarding drug treatment of diseases and poisoning. Further knowledge in these disciplines is essential to understand the part of food hygiene, including meat control, which deals with drugs and toxins, and to understand the background of the retention periods of animal food products for human consumption from animals that have been exposed to contaminants.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.3, 1.4, 1.6, 1.9, 1.11, 1.12, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4, 3.10, 3.13, 3.14, 3.15

After completion of the courses, the students should (be able to):

- Have acquired knowledge and attitudes that will allow him or her to be able to use drugs for animals in accordance with the laws and regulations applicable to such activities.
- Define key concepts in pharmacology and toxicology.
- Explain key processes in pharmacokinetics and pharmacodynamics, and the impact these processes may have on treatment outcome.
- Explain key processes in toxicokinetics and toxicodynamics, and how these processes can affect the outcome of a poisoning condition.
- Clarify the mechanism of the different main groups of drugs.
- Clarify side effects and interactions between different drugs.
- Clarify the rules that apply to requisition, handling and storage of medicines.
- Be familiar with the content of the laws and regulations governing the use of veterinary medicines.
- Clarify the mechanism of relevant toxins.
- Define key concepts in environmental toxicology.
- Clarify the different groups of pollutants, the characteristics of the different groups and what effects they have.
- Use available channels of information concerning drugs and their use.
- Prescribe medicinal products in accordance with the regulations for prescription writing.
- Consider the ethical aspects and propose rational drug therapy in domestic animal and fish diseases.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Content**

- Pharmacology (the study of drugs, their composition, effects and use on various domestic animals species).

- Toxicology (the study of poisons, their effects in different domestic animals species and treatment of poisoning). It also provides an introduction to environmentally hazardous prevalence and effects.
- Drug Legislation and prescription writing

### **Veterinary Pharmacology and Toxicology in relation to past and future courses:**

The block builds on the previous teaching, for example in physiology and biochemistry. It is often necessary to repeat or highlight parts of the previous teaching. This applies to parts that are central to understanding the mechanisms in pharmacology / toxicology. For example, parts of the central nervous system's anatomy, physiology and biochemistry are repeated because of its relation to the lectures on medicinal products that affect the central nervous system. Treatment is reviewed in the 7th semester, and in terms of repetition of pharmacology/toxicology, we meet our alumni also in the clinic in the 10th term, where we in groups consisting of 8-10 students, present topics in clinical pharmacology. For example, we provide at the medical clinic, a repetition of antibacterial drugs in which we emphasize on pharmacokinetic and dynamic properties that are particularly relevant in a clinical context. As a rule, it is also a clinician present at these gatherings.

### **Teaching methods and approach**

Emphasis will be placed on admission, distribution, transformation and excretion (kinetics), mechanisms (dynamics) and effects in various animal species. The course emphasizes in addition clinical veterinary pharmacology and toxicology of small animals, horses and production animals and aquatic species. Teaching is provided in the form of lectures (80 hours) and organized study groups (30 hours).

### **Recommended previous knowledge**

The blocks provided previous in the programme.

### **Teaching Material**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Compulsory teaching and programme requirements**

Test: A test must be passed in order to take the exam in Animal Nutrition. In special cases, in agreement with the Block Leader, the exam may be taken before the test is passed, but the grade will not be valid until the test is passed. The Block Leader will decide when a new test can be conducted in the following semester. If the student fails the test for a second time, he or she may have to wait until the next time the block is implemented.

Teaching in colloquiums is mandatory. You are allowed one absence from the courses / colloquia. In absence beyond this, one must submit an additional task assignment (s) which must be assessed as passed before one gets a valid grade in the subject. The colloquium additional task (s) will be distributed after the first exam, and papers will be submitted for evaluation during the first week of the spring semester.

### **Requirements for personal equipment:**

None

**HMS**

Biochemistry Hall: It is considered to be very low risk activity in the block. A first aid kit is available. All handling of drugs is carried out by the teachers. However, when extraction and processing of fish, students will be in contact with low concentrations of anesthetic drugs. Prior to the course students are instructed about safe handling of drugs, and during the practical part, teachers ensure that safety is maintained in terms of the students using gloves and protective clothing.

### **Examination**

**Written final examination (FARMTOK)** 4 hour last week before Christmas

Examination support material: Calculator is allowed on tasks that require extensive number crunching.

Grading scale: A-E

### **Contact**

Block Leader: Nils Søli

Head of Department: Per Einar Granum, MatInf

## **Block 9: Food Safety (16 weeks, 24 ECTS Credits)**

**Semester: 6**

### **Aim and learning outcomes**

The teaching in food safety will provide students with comprehensive knowledge of the pathogenic microorganisms and toxic substances that can be transferred in the food chain, with emphasis on the animal, and how health hazards can be prevented. Students will acquire an understanding of that the quality of the finished foodstuffs depends both on the health of the food-producing animals, the environment and the handling of foodstuffs. They will acquire the skills to be able to determine which laboratory analysis of food that is necessary and appropriate for different issues, and knowledge to assess the results of such analyzes.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.3, 1.4, 1.5, 1.8, 1.9, 1.10, 1.11, 1.12, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.6, 3.8, 3.16, 3.17, 3.20

After completion of the courses, the students should:

Have developed an understanding of food safety as a very important part of veterinary public health and as a link between veterinary and human public health. The student will have developed the ability to acquire and apply knowledge, and ability to cooperate and critical thinking in the field.

- Be able to explain zoonoses, other agents and toxic substances / pollutants that can be transferred in the food chain, with emphasis on animal infection paths.
- Know the principles for the detection of pathogenic bacteria and examination of microbiological quality of food and water, to conduct such analyzes, and assess the significance of the analytical results.

- Take precautions to prevent contamination in the food chain.
- Conduct epidemiological outbreak investigation of food-borne illnesses.
- Perform a simple microbiological / toxicological risk assessment.
- Have an awareness of animal welfare during transport to slaughterhouses and at the slaughterhouse.
- Know the content of the laws and regulations related to safe food production.
- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.

### **Food Safety in relation to past and future courses:**

The subject of food safety, which has its main block in 6th semester, is based on several subjects from previous blocks. Subjects such as microbiology, biochemistry, pharmacology and toxicology form the basis for teaching in Food Safety. While students in 6th semester get a theoretical introduction to meat inspection, they get the practical implementation in 9th semester. Especially the knowledge acquired in 6th semester of zoonoses, and how these can be transmitted through meat to humans, is important for meat inspection instruction. This aspect and knowledge of epidemiology has become even more important since the EU, through the EFSA, now will modernize and change the meat inspection in a more risk-based direction. In meat inspection, knowledge in animal welfare, clinical microbiology, pharmacology, toxicology, anatomy and pathology is also applied. In 9th semester the students are given an insight into FSA's practical work with inspections, where knowledge from 6th semester is the most important scientific basis. Common teaching in infection control for all directions of differentiation is based on everything that has been taught previously at NVH. This also applies to the further education of ProdMat differentiation students. These students will gain more practical knowledge in production hygiene and in the course in veterinary public health students will get more in-depth teaching in legislation, epidemiology, risk assessment, animal welfare and specific learning objectives as the Hygiene Package describes to the official veterinarian at the FSA.

### **Teaching methods and approach**

Pathogenic organisms and toxic substances may be transferred to humans through food and water, and is both nationally and globally important causes of diseases. Veterinarians are responsible for the public meat control and are employed in the local Food Safety Authority, which is responsible so that all food that is traded is safe to be eaten. Many also work to ensure safe production in the food industry. The understanding of the relationships in the food chain (from earth and fjord to the table) is gradually built up throughout the veterinary programme, but it is focused specifically on this subject in Food Safety.

Teaching takes place in the form of lectures (approx. 110 hours), laboratory courses (37 hours), group work in outbreak detection, and colloquia exercises for self-study, organized study groups with plenary discussions, exercises in risk assessment and individual tasks in food safety:

- Theoretical part: Basic theory on agents / toxic substances, and on food safety and product quality in the animal food chain and the aquatic environment. Ends with a multiple choice test (partial examination 1).
- Laboratory part: Laboratory course, and group work with outbreak detection. Ends with a practical laboratory test and presentation of group work / submission of report.
- Food chains and risk based supervision: Lectures in risk assessment and management. Group work in risk assessment with exercises in microbiology / toxicology. Ends with a presentation / discussion.

Individual tasks in food safety that ends with a report.

At the end of the semester, it will be held a final oral examination which includes material from the entire syllabus (Partial examination 2).

### **Recommended previous knowledge**

The blocks prior in the study such as microbiology, biochemistry, pharmacology and toxicology.

### **Teaching Material**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Compulsory teaching and programme requirements:**

- Excursion to the slaughterhouse, including preparation and summary.
- Laboratory course, including lectures in lab theory at startup and a laboratory test.
- Epi-games
- Outbreaks Detection. The work spans a few weeks, but the time spent to solve the task will differ between the groups.
- Risk assessment
- Individual tasks

It is allowed with up to 10% absence from compulsory teaching. In case of absence beyond this, a medical certificate is required. Excluded from the 10% is: Excursion to the slaughterhouse including preparation and summary, lectures in lab theory as well as the laboratory test, presentations of outbreak detection and risk assessment. In case of absence, a medical certificate is required. To participate in the course in meat inspection at the slaughterhouse in 9th semester must the excursion to the slaughterhouse be approved by the academic community.

On submission of a medical certificate it will be created a customized program so that it is possible to obtain a valid examination provided that the absence is no longer than 1 week. Students will normally be able to take the exam even though not all mandatory training is approved, but the grade is not valid until the requirement is passed.

### **Requirements for personal equipment**

None. Lab coats are available at the laboratory.

Programme requirements:

1) Laboratory Test: Individual test in technical laboratory work. Duration pr. candidate: 20 min.

Pass / Fail. In case of a fail one gets one retake in the 6th term, and possibly another next year. The grade will not be valid until the test is passed.

2) Outbreak Task: Pass / Fail. Assessed by a submitted questionnaire, reorders, report and presentation (20 min in groups). All aids allowed. If not passed, the student must submit a new report, and present a new presentation with the examination no later than August.

3) Group assignment in risk assessment: Presentations that are assessed pass / fail.

4) Individual tasks with submission of report: To be assessed as pass / fail.

### HMS

Please see “*the instructions for the laboratory*” (Microbiology hall). It is mandatory with lab coats. Individual lab coats in the courses where the students are working with microbiology. There is a clean and unclean zone by the entrance to the laboratory. Hand wash and coat change is required at entry and exit.

Training in fire protection is provided. It is mandatory with lab coats when working with gas. A first aid kit and an emergency shower are available. Gas plants are centrally controlled with a stopcock. The stopcock is demonstrated to the students at the first visit. The number of gas units is reduced to a minimum. Gas plants are checked prior to the instruction 2 times a year. There are separate fume hoods used where chemicals are used.

Since working with infection subjects represent a real risk of infection, thorough training and a variety of security measures are initiated (see infection learning).

It is informed both orally and in writing (in writing about *Listeria monocytogenes*) that special consideration must be taken by students with impaired immune systems or who are pregnant. Students in such a risk group must inform their course leader about their condition, and it will be ensured that these students do not get distributed tasks or cultures of *L. monocytogenes* or *Salmonella Typhimurium*.

### Examination: (MATTRY)

The examination consists of two partial exams which are recognized in the grade. There is no requirement that the two parts must be passed in order to take the final oral examination. The final oral exam includes questions from the whole syllabus.

Grading scale: A-F.

*Partial exam 1*: Multiple choice (1 hour)

Midterm exam is held directly after the curriculum that is included in the examination is reviewed. It will be given scaled grades for 30 % of the final grade for the course. The repetition of the exam is held after a short time (about 2-5 weeks) if there are students who fails or have valid reasons for absence in accordance to guidelines, attachments and regulations. If there are students who withdraw or don't take the exam, it must be taken the

following year. Students are allowed to take the final exam even if the midterm is not passed, but the grade is not valid before the midterm 1 is passed.

Scoring /given on the activity sheet):

Correct answer: 1 point. No answer: 0 points. Incorrect answer: - 1/2 point. One cannot receive less than 0 points. Grades are given.

Examination support material: None

*Partial exam 2:* Final oral exam over 3 days.

The repetition of the exam is held in August.

Examination support material: None

### **Grades in the course:**

Grading scale: A-E.

The grade is calculated on the basis of the grades in partial exam 1 (30%) and 2 (70%).

### **Contact**

Block leader: Tone Normann Asp

Head of Department: Per Einar Granum, MatInf

## **Preliminary course in clinical sciences (6th semester) (see 7th semester)**

**Semester: 6**

**Overall learning objectives:** See 7th semester

### **Content:**

#### **Propaedeutic course:**

- Production animals: Clinical examination and herdinvestigation
- Horse: Clinical examination
- Companion animals: Clinical examination
- Horse: Cutting, seizures, Hoof disease
- Production animals: Hoof shape. Hoof diseases. Pruning of cows.
- Handling animals, ampling, anesthesia horse
- Asepsis, antiseptics, sutures
- Reproduction all animals
- Obstetrics large and small animals

#### **Clinical examination etc.:**

- Clinical examination and herd investigation
- Diagnostic methods
- Obstetrics large animals

### **Teaching methods and approach**

#### **Propaedeutic course:**

The year group is divided in 4 groups that rotate between the topics on Wednesday mornings for 14 weeks. Both live animals and slaughterhouse materials are used in teaching.

**Clinical examination and more:**

There are days of lectures in parallel with coincident species with the block animal welfare, animal housing and laboratory animal science. It is given a 1-week course in diagnostic methods. The entire year group will participate in practical courses in first aid which is a course in the use of first aid theory using phantoms and dead animals.

**Recommended previous knowledge**

The programme's previous blocks. Especially anatomy and physiology and the infection courses.

**Requirements for personal equipment in the propaedeutic course and the first aid course**

The first day will the student groups 1, 2 and 3 wear coveralls / other clinic clothing suitable for working with large animals, whereas group 4 will wear a white coat designed to work with small animals. Group 3 and 4 shall bring stethoscopes. Group 1 and 2 should preferably be wearing gloves.

**Compulsory teaching and programme requirements**

Practical lessons: Everything is mandatory. These are lessons that cannot be replaced by self-study, and prepares students for the clinical periods. It is accepted with up to one-time valid absences before substitute teaching must be taken. Lectures are optional.

Absence from the propaedeutic course will be replaced with ambulatory clinic equivalent with the number of days as the absence, taking place in the summer holiday between 6th and 7th semester or a suitable programme in the training clinic. If necessary, substitute teaching is not taken SFA shall be notified so that the exam after the 7th semester will not get approved before substitute teaching is conducted. Substitute teaching in the first aid course must be taken the next year. The grade will be retained until this is implemented.

**HMS**

Handling large animals are demonstrated.

Upon review of the clinical examination of dog, proper handling and protection against bite injuries are important. See additional information 7th semester.

**Examination**

Administered in conjunction with the 7th semester exam.

**Contact**

Block Leader for the Wednesday mornings in 6th semester in the propaedeutic courses: Carl Fredrik Ihler

Block Leader for the other weeks: Ann Margaret Grøndahl

Theme Responsible, first aid course: Adam Martin

Theme Responsible, clinical examination: Anna Eggertsdottir (Small Animal and Equine), Terje Fjeldaas (Production Animals)

Theme Responsible, diagnostic methods: Stein Istre Thoresen

Head of Department: Ann Margaret Grøndahl

## **Block 10: Animal welfare, Animal housing and Laboratory Animal Science (3 weeks + summer practice, 5 ECTS Credits)**

## Semester: 6

### Aim and learning outcomes

Animal welfare, Animal housing and Laboratory Animal Science will give students a basic understanding of the veterinary medicine and ethological basis of animal welfare, focusing on animal welfare in Norwegian animal housing. Furthermore, the course provides insight into the use of laboratory animals and how to ensure good welfare of animals used in scientific work.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 2.1, 2.2, 2.3, 2.6, 2.8, 3.2, 3.15, 3.18

After completion of the courses, the students should:

Have knowledge of animal welfare, ethology (behavioral learning) and animal ethics with regard to animal husbandry and have an understanding of the complexity of the concept of animal welfare.

- Understand the main legislations, regulations and supervisions in the field.
- Be able to define and use terminology in the field.
- Be able to explain the health, physiological, cognitive, emotional and behavioral indicators of welfare status.
- Be able to describe welfare issues with domestic animals and fish.
- Have a general knowledge of the scientific basis for the development of welfare protocols, and could explain some advantages and disadvantages associated with different types of welfare indicators.
- Have knowledge of normal behavior in domestic animals including dogs and cats.
- Have an understanding that the behavioral medicine is a veterinary area and know the progress of a behavioral consultation as well as the most common behavior problems in dogs and cats.
- Be able to describe the welfare consequences of selective breeding.
- Be able to explain the connection between the environment, health and welfare.
- Be able to account for environmental factors and structural facilities for domestic animals.

Know the key principles for milking.

- Be able to account for factors that can affect the outcome of an animal experiment and how experimental animals' health and welfare status is monitored.

- Be able to explain the principle of "the three Rs".
- Be able to explain the methods of handling, anesthesia, analgesia and euthanasia of experimental animals (including fish).
- Be able to debate animal welfare, and take a critical look at the arguments about animal welfare.

### **Content:**

The course is divided into four topics:

1. Animal Welfare and Ethology (3 credits)
2. Animal Housing (1 credit)
3. Laboratory Animal Science (1 credit)
4. Husdyrpraksis og rapport (Programme Requirement)

### **Animal Welfare in relation with future courses:**

Animal welfare and animal environment (6th semester) provides a general introduction to animal welfare with a focus on behavioral and health aspects of animal welfare and animal ethics. In 8<sup>th</sup> semester there will be visits to stocks: Visits with poultry producers. Currently laying hens, but from 2013, poussins. In addition to disease issues, relevant welfare issues will also be addressed. In 9<sup>th</sup> semester there will be a theme day in animal welfare: Ambulatory Clinic. The students will go on stock visits to poultry producers with laying hens in environmental cages. Some legislation (animal welfare legislation, hold regulations poultry), focusing on the welfare evaluation using resource-based and animal-based measurements, WelfareQuality welfare protocol, behavioral indicators, health with a focus on "production diseases", stabling forms, advantages and disadvantages of cages/aviaries, handling of chickens, lock routines. As part of the meat inspection instruction in Rogaland it will be looked at poultry slaughter in its totality and animal welfare in relation to anesthesia and euthanasia methods are central themes. Otherwise it is included animal welfare in all clinical subjects and pathology in 8<sup>th</sup> and 9<sup>th</sup> semester and the differentiation year. In Ambulatory there are stock visits with welfare protocols in cattle and pigs. In the course public veterinary medicine hold regulations and animal welfare legislation which is central to animal welfare issues will be reviewed.

In the differentiation year there are own themes in the differentiation in both ProdMat and Aquatic Medicine:

- *Veterinary Public Health*: Food Safety Authority's role in animal welfare issues; supervision, decision, police report.
- *Herd consulting and supervision*: Herd visits poultry two full days, where topics of animal welfare are key + supervisory work with FSA.
- *Fish welfare*: The theme is animal welfare and animal ethics in aquaculture.

### **Teaching methods and approach**

#### *Animal Welfare:*

The teaching of animal welfare provides insight in ethology (behavioral learning), general animal welfare and animal ethics with regard to practical animal husbandry. Students will acquire knowledge of behavioral indicators, physiological indicators, and production and health indicators for animal welfare. There will be an introduction to pain physiology and

welfare parameters. Students should have knowledge of human - animal relations' impact on animal welfare.

*Animal Housing:*

*Laboratory Animal Science:*

Instruction in laboratory animal science will give students insight into the use of experimental animals, legislations and administrative procedures when carrying out animal experiments. It then provides an introduction to the choice of experimental animals, health risks and health control, environmental factors and anesthesia, analgesia and humane killing of experimental animals. It also provides an introduction to quality control and good laboratory practices.

**Teaching Material:**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Recommended previous knowledge**

Blocks earlier in the programme. Especially husbandry practices, animal nutrition, propaedeutic courses in the animal welfare section and physiology courses in laboratory animal science.

**Requirements for personal equipment**

None

**HMS**

No specific procedures for this block.

**Compulsory teaching and programme requirements:**

It is recommended to attend classes, as it will be difficult to read the entire subject oneself. Husbandry Practice and Report is mandatory and must be passed to pass the course.

**Mandatory husbandry practice:**

See earlier in the curriculum.

Students are allowed to take the written exam even if the requirement has not been passed, but the grade will not be valid until the requirement is passed.

**Written Examination in the whole subject area (4 hours):**

Animal Welfare and Etiology, Animal Housing, Laboratory Animal Science

Examination provides 5 credits. It can be achieved a total of 100 points on the exam. It is given graded marks of A-F. The examination in all three subjects is assessed together, and the whole examination must be re-taken at grade F.

**Contact**

Block Leader: Randi Moe

Partly Responsible: Hans Petter Kjæstad (Animal Welfare), Kristine Eraker Aasland Hansen (Laboratory Animal Science)

Head of Department: Olav Reksen, ProdMed

## **Introduction to diagnostic work (18 weeks, 27 ECTS Credits) (21 weeks 31 ECTS Credits as of year group 2011)**

**Semester: 7**

### **Aim and learning outcomes**

The purpose of the “Introduction to diagnostic work” is for students to be knowledgeable and skill wise prepared for the clinical rotation in production animal, equine and small animal medicine in 8th and 9th semester. The goal is that the teaching should contribute to the integration between the preclinical and clinical part of the programme and that it has provided students with inspiration and desire to further clinical work. Although pathology is taught in the 7th semester, it will first be tested at the examination of pathology in the 8th semester. The student must, however, possess relevant knowledge of pathogenesis and pathoanatomy to understand the subject “Introduction to diagnostic work”.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.3, 1.4, 1.5, 1.7, 1.8, 1.10, 1.11, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.11, 3.12, 3.13, 3.16, 3.17, 3.18, 3.19, 3.20

After completion of the courses, the students should:

### **Learning objectives**

Students should

- Know the most common anomalies, disorders and diseases of the various organ systems that are included in the subjects being taught in the 7th semester.
- Acquire sufficient knowledge to be well positioned when it comes to undertake patient assessment in the clinic, ie able to know about the causes, prevention, investigate further, monitor and treat individual animals that have been reviewed in the themes of 6th and 7th semester.
- Know (to the extent that the subjects are reviewed in 6th and 7th semester) sufficiently about stock medicine to participate actively in stock findings.

Have knowledge about zoonoses so that students can protect themselves and others in the clinic.

### **Skills (There will be asked theory questions from these topics):**

- Be able to handle experimental animals.
- Be able to record anamnesis, conduct a physical examination and be familiar with the main points in a problem-oriented patient evaluation.
- Be able to handle sick and healthy animals.
- Be able to perform simple sampling, bandaging and suturing.
- Be able to remove horseshoes and be familiar with the crop of hooves.
- Be able to perform a gynecological examination of cows and a single heat control in bitch.
- Take out a semen sample and evaluate the semen quality.
- Know the principles of adequate treatment at birth difficulties with our most usual domestic animals.

**General competence:**

- Have learned to collaborate through colloquiums and group work, and be able to present the academic material both in writing and oral.
- Have an ethical awareness of the housing conditions of experimental animals.

**Content:**

- Production Animal Clinical Science
- Small Animal Medicine
- Equine Medicine
- Obstetrics
- Reproduction
- Clinical chemistry and other diagnostic aids
- Laboratory Animal Science
- Pathology (but first tested at the examination after the 8<sup>th</sup> semester)
- Treatment

**Teaching methods and approach**

The teaching is based on organ systems of living and dead animals. This takes place as theme modules consisting of lectures, problem solving in groups, demonstrations and reviews. The approach is a problem-oriented patient evaluation.

In rotations, students are divided into 6 groups. Students will get demonstrations and training in clinical examination as well as other basic skills on living animals, and performed autopsies on animals, and microscopy of tissue sections. Students have rotations at the pathologist (9 mornings), production animal clinics (6 mornings), horse clinic (2 mornings), experimental animal unit (2 ½ mornings), small animal medicine (1/2 morning) stock medicine (5 mornings).

Laboratory Animal Rotation provides an introduction to the work at a laboratory animal facility and maintenance of laboratory animals. It also provides a brief description of the principles of anesthesia and analgesia. Emphasis is placed on legislations and ethical handling of animals.

The course in preventive health care has the herd as an approach. It is given an introduction to epidemiological principles of disease surveillance, organized health plans, policies and procedures for disease prevention in problem herds.

**Literature and reading references**

Core literature for propaedeutic course, 6th and 7th semester:

Torleiv Løken's «Klinisk diagnostikk hos produksjonsdyr». This must be mastered and similar facts for small animals and horses must also be mastered.

Otherwise it is recommended to start reading the recommended literature, but these works are also intended to be read in 8th, 9th and possibly in the differentiation year while learning by meeting cases and issues in the clinic.

We recommend that you read the distributed lecture notes and that you follow the emphasis in the teaching in the 6th and 7th semester and read about the various topics in relation to this.

**Recommended previous knowledge**

Programme's previous blocks.

**Requirements for personal equipment**

Work clothes and protective footwear. Stethoscope and scissors.

**HMS**

A first aid kit is available in the clinics. Fire Training is provided in the clinics. Students are encouraged to wear gloves when handling medications and other risk materials, allergens and when handling animals suspected to be suffering from a zoonosis. There are separate infection locks by the entrance to the clinics for production animal medicine and the section of pathology. Overalls, gloves and boots are available by the infection locks.

Students who are pregnant or have compromised immune systems are encouraged to contact the responsible for the education in advance of all the clinical courses.

**Rotation Pathology:**

At the section hall, HMS training is divided in 2 parts. First a briefing with HMS rules that the students must read and sign. This is supplemented with information and pictures illustrating the procedures. The second part consists of information at the audience on how to implement infection control practices.

**Rotation in the clinics:**

Quarantine: Students cannot have been abroad for the last 72 hours before the clinic teaching in production animal medicine.

See the "Rules for handling large production animals and horses at NVH" and "Basic Policy regarding the handling of animals". Prodmed strives to not have larger groups than six students when handling large animals.

Stationary Clinic: Clinic Procedures are reviewed orally at the first visit. Production Animal Medicine has prepared a briefing on hygiene and safety of ProdMed's clinical activities. Excerpts are handed out.

Reproduction: Gloves are used when examining organs from the slaughterhouses. Gloves are also used upon examination of animals, and gloves shall be changed for each animal.

**Rotation Equine Clinic**

Introduction to clinical procedures are reviewed orally. Students acknowledge that they have received this training.

**The laboratory animal unit**

Renewed international accreditation by AAALAC. This sets very stringent requirements for HMS training and procedures at the department.

Quarantine: The section has its own quarantine rules that state that if one has been in contact with animals abroad in the past three days or in contact with rodents, rabbits or production animals in Norway over the past two days, one will not gain access to the department.

Allergen Information is given to the students.

**Compulsory teaching and programme requirements:**

Rotation the first 6 weeks at ProdMed (medicine, reproduction, preventive health care), SportFaMed, pathologist, laboratory animal department.

Reproduction the whole day.

Pathology rotation before lunch for 1/6 of the year group.

This instruction is mandatory and must be taken again in case of absence. Generally it is accepted with one day valid absences for the compulsory teaching which runs over a week before substitute teaching must be taken. For pathology it is accepted with until 2 days valid absences for the 7th and 8th semester together. Wherever possible, repetition of absence shall be agreed with the module manager. If this is not possible it must be taken the following year. The exam can be taken, but the grade will not be valid until all mandatory teaching is completed. Head of Department must submit lists of students who lack compulsory teaching to the SFA no later than the day before the exam.

### **Examination**

Short answer tasks and multiple-choice questions

Examination support material: None

Grading scale: Pass / Fail

Examination will ensure a certain factual foundation before the clinical work at production animals, small animals and horses. Examinations may contain questions from topics of 6th semester and preparatory course. The examination will be assessed as a "pass" if one has the right answers to 60% of the tasks. Application and deeper understanding is tested in the clinical examinations (9th (10th) semester).

Pathology is taught in 7th semester and tested at the end of 8th semester.

### **Contact**

Block Leader and Head of Department: Responsibility is rolled don a two-year basis between the Head of Departments at ProdMed and at SportFaMed.

For 2013, it is: Ann Margaret Grøndahl

### **Clinic Preparatory Week**

This is added to the week after the exam in "Introduction to diagnostic work", and is part of the subject "Small Animal Medicine". Attendance is voluntary, but the program requirements in the form of a test must be passed before the clinical examination may be taken (after 9th (10th) semester). Focus is patient management and clinical investigation.

## **8th Semester**

The 8th semester begins with one week of joint teaching in «Diseases in Wildlife and Semi-Domesticated Reindeer», «Aquatic Animal Medicine and Fish Health» and «Poultry Diseases». Then the year group is divided into 3 groups that follow rotation in Production Animal, Small Animal and Equine and Mixed Clinical Rotation. In May, the year group is deployed one week in Sandnes, Sheep and Goats Diseases and one week in Hjelmeland, Aquatic Animal Medicine and Fish Health. The semester ends with two final exams in Pathology and one final exam in Aquatic Animal Medicine and Fish Health.

### **Mixed Clinical rotation in 8th semester consists of:**

- Pathology
- Aquatic Animal Medicine and Fish Health
- Professional Ethics (included in the clinical courses)

Semester responsible: Carl Fredrik Ihler

## **Small Animal Medicine and Equine Medicine (9 weeks + reading period, 16.5 ECTS Credits)**

## **Production Animal Clinical Science (9 weeks + reading period, 16.5 ECTS Credits)**

See description under 9th semester

## **Diseases in Wildlife and Semi-Domesticated Reindeer (1 week, 1.5 ECTS Credits)**

**Semester: 8**

### **Aim and Learning Outcomes**

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.8, 2.1, 2.2, 2.3, 2.8, 2.9, 3.17

After completing the course the student should have basic knowledge of the most important diseases in domestic reindeer, wildlife (including marine mammals):

- Be able to explain the most important zoonoses found in reindeer and wild animals in Norway or that can be introduced to Norway, and how they behave (reservoir, transmission routes, symptoms, etc.)
- Be able to explain the infectious diseases that can be transmitted between domestic animals and reindeer / wild animals.
- Have knowledge of selected pathological findings that are normal or may occur in relation to meat inspection of reindeer.
- Have knowledge of selected pathological findings that are common in wild animals.
- Work in groups and prepare a literature study in a relevant theme based on the collection of scientific information and publication rules.

### **Content:**

- Diseases in wildlife
- Diseases in reindeer

### **Teaching methods and approach:**

The course consists of 6 hours of lectures on diseases of reindeer and wild animals, including marine mammals. There is an emphasis on matters of importance and that veterinarians may be confronted with in their further work. One such topic is diseases in reindeer and wild animals that are hunted. Furthermore, emphasis is placed on zoonoses, and diseases that can be transmitted between wildlife and domestic animals. Students are strongly encouraged to follow the lectures because of the task that will be written afterwards.

### **Teaching Materials**

It is not defined a special curriculum for this course, primarily because the available literature will go far beyond the course framework. It will, however, be handed out source references at the lectures.

### **Recommended previous knowledge**

The programme's previous block.

### **Requirements for personal equipment**

None

### **HMS**

No specific procedures for this block.

### **Compulsory teaching and programme requirements:**

None

### **Examination**

Students are divided into groups (or one uses the practice groups) and are given an assignment that is presented in the last lecture. The assignment will consist of a frontage and 4-8 pages of text (Word, double line spacing, Norwegian or English) including references. Students will focus on a topic, search for information (articles, textbooks, etc.) and put this together as a whole. Through this, students will gain experience in putting together short and concise information on a topic and convey this in writing. The assignment will also be training in the use of source references and references. Students are encouraged to contact the course coordinator and teachers if there is a need for clarification or feedback along the way. The assignment must be submitted within the given deadlines. The assignment is returned to the students with comments and corrections. The assignment is then delivered back in a revised form for approval within the stipulated deadline.

*The assignment should be organized according to the following scheme:*

Front page: assignment title and authors, year group, date of submission

Introduction: presentation of the problem

Special conditions related to pathology, infectious agents, routes of transmission, epidemiological conditions etc. from the problem job's nature.

Discussion about diseases' impact on animal health and possible for people (nutritional conditions, infection factors etc.). Emphasize matters of practical importance.

References

*The assignment is evaluated as pass / fail based on the following criteria:*

Ability to present a topic in writing

Ability to find relevant information on a topic and to acquire information from sources such as scientific articles and summarize this

Ability to use referrals and references in the text and in the reference list

Ability to put the information in a context and to discuss and consider the problem in relation to other relevant factors

All students of each group are evaluated equally on the basis of the joint assignment

The assignment is approved only after it is delivered back in the revised form. This requires that the audit complies with the guidelines that are given to each student group

### **Examination:**

Home Exam: Submission of a written work within 4 weeks after the lessons end. (VILTRE07)  
Grade: Pass

Lack of submission within the given deadline without documented and valid reason (medical certificate), causes the grade: Fail.

If the assignment is not passed, or exams not taken due to legitimate absence or as a result of student exchange, it is given a new assignment at the beginning of the fall semester. Deadline: 6 weeks. If the assignment is not submitted and approved within the deadline, the last attempt will be at the next scheduled exam the following year (3 attempts in the discipline in accordance with the regulations).

### **Contact**

Block Leader: Morten Tryland

Head of Department: Per Einar Granum, MatInf

## **Pathology (15 ECTS Credits)**

(Including infection diagnosis)

**Semester: 8**

### **Aim and learning outcomes**

Pathology will provide students with sufficient knowledge of disease development (pathogenesis), pathological-anatomical and histopathological changes of the most commonly occurring disease states, and of serious infectious diseases (Group A and B diseases) in production animals, horses and family animals in Norway.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: **1.2, 1.3, 1.4, 1.6, 1.8, 1.10, 1.11, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 3.1, 3.2, 3.5, 3.6, 3.15, 3.16, 3.17, 3.20**

After completing the course in pathology, the student should:

- Be able to understand and explain the basis for disease development (pathogenesis) and could explain the macroscopic and microscopic changes in commonly occurring (infectious and non-infectious), and serious infectious diseases (Group A and B diseases) in production animals, horses and family animals in Norway. This applies to:
  - Nutrition disorders
  - Production Diseases
  - Poisonings
  - Neoplasia
  - The most common congenital disorders
  - Virus Infections
  - Bacterial infections
  - Fungal infections
  - Parasitic Diseases
  - Prion diseases

- Have good hygiene regarding the handling / autopsy / investigation of potentially infectious material.
- Be able to conduct independent autopsies of domestic animals and describe the autopsy findings for important diseases in domestic animals.
- Observe and describe the basic microscopic changes and be able to make morphological (pathoanatomical) diagnoses based on macroscopic and microscopic descriptions of the most important diseases.
- Be able to recognize changes in organs and tissues in production animals in relation to food hygiene (meat inspection).
- Be able to retrieve samples for histological, bacteriological and parasite survey, know how to handle and ship, and when appropriate diagnostic laboratory should be contacted before sending out samples.
- Be able to assess the pathoanatomical diagnoses in relation to the clinical diagnoses and specify possible cause of death.
- Know their own limitations and know when it is right to bring in expertise, advices from laboratories or management.

**Content:**

- Special Pathology
- Pathophysiology
- Autopsy

**Teaching methods and approach:**

In special pathology the individual organ systems' disease processes, their causes, development and appearance are emphasized. In pathophysiology the physiologic changes that occur as a result of disease, and how this manifests itself in the sick and dead animal is emphasized.

Instruction is provided in the form of 18 lectures spread throughout the semester and continues with lectures given on the 7th semester. In connection to this there will be given demonstrations of slaughterhouse material. There will be offered daily throughout the semester, demonstration of cases from the clinics. Each group of students has two weeks of autopsy in the mix rotation. It will, through collaboration with infection diagnostics be a plan for further diagnosis of the autopsy material. There will also be an arrangement of self-study with journals.

**Teaching Materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Recommended previous knowledge**

Blocks earlier in the programme

## **Requirements for personal equipment**

None

## **HMS**

There are separate infection locks by the entrance to the section of pathology. Overalls, gloves and boots are available by the infection locks. At the section hall, HMS training is divided in 2 parts. First a briefing with HMS rules that the students must read and sign. This is supplemented with information and pictures illustrating the procedures. The second part consists of information at the audience on how to implement infection control practices.

## **Rotation Pathology:**

At the section hall, HMS training is divided in 2 parts. First a briefing with HMS rules that the students must read and sign. This is supplemented with information and pictures illustrating the procedures. The second part consists of information at the audience on how to implement infection control practices.

## **Compulsory teaching and programme requirements:**

All autopsy work and work with journals is obligatory. In the case of absence, students must contact the person who is responsible for the exam and arrange when the work can be carried later in the semester in the following year. Students will normally be allowed to take the exam even if they have not completed the course work. However, grades will be held back until the course work has been completed.

## **Examination**

### **Test Examination**

The test exam (both partial examination 1 and 2) will be held before Easter. The test exam is voluntary, but students are encouraged to participate. Selected tasks will be discussed in plenary, after an assessment of the voluntary submitted assignments.

### **Examination**

Examination: (PATOLO06)

Examination support material: None

### ***Partial examination 1:***

Practical Exam– Macro and micro images

The class will be divided into two groups.

Macro part will be held in an auditorium. Slides of macro preparations will be displayed on canvas in a PowerPoint file. A total of 30 images with automatic change of image after 3 minutes - total time spent 90 minutes. For each image there will be 2 questions.

Micro part is held in at a different localization. Students will be given a task set of 10 tasks consisting of color photographs of histological sections. For each task, there will be 2 questions. Total time: 60 minutes.

### ***Partial examination 2:***

Written exam of 5 hours

There will be a total of 60 tasks with approx. half multiple choice assignments and half short answer assignments.

Evaluation: Scaled grades

$\frac{(K_1 + K_2)}{2}$ ,  $K_1$  and  $K_2$  is the grades per part converted to numeric value A= 5, B=4 etc.

### **Responsible**

Block Leader: Arild Espenes

Responsible for the written exam: Gjermund Gunnes

Responsible for practical/oral: Randi Sørby

Head of Department: Mona Aleksandersen

## **Aquatic animal medicine and fish health (6 ECTS Credits)**

**Semester: 8**

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.5, 3.6, 3.10, 3.14, 3.18, 3.19, 3.20,

### **Aim and learning outcomes**

Aquatic Animal Medicine is a field of study that primarily deals with diseases in aquaculture with emphasis on salmon farming. Knowledge in Aquatic Animal Medicine is essential to be able to make rational choices in the diagnosis, treatment, control and prevention of diseases in aquaculture.

After completing the course the student should:

Have knowledge of the farming industry's structure, principally in the production cycle and the most important diseases of farmed fish

- Have basic knowledge of the life cycle of Atlantic salmon, rainbow trout and cod in fish farming.
- Have knowledge of infectious and production-related diseases in the different phases of the production cycle, with emphasis on issues related to the introduction of agents (pathogens), host factors and environmental conditions.
- Have knowledge of principles of disease prevention, including infection containment and vaccination under farming conditions.
- Be able to diagnose various diseases in farmed and wild fish based on histological preparations, provide a general description of pathological changes and indicate possible differential diagnoses.
- Know general characteristics of the cultivation and disease in wild fish (salmon), and interactions between wild and farmed fish.
- Be able to conduct autopsies and know how samples should be taken for submission to a diagnostic laboratory.
- Conduct surveys of fish parasite.

- Be able to treat diseases in farmed fish.
- Understand the legislation concerning the welfare of fish and understand that good health is an important indicator of welfare.

**Content:**

- Aquatic Animal Medicine
- Fish diseases with emphasis on disease in farmed fish
- Fish Biology
- Fish Histopathology
- Fish Pharmacology and Treatment

**Teaching methods and approach:**

The teaching will focus on relevant species, their natural living conditions and extend as well as an introduction to modern fish farming. The teaching in fish farming discusses the diseases that affect them.

Teaching is spread throughout 8th semester. Introductory instruction is given in the form of lectures, group rotation instruction in the mixed block in form of courses in fish histopathology and group projects with plenary discussion. In addition, there is organized a field trip to Sandnes with visits to fish farms along with local fish health veterinarians. Treatment of fish is taught at the end of the semester.

**Teaching Materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

**Recommended previous knowledge**

Block earlier in the program. Fish have been taught previously in all relevant contexts.

**Requirements for personal equipment**

Lab coat, warm clothes in the field course

**HMS**

Field course:

Marine Harvest's procedures for employees are followed. It is mandatory with lifejackets when the students are on board the boat or out at sea sites. In addition, students are required to abide by the messages given, either from the instructor, skipper of the boat, or the operator of the facilities. There are special safety procedures on board the boats and limitations in passenger numbers. In all plants and in most of the boats there are first aid kits available that we can use in case of cuts, etc. There is very little or absence of zoonotic potential in the autopsy material we have access to. Upon visit to the slaughterhouse, all will be equipped with overwrap suits and shoes for the sake of product quality and safety.

**Compulsory teaching and programme requirements:**

Group instruction in pathological diagnosis in fish

It is agreed with the field course instructor how the course can be taken again later in the semester in case of absence, possibly next year.

On the last day of the initial lecturing week it will be distributed group tasks that will be presented in plenary in the group rotation instruction in the mixed block (all students in the group must participate in the presentation).

Field course in Hjelmeland

This must be taken again next year (or similar programmes) that the students must provide themselves and in consultation with the course coordinator.

Students will normally be able to take the exam even though not all mandatory training is approved, but the grade will not be valid until the study requirements are passed.

### **Examination**

4 hour written final exam (AKVFIS06)

Examination support material: None

Grading scale: A-F

### **Contact**

Block Leader: Øystein Evensen

Head of Department: Mona Aleksandersen

## **The 9th semester**

The semester begins with an insemination course the week before the start of semester.

The 9th semester starts with 4 days of teaching in state veterinary medicine and 1 day bird medicine, exotic and rodents. Then the year group is divided into 3 groups and they rotate between mixed clinical rotation, production animal clinical science and small animal medicine and equine medicine.

### **Mixed clinical block rotation consists of:**

- Food and meat inspection (1 week) (practical examination)
- State veterinary medicine (1 week)
- Epidemiology (1 week) (as of year group2004)

The course ends in week 46. Autumn candidates have one exam in production animal clinical science and two partial exams in small animal medicine and equine medicine.

Semester responsible: Carl Fredrik Ihler

## **Food and meat inspection (3 ECTS Credits)**

**Semester: 9**

### **Aim and learning outcomes**

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 3.2, 3.3, 3.5, 3.6, 3.8, 3.13, 3.14, 3.17, 3.20

After completing the course the student should:

Be able to perform ante-and post-mortem inspection of production animals and identify factors that affect food safety, animal health, animal welfare and quality of products derived from animals.

The student should:

- Be able to carry out ante and post-mortem inspections.
- Be able to make relevant technical evaluations in terms of meat inspection rating of the slaughter.
- Be able to perform simple assessment of slaughter hygiene.
- Be able to perform simple assessment of animal welfare in slaughterhouses.
- Have theoretical knowledge on the assessment of slaughterhouses and other food industry's Hazard Analysis Critical Control Point (HACCP) system.
- Have theoretical knowledge of inspection / auditing of food businesses.

**Content:**

- Food and meat inspection

**Teaching methods and approach:**

All students will travel to Sandnes in the mixed clinical rotation, which includes 1 week in Sandnes. To attend classes, students must have completed a field trip to the slaughterhouse in 6th semester. **(Students meet at Highland, the Sunday before the rotation week in Sandnes.)**

**Meat Inspection:**

Teaching is carried out in the slaughterhouse, and students get, through practical work and group instruction, an introduction to animal welfare during transport, housing, driving, anesthesia and euthanasia. Veterinary tasks such as ante-mortem inspection and post-mortem inspection (assessment of slaughter) have a special focus. Knowledge of slaughter hygiene, animal welfare at slaughterhouses, inspection and auditing of slaughterhouse and extraction of samples in connection with monitoring programs are also included in the curriculum.

**Food Inspection:**

The main focus will be on work at the FSA. This includes risk-based supervision, supervision philosophy, holistic thinking, the Food Safety Act and the administration of this Act, inspection and audit, client's internal control, import and export. Based on the common theoretical introduction at NVH, students participate in groups on practical inspections and audits together with the staff from the Food Safety Authority's regional office in Sandnes.

**Teaching materials and learning objectives:**

Relevant legislations and regulations (See the block's home area on Hippocampus).

**Recommended previous knowledge**

Blocks earlier in the programme

**Requirements for personal equipment**

Lab coats, boots and helmets are handed out in slaughterhouses.

**Compulsory teaching and programme requirements:**

The course week in Midt-Rogaland is mandatory. Students must contact the examination coordinator unless the course can be completed on the scheduled week. An assessment of the course can be completed later in the fall or the year after. In the week it is allowed with up to one day's absence. If the student has more than one day's absence, the whole week must be re-taken at a later time.

**HMS**

On the first day at the slaughterhouse, the students get general information about safety, fire and knife use. Emphasis will be placed on getting the students into an environment where many people are working in a relatively small area, with fast movements, sharp knives, boiling water, etc. Students will stay close to the facilitator and follow direct orders about where to roam.

In the practice period of meat inspection, students are always together with an educator who knows the facility well. Every morning at the various facilities, the students get a brief refresher on the use of protective equipment and an introduction to fire safety / evacuation routes. When knife use is relevant, an educator will display in practice how the knife use shall be carried out, sheath use and washing. The knife should not be used for pointing, only for sectioning. The hand not holding the knife should be kept well away from the blade leading hand.

**Examination**

Practical/oral examination in food and meat inspection

The examination will be conducted in the premises of Fatland Jæren A/S, Friday in rotation week.

*Meat Inspection:*

Students will perform post-mortem examination of at least two slaughter and will be examined in relation to this.

*Theoretical examination:*

After completing the post-mortem examination, the student will be examined in relation to the learning outcome's descriptions.

To pass the examination must both parts be assessed as passed. If the student fails, both parts must be re-taken in Sandnes. Date will be arranged individually. It will be offered internship at the forefront in connection with this. Fail examination will not affect the clinical examinations in the autumn.

Examination support material: None

Grading scale: A-F

**Contact**

Examination coordinator: Truls Nesbakken

Contact person Sandnes: Guro Myrene  
 Head of Department: Per Einar Granum, MatInf

## **State veterinary medicine (3 weeks, 4.5 ECTS Credits)**

### **Aim and learning outcomes**

State veterinary medicine will provide students with basic knowledge and understanding of the regulations that are necessary to exercise the veterinary profession in a legally sound manner.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 1.12, 2.3, 2.6, 2.7, 2.8, 2.9, 3.15

After completing the course the student should:

- Be able to describe the main features and use regulations pertaining to
  - animal welfare
  - control of infectious animal diseases, both in land animals and fish
  - importation and exportation of animals and infectious objects
  - veterinary medicine and professional liability
- Have insight into how the FSA administer the Animal Welfare Act, Food Safety Act and the Act Relating to Animal Health Personnel through the rules of case procedure and principles of the Administration Act and Freedom of Information Act.
- Know the law of sales' usage when buying and selling animals.
- Know the veterinarian's duties in the legal system and the penal procedure.
- Be able to manage / deal with a complaint / compensation from a customer and be able to fill out veterinary certificates and declarations in a proper way / in accordance with the regulations.
- Be able to prepare and carry out inspections in animal husbandry.
- Show an attitude and behavior that shows respect for animals based on their uniqueness and intrinsic value.
- Display an attitude and behavior in their professional practice that do not undermine confidence in the professional group.
- Develop a thesis relevant to the differentiation direction.

### **Content:**

- Law and Forensic Medicine
- Public Administration

**State Veterinary Medicine in relation to previous and future courses:**

6th semester, animal welfare: Introduction on regulatory importance and animal protection/animal welfare.

9th semester: 1 week of lectures where all relevant regulations for veterinary medicine is presented.

9th semester, mixed clinical rotation: practical application of the legislation through assignments in disease control (1 day) and 3 days deployment at the FSA.

10th semester: 1 week is set aside for independent work on a written assignment in state veterinary medicine. The assignment is a part of the oral exam the same semester.

ProdMat specialization: 1 week of the course in veterinary public health is allocated for administrative law and practical task with animal protection issues and combating diseases.

Equine specialization: Further education about doping of horses and regulations.

Courses in management and clinical operation: Further education about the Veterinary Medicine Legal Advice.

### **Teaching methods and approach:**

The teaching includes legislation of relevance to veterinary medicine, with particular emphasis on the Act Relating to Animal Health Personnel, the Food Safety Act and the Animal Welfare Act, and regulations issued pursuant to these laws. Particular emphasis is placed on rules for combating infectious animal diseases, import and export of animals and veterinary's role in relation to the animal welfare regulations. Rules of case processing and principles of public administration and public law are affected too. The teaching also includes the Rules of Procedure, business as a specialist, provisions concerning trade in animals related to the purchasing laws and veterinary professional responsibility and legal liability in connection with the claim for compensation. The teaching is divided between 9th semesters and 1st differentiation semester (1 week mandatory part of this). In 9th semester there are given four days of lectures in state veterinary medicine (17 hours) and one week internship at the FSA. The first day of this week, students work with a group assignment with regulations associated with combating diseases and animal welfare, as an extension of the thesis the students have the week before with disease control. In the first differentiation semester the student works under guidance with a thesis related to the differentiation direction. It will be held an oral exam during the last study week of the first differentiation semester.

### **Learning Materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Recommended previous knowledge**

Blocks earlier in the programme

### **Requirements for personal equipment**

None

### **HMS**

No specific procedures for this block.

### **Compulsory teaching and programme requirements:**

An internship in Food Safety Authority is mandatory. It can be agreed with the examination coordinator how this may be re-taken later in the semester, or the next year.

The thesis in the differentiating year must be submitted within the prescribed time limit in order to take the exam.

## Examination

**Programme requirements:** Passed individual home examination.

**Oral examination:** Students come up in groups of maximum 8 per day. Individual examination of approx. ½ hour (OFFVET07) carried out. The students are questioned about both the assignment and the curriculum from 9<sup>th</sup> semester.

Examination support material: None

Grading scale: A-F

## Contact

Examination coordinator: Marit Nesje

Head of Department: Olav Reksen, Prodmed

## Professional Ethics

### Learning outcomes

**After completing the course the student should:**

- Know what it means to be a “professional athlete”. Know both the social mandate veterinarians are set to manage **and** that those who are vets share a common set of values that form the basis for the practice of the subject.
- Know and use the professional ethical guidelines in reflections on their practical work.
- Have a moral awareness and develop moral judgment that the student may benefit from in the conduct of their profession.
- Use tools they can use to reflect ethically in specific situations.

### Educational programme:

3 hour joint lecture for the entire year group

The purpose is to give students an introduction to the subject.

Teaching in groups (the practice groups), 3 hours times 2.

Instruction will be based on the principles of a study model called Problem-based learning.

Problem-based learning is characterized by the fact that teaching is based on specific problems or situations. Students are encouraged to ponder whether the problem reminds them of situations or problems they are familiar with from before. By examining the issue in light of the students' previous experiences and new knowledge they have acquired, the students, together with the teacher, should discuss specific ways to understand or solve the problem.

Key principles are to work in small groups and that the problems are authentic.

The reason why this model is selected, firstly, that it represents a good way to learn. It gives students the opportunity to work actively with the material and make connections between experiences they have already made themselves and new knowledge. Another reason for choosing this model is that it has much in common with the way it will be natural for students to reflect on ethical issues in their upcoming professional life. Learning adds in this way a foundation for good habits and patterns that can be easily retrieved. Groups are also similar to work jointly students can later become a part of.

### Assessment:

After the first three hours of group lectures, students will be assigned a professional ethical problem they will discuss and present a reflection on in the last three hours. Students can work in pairs and present the problem for the rest of the group, followed by discussion in plenum about the presentation. In this way, the evaluation also becomes a type of learning.

#### **Literature:**

Literature should be generally about professional ethics and professional ethical problems. This material can be taken from one or more suitable textbooks that are not necessarily related directly to the veterinary profession. There will also be some literature that is more specifically related to Veterinarians professional practice. Relevant scientific articles will also be used. In addition, DNV's professional ethical guidelines will also be part of the curriculum.

#### **Introductory lecture -3 hours**

*Why do you want to be veterinarians? Values and motives that characterize the study and the professional practice*

When I began the veterinary studies, we were interviewed by the “Hippie Tiden” about why we wanted to be veterinarians. I will present some of the answers to the students. Prior to the lecture, I will also ask the students to send me two lines about how they would answer the same question today. I will also ask some of my fellow students to answer why they are still working as veterinarians. The point is to make students aware that most of them probably have reflected ethically on their future profession, ever since they began studying and that to a greater or lesser degree this is something they always do. They bring, in other words a lot of experience and reflection into the teaching. As we will later discuss specific issues, it is important that they are aware of this.

I also want to highlight the values and motives that are dominant and show what happens to those during the study period and over a relatively long profession. Are there any values and motives that are stable all the way? Are there any values and motives that become less clear after a while and if so, why? Is this positive or negative? Are there any values and motives that arise during the program / profession?

#### **What makes the veterinary profession into a profession? What is professional ethics?**

The veterinary profession as **a profession**. Brief description of the characteristics of a profession and of the veterinary profession's history. It may be helpful to look at the development of a pure man profession to gradually a rather female dominated profession, and at the development in terms of what kind of tasks veterinarians are working with. What impact has the development had for veterinarians' views on their own profession, and also the society's views on the profession?

The veterinarian as **a helper**. The word profession comes from the Latin word *professio* which means: I declare myself willing to help. Professional Performers are understood as a resource and a help, both to individuals (people and animals) and to society. In other words, it is not the professional's own interests, but the interests of the people one are helping that should govern the practice.

Veterinarians' **social mandate**. Veterinarians' practices are intended to also realize benefits beyond the specific practice exercise. That people are confident that they will receive help if their animals become sick or injured, and that the food we eat is safe, is considered as the basic goods of society.

Professional **autonomy**. The veterinary profession possesses a special knowledge that allows it to be given the authority to assess the quality of their work and to define what constitutes

the professional and ethical boundaries in both meetings with individual patients and in relation to the demands of society. Such authority is based on society's confidence in that the profession takes the work to ensure the quality of work seriously.

Veterinary profession as **a normative practice**. The characteristics mentioned above, make the veterinary profession into a normative practice and not just a profession of a craft. It instructs profession practitioners with ethical obligations. Veterinarians must not only consider what is the appropriate treatment or the right action in a specific situation. They must also consider the consequences of their activities. Such assessments can often be difficult. It is not always a good and a bad way of doing something.

Do veterinarians need their own ethics, or is it enough with good manners?

The veterinarian as **an administrator of the specialized knowledge**. As professionals, vets may do things others cannot afford to do. They can, for example, give medication to other people's animals. They may also determine whether a business has to be closed. Such actions and decisions would be completely unacceptable if they were made by people who did not have a veterinary medical education. Patients or clients are also at the mercy of veterinarian reviews and must assume that the support they receive is relevant. Veterinarians need therefore an ethic that goes beyond general ethical boundaries.

Important to problematize the responsibility and power that lies in the expert role, in having a monopoly on managing knowledge.

The veterinarian as **an administrator of major social resources**. Veterinarians make decisions that have consequences for both animal and human welfare.

Veterinarians authority and autonomy of the profession is challenged by market thinking, the increased level of knowledge of the population and competition from other professions.

Veterinarians work under pressure from **many stakeholders**. Having a mandate from the community while also being committed to the individual patient or client may in some cases be problematic (eg conflict between the interests of animal welfare and economic interests). How awareness of ethical values can be of help to oppose the irresponsible demands from the client's side.

Veterinary activities are often also **a business**. Many veterinarians are private practitioners. They are not only the good helpers, but also need to make money. It is not in itself morally reprehensible to be concerned with good income and a successful career, but ethics can be helpful to avoid unaccountable private interests?

### Professional Ethical Guidelines

This concerns ethical requirements and obligations relating to a specific type of profession. Professional Ethical Guidelines will help the individual practitioner to have the ideal purpose of the practice in mind. The guidelines have three main perspectives:

- One is related to that which is the profession's **social task**.
- The second is rooted in **the relationship between the profession practitioner and the individual patient or client**.
- The third is intended to regulate **relations among the profession practitioners**.

The professional ethical guidelines are practically oriented and have good results as its objective. The guidelines are important both because they provide guidelines for what constitutes good professional help, thus helping to ensure the customer service quality, and as a source to the professional's understanding of their professional and moral identity. Used

indiscriminately, they can however be too instrumental and general. They provide little action guidance in specific situations.

I will go through parts of the veterinary association's ethical guidelines and associate them with the values and motives we talked about initially.

### **Follow Up lecture – 3 hours x 2**

The main theme here will be practical professional ethical problems. The problems will be taken from the veterinary medicinal legal advice, DNV and from problems that students or teachers have experienced in the clinic. If students have good professional ethical issues they wish to discuss, these will be raised. There is much to learn by reflecting on own experiences. It is vital that the problems primarily revolve around professional ethics and not animal ethics - although animal ethics in many situations will be part of a professional ethical issue, this instruction will focus on professional ethics. Students will gain insight into two types of ethical theory. The first is about how we can work to train our moral judgment. The second presents a possible tool for practical reflection on ethical issues.

**Discernment Ethics** is not primarily action-oriented, but adds weight on the person behind the action. The point here is that students will be aware of how the ability to assess a situation in a positive way is related to the individual's characteristics and attitudes. Moral judgment is not something that is innate, but something that is formed through learning and that such learning happens best in community with others. The importance of learning from our own and others' experiences and to be able to rely on your judgment will also be emphasized.

**Casuistic** is a way to reflect ethically, and is close to the general human and intuitive way we often reflect on moral issues. What we do when we find ourselves in a difficult situation, is to think what we did then, and how it worked. The casuistic focuses precisely on solving specific problems through looking at old cases that are recognized as acceptable or good solutions. Such solutions are often called role models, examples, standards or scales of what is considered as appropriate behavior or attitude. Widely used within the legal system. The importance of good examples - not as an illustration of what is the right thing to do, but as a moral scale for how we should be or act. By studying practical situations or examples and compare them with situations we've been in before, we can become aware of what values or interests that are at stake in a situation.

Contact: Cathrine Grimsgård (external lecturer)

## **Epidemiology** (1 week, 1.5 ECTS Credits)

### **Aim and learning outcomes**

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.5, 3.7, 3.8, 3.14, 3.18, 3.19, 3.20

After completing the course the student should:

Have knowledge and skills in the use of quantitative epidemiological methods to detect, monitor and combat infectious diseases in a population.

- Understand how infectious animal diseases and zoonoses spread in populations and could simulate the path of an infectious disease in simple simulation models.
- Recognize the importance of zero access of exotic diseases and to propose appropriate measures to prevent such diseases.
- Be able to find information online about both diseases and the relevant epidemiological tool for assessing sample sizes, diagnostic test characteristics etc.

### **Content**

- Basal epidemiological principles and methods.
- Simulation of epidemics.
- Case Assignment: Surveillance and control of a contagious infectious disease.

### **Teaching methods and approach**

Problem-based learning with the following pattern:

- Day 1: Tasks related to basic epidemiology with a review the same day.
- Day 2: Infection Epidemiology. Simulation of progresses under various conditions.
- Day 3-5: Working with an assigned group task - one per five students. The supervisor is the whole time available when needed.
- Day 5: Presentation and discussion of the task. After lunch.

### **Learning Materials**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Recommended previous knowledge**

Blocks earlier in the programme. Especially we recommend a repetition of material taught in statistics and epidemiology in the PopMed-block.

### **Requirements for personal equipment**

Each group of 5 students should have access to a computer, preferably a laptop.  
All: Calculator with basic statistics function.

### **HMS**

No specific procedures for this block

### **Compulsory teaching and programme requirements**

Presence all week, active participation in the group work including presentation and discussion Friday and the following Monday.

### **Examination**

Presentation of the group's task. Approval requires that the solution of the task and presentation gives a proper discussion of all relevant sub-questions and proposes and justifies appropriate measures for that particular case.

### **Contact**

Block Leader: Rolf Bjerke Larssen, EPI-Center  
Head of Department: Olav Reksen, Prodmed

# **Production Animal Clinical Science, Equine Medicine and Small Animal Medicine**

## **Aim and Learning Outcomes**

Provide students with theoretical knowledge and clinical skills in disease development, diagnosis, treatment and preventive health care in production animals, horses and small animals.

The block forms the basis so that the student after completing the course will master the following «Day One Skills» by EAEEVE: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.17, 3.18, 3.19, 3.20

After completing the course the student should:

- Show respect for animals and humans and have an understanding of owners' relationships with the animals.
- Be familiar with animals' welfare needs.
- Emphasize economic considerations.
- Work independently.
- Communicate and collaborate with animal owners and colleagues and other professionals.
- Gather and assess expert information.
- Know their professional limitations and seek help when needed.
- Render knowledge of important diseases, diagnostic tools and treatment methods in common species.
- Adopt anamnesis and obtain relevant information about the livestock.
- Handle animals in a safe manner.
- Perform clinical examination and evaluate findings.
- Take out relevant tests and interpret test results.
- Set up a relevant list of differential diagnoses and diagnostic.
- Assess prognosis.

- Carry out or suggest treatment.
- Provide emergency assistance, including obstetrics.
- Assess the need for and apply principles of livestock diagnostics.
- Suggest preventive measures in production animal herds.
- Write detailed journals, reports and certificates that meet applicable regulations.
- Implement practical hygiene measures and infection prevention.
- Be aware of the importance of food safety in the food chain.
- Prevent zoonoses.

## **Pathophysiology**

### **Interdisciplinary case reviews based on Pathophysiology:**

During 8th and 9th semester it will be presented 8 different cases of 90 minutes from central organ systems such as the nervous system, endocrinology, cardiovascular circulation, respiration, kidney / urinary tract, gastrointestinal, liver and reproduction. Various professionals will present the relevant cases from their respective field. Pathophysiology will be central, and in addition to a clinician and a physiologist it may, depending on the type of case, also be appropriate to have a presentation from a pathologist, clinical pathologist, immunologist, pharmacology, etc. There will be plenty of time for questions and discussion among all those present. The reviews will be open to all students and staff, but aimed at students in 8th and 9th semester.

Block Leader: Karin Zimmer

Head of Department: Mona Aleksandersen

## **Small animal medicine and equine medicine (9 weeks + reading weeks, 16.5 ECTS Credits)**

### **Content:**

- Anesthesia and Radiology
- Small Animal Medicine
  - Internal Medicine
  - Obstetrics/disease in newborn animals
  - Surgery
  - Outpatient clinic
- Equine Medicine
  - Internal Medicine
  - Surgery
  - Foal Diseases (including neonatal disorders)

### **Teaching methods and approach:**

Teaching takes place in small groups in rotations in the clinics at the Division for Small Animal Diseases and the Division for Equine Diseases in 8th and 9th semesters (5 weeks in

8th semester and 4 weeks in 9th semester per student). Students are a total of 2 weeks at the surgical clinic for small animals (1 +1), 2 weeks at the medical clinic for small animals (1 +1), two weeks at the outpatient clinic for small animals (1 +1) and 3 weeks at the horse clinic (2 +1).

### **Small Animal Medicine**

The field includes internal medicine and surgical diseases in small animals, mainly dogs and cats, but also rabbits, rodents and cage birds that are kept as pets. Overview lectures on disease development, diagnosis and treatment are given. Students rotate at the medical and the surgical clinic at the outpatient clinic. Students make independent clinical examinations of patients under the supervision of a veterinarian. Instruction in clinical laboratory techniques and diagnostics is also given. In addition to the purely medical disciplines, an introduction to preventive health care, environmental issues, management, owner's behavior and communication and ethics is also given. As far as is practically possible, the castration of tomcats and ovarian hysterectomy of female cats will be offered. Radiology teaching is an integral part of the rotation. There is a theme day on bird and rodent medicine in the first week of the 9th semester. Students will also have 1-3 evening shifts / night shifts per clinical week. This will include weekends and red letter days. Shift rotations are set up by the education coordinator.

### **Equine Medicine**

The field includes internal medicine and surgical diseases in horses, as well as foal diseases. Radiology is an integral part of the rotation. Students make independent clinical examinations of patients under the supervision of a veterinarian.

### **Propaedeutic Course and Introduction to Diagnostic Work and Pathology**

See 6th and 7th semester. Themes from this teaching will also be examined at the clinical examination in 9th semester.

### **Learning Materials:**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Recommended previous knowledge**

Blocks earlier in the program

At the examination in 9th semester themes from the entire veterinary curriculum may be examined to the extent it is relevant to the issue / case which is examined.

### **Requirements for personal equipment**

Work clothes, protective footwear, stethoscope and scissors.

### **Compulsory teaching and programme requirements:**

Courses and clinical service is mandatory. Weekend and night shifts are also mandatory.

### **Absence:**

A maximum of one day of valid and documented absence per week is allowed. It is not possible to accumulate days. Valid absences beyond this must be re-taken in accordance with the Head of Section's instructions.

The reason for the above is that the rotations provide the skill training which is necessary for professional practice. In case of absence beyond what is accepted, the number of missing days must be re-taken, following rules found in this document, "Clinical Rotation 8th and 9 semester, information and form " of the quality system. Students will not be able to take the clinical exam until the missing time/days are re-taken.

### **Examination**

**Programme requirements:** Students must pass each clinical period and ensure that documentation is completed. Regulations and forms are found in the document: "Clinical Validation 8th and 9th semester". **To pass the clinical period, the student must have been sufficiently present and have shown that they possess widely acceptable professional and ethical standards.** The form is handed out on the last day of the rotation. Students who have not passed the clinical period will not be allowed to take the exam.

### **HMS**

A first aid kit is available. Fire Training is provided in the clinics. Students are encouraged to wear gloves when handling medications and other risk materials, allergens and when handling animals suspected of being infected by a zoonosis.

### Rotation Horse Clinic

See the "Rules for handling large production animals and horses at NVH" and "Basic rules regarding handling of animals" (see Hippocampus).

Introduction to clinic routines are discussed orally. Students must acknowledge that they have received this training.

### Rotation Small Animal Clinic

The greatest health risk is bite wounds by animals. Handling and the use of muzzle bands in risk situations are emphasized. Students use gloves when handling medications and when required.

### Radiology

In the theoretical radiology review in 6th semester, risks and protection are reviewed. In the practical lessons as from 8th semester, students are shown in practice how to protect themselves. Students must follow the rules below. There is a separate Radiation Protection Manager at the department.

- Using lead-coat and thyroid protection when the student assists in the X-ray room.
- Female owners / students who are pregnant or suspect pregnancy, shall not participate in taking pictures.
- Owners younger than 18 should not assist.
- There shall not be unnecessary people inside the X-ray room when exposed.
- The use of sedation / restraints to reduce the number of images and to reduce the risk of injuries may be used on troubled patients.

**Practical / oral examination in Small Animal Medicine and Equine Medicine:** Students are automatically registered for the exam in the Small Animal Medicine and Equine Medicine. There is one partial examination in Small Animal diseases and one partial examination in horse diseases. Both parts must be passed in order to pass the subject.

Examination is held on 2 different days for each student with a clinical test on one of the partial examinations (either in the field of small animal medicine or the field of equine

medicine) and an oral examination in the second field. Lots are drawn to decide this at the beginning of the examination period by the SFA.

Re-sit examination:

Students must only re-sit the failed partial examination. There will be no new drawing of lots, ie if one fails on the clinical test; one gets a new clinical examination.

### **Contact**

Block Leader, Small Animal Medicine: Anna Eggertsdottir

Course Coordinator, Equine Medicine: Carl Fredrik Ihler

Course Coordinator, Radiology: Magnus Rørvik

Head of Department: Ann Margaret Grøndahl

Head of Section, Small Animal Medicine: Anna Eggertsdottir

## **Production animal clinical sciences (9 weeks + reading period, 16.5 ECTS Credits)**

### **Content:**

- Medical disorders in production animals.
- Surgical diseases in production animals.
- Obstetric disorders, puerperium disorders and diseases in new born animals in production animals.
- Reproduction in production animals, dogs, cats and horses.
- Obstetrics in horses.
- Ambulatory activities on production animals and horses.
- Livestock Medicine on production animals.
- Poultry Medicine.
- Field work in Sandnes in sheep diseases and livestock medicine.

### **Teaching methods and approach:**

The teaching is given as lectures in poultry during the first week of the 8th semester, Rotation Teaching in small groups at ProdMed's clinics and ambulatory activity in 8th and 9th semester (4 weeks + reading week in 8th semester and 4 weeks in the 9th semester per student). Field work in Sandnes in sheep diseases and livestock medicine in 8th semester (1 week). Weekend and night shifts at ProdMed's clinics and ambulatory services.

### **Medicine/Surgery/Obstetrics Clinic**

Instruction provided on the Medical clinic includes internal medicine, surgical and obstetric disorders in cattle, sheep and pigs. Puerperium diseases, newborn animal diseases and udder diseases are also included. Each student is a total of 3 weeks at this clinic (2 +1 in respectively 8th and 9th semester). Students have to help in the clinics, where they will be given patients who they will examine and treat, and under guidance they will even perform surgeries on animals. It will, as far as practicable implement, also be offered caesarean section on ewe. Students will be extracted from the other rotations.

### **Reproduction Clinic**

Teaching includes reproductive physiology, gynecology, andrology, reproductive endocrinology. Instruction is provided partly at the department's stationary clinics and partly on livestock visits. Each student is a total of 2 weeks at this clinic (1 +1 in respectively 8th

and 9th semester). In this clinic, the reproduction of horses, dogs and cats, in addition to cows, sheep and pigs, will be covered.

### **Ambulatory Activity**

The ambulatory clinic serves livestock farms in Oslo, Bærum, Lørenskog, Skedsmo and Nittedal, as well as UMB's cowsheds. Students receive training in ambulatory practice under realistic conditions on production animals and horses. The course lasts for two weeks per student.

### **Livestock Medicine**

Teaching takes place in the form of livestock visits and working with tasks in connection with this. Teaching lasts for 1 week per student and takes place during the 8th semester.

### **Poultry Medicine**

Instruction is provided in the form of lectures and 1 day in livestock medicine. The autopsy in poultry in the mixed clinical rotation in 8th semester is mandatory. Students are responsible for making sure to contact the course coordinator so that it is possible to re-take this during the current semester. Otherwise, it must be retaken the next year. The student will not get a valid grade in this subject until the autopsy is taken.

### **Sheep Diseases and Livestock Medicine**

Teaching also takes place in the Sheep Section in 8th semester in Sandnes. In addition to teaching using the section's own livestock and pathological diagnosis of incoming material, lectures, seminars and livestock visits to sheep herds are also provided.

### **Propaedeutic Course and Introduction to Diagnostic Work and Pathology**

See 6th and 7th semester. Themes from this teaching will also be examined at the clinical examination in 9th semester.

### **Learning Materials:**

Recommended literature and detailed description of the course are found at the block's home area on Hippocampus.

### **Recommended previous knowledge**

Blocks earlier in the program

At the examination in the 9th semester, themes from the entire veterinary curriculum may be examined, to the extent that this is relevant to the issue / case which is being examined.

### **Requirements for personal equipment**

Work clothes, protective footwear, stethoscope and scissors.

### **Compulsory teaching and programme requirements:**

Poultry autopsy in the mixed clinical rotation: see the rules under poultry medicine.

### **Compulsory teaching and programme requirements:**

Courses and clinical service is mandatory. Weekend and night shifts are also mandatory.

### **HMS:**

**Quarantine:** Students may not have been abroad for the last 72 hours before the clinical teaching in production animal clinical science. See the "Rules for handling large production animals and horses at NVH" and "Basic rules regarding handling of animals" (see Hippocampus). A first aid kit is available. Fire Training is provided in the clinics. Students are encouraged to wear gloves when handling medications and other risk materials, allergens and when handling animals suspected of being infected by a zoonosis.

There are separate infection locks by the entrance to the clinics. Overalls, gloves and boots are available by the infection locks and at the visits to livestock. Investment in a new hoof box reduces the risk of injury. ProdMed strives to have groups no larger than six students when handling large animals.

**Stationary Clinic:** Clinic Procedures are discussed orally at the first visit (See Hippocampus). Production Animal Clinical Science has prepared a briefing on hygiene and safety regarding ProdMeds clinical activities. Excerpts from this are handed out.

**Reproduction:** Gloves are used when examining organs from slaughterhouses. Gloves are used in the examination of animals and one must change gloves for each animal. The Ambulatory clinic has created its own safety procedures (See Hippocampus). These are reviewed orally at the beginning of 8th semester.

The Section of Sheep Diseases have prepared a document on protection against the spreading of infection. Procedures for the various activities are posted on the wall in any room that students congregate. Students are not given permission to use the autopsy saw. Students are given thorough training in fire drill upon arrival and must sign that they know the escape routes in case of fire. Students who are pregnant must contact the section on arrival. They are given a customized program, so that the risk of coming into contact with dangerous material that could cause miscarriage, such as Listeria and Toxoplasmosis, is minimized.

### **Absence:**

A maximum of one day of valid and documented absences per week is allowed. It is not possible to accumulate days. Valid absences beyond this must be re-taken in accordance with the Head of Section's instructions. The reason is that this is skill training necessary for professional practice. In case of absence beyond what is accepted, the number of missing days must be re-taken, following rules found in this document, "Clinical Rotation 8th and 9 semester, information and form " of the quality system. Students will not be able to take the exam until the missing time in the clinics is re-taken.

### **Examination**

**Programme Requirements:** Students must pass each clinical period and ensure that documentation is completed. Regulations and forms are found in the document: "Clinical Validation 8th and 9th semester". To pass the clinical period, the student must have been sufficiently present and shown to possess widely acceptable professional and ethical standards. The form is handed out at the last day of the rotation. Students who have not passed the clinical period will not be allowed to take the exam.

**Practical / oral examination in Production Animal Clinical Science:** Clinical examination and oral theory examination (2 examination stations are used; candidates come up in clinic either in the field of medicine / surgery or reproductive physiology / obstetrics and a theory examination in the second field or in preventive health care / livestock medicine / poultry medicine). Students come up in groups of up to 8 and are examined individually. An overall

grade is given for the entire exam. If the average grade is not a whole grade, the grade in the clinical examination shall count most. A fail in the first part will cause the student to be disqualified from taking the second examination.

### **Contact**

Block Leader: Terje Fjeldaas

Course coordinator, Internal Medicine, Surgery and Obstetrics: Terje Fjeldaas

Course coordinator, Reproduction: Wenche Farstad, Knut Karlberg

Course coordinator, Ambulatory: Hans Petter Kjæstad

Course coordinator, Obstetrics: Olav Reksen

Course coordinator, Sheep Diseases and Livestock Medicine: Martha Ulvund

Course coordinator, Livestock Medicine on Production Animals: Olav Reksen

Course coordinator, Poultry Medicine: Tore Engen (pathology) and Randi Moe

Group Contact: Kirsten Bredeveien

Head of Department: Olav Reksen ProdMed

## **Clinical Examinations: autumn and spring candidates. Conditions for registration and further progression**

§ 7.12 and 7.14 of the Regulations deals with the practical / clinical exams § 7.14 authorizes that the special rules for continuing the programme must be stated in the curriculum. There will be no separate re-sit examinations for those practical / clinical exams that normally take place at 2 periods per year. Students who fail must wait until the next scheduled exam period (1/2 years).

Students who fail in both the clinical examinations (Production Animal Clinical Science and Small Animal Medicine and Equine Medicine) may not commence the differentiation year. This means that students who fail in the Production Animal Clinical Science examination + one of the partial examinations in Small Animal Medicine and Equine Medicine do not get to start the differentiating year

If the student has not passed one of the clinical examinations, the following applies:

- The student must have passed (partial) examinations in the subject area he/she has chosen as differentiation to proceed in the study.
- The student re-takes the failed exam the next time it is held, i.e. in about ½ year.
- There is a requirement for additional clinical training before the re-sit examination (§ 7.14)
- In Small Animal Medicine and Equine Medicine student must only re-take the failed partial examination. There will be no new drawing, ie if one fails in clinic one gets a new clinical examination. In Production Animal Clinical Science there will be a new drawing in case of repetition of an examination.

Study Committee set the extent of additional clinic service to 1-2 weeks at each of the two clinical departments - or spread over the semester. Candidates who have failed the clinical examination must contact the relevant course coordinator (Løken, Eggertsdottir, Ihler). The course coordinator notifies SFA when the candidate has received approval for additional clinical practice. Candidates participate in the re-drawing in Production Animal Clinical Science, and goes up to the re-sit examination on the date SFA sets.

## Guidelines for the distribution of autumn and spring graduates

Students may, within certain limits, choose whether they want to be autumn or spring graduates, i.e. take the clinical examinations in the 9th autumn semester and start right on the differentiation year, or take a "standby semester" in 10th semester and take the clinical examinations at the end of this semester and be spring candidates. The clinics have set a maximum limit of 40 examinees per semester, to make it practical to hold the clinical exams.

Students then can choose between two options:

1) "Autumn Candidates":

Clinical examinations after the common part are implemented in the 9th semester. The differentiation year is implemented in 10th and 11th semester.

2) "Spring Candidates":

Clinical examinations are implemented in 10th semester. The differentiation year is implemented in 11th and 12th semester.

These students have no regular teaching in 10th semester.

Students choose when they want to take their clinical examinations at the same time as they apply for admission to the differentiation they wish to follow i.e. in the latter part of 8th semester.

There can be a **maximum of 45 students in each option**. If there are more than 45 who choose one of the options, students are allocated according to the following guidelines:

Students have priority in the selection of examination semester in the following cases:

- Pregnancy / maternity leave during 9th and / or 10th semester
- Special social needs (e.g. specific care responsibilities, illness / death in the family, etc.)
- Other circumstances where weighty reasons indicate why the student should receive their primary choice.
- 

The issue of priority is determined by the Head of Studies after an individual evaluation.

When the question of priority cannot determine the distribution, a draw is conducted of the students who have requested a particular option that does not have places for everyone.

Students should be informed about the allocation within the end of the 8th semester.

## Differentiation year in the veterinary programme 60 ECTS Credits

### General information about the differentiation year:

The following number of students may be admitted to the 5 following differentiation directions:

- |                                      |           |                               |
|--------------------------------------|-----------|-------------------------------|
| - Small Animal Medicine              | 25 places | (Head of Department:          |
| SportFaMed)                          |           |                               |
| - Equine Medicine                    | 10 places | (Head of Department:          |
| SportFaMed)                          |           |                               |
| - Production Animal Clinical Science |           |                               |
| and Food Safety,                     | 35 places | (Head of Department: ProdMed) |
| - Aquatic Medicine                   | 12 places | (Head of Department: BasAm)   |
| - Research Project                   | Varies    | (Head of Department: BasAm)   |

The differentiation year runs over 2 semesters (40 weeks, 60 credits). The diploma will say: *Specialization in Aquatic Medicine 60 credits* (equivalent for the other directions) and the title of the specialization thesis in Norwegian and English.

Students can complete the differentiation year in 10th and 11th semester or in 11th and 12th semester. This depends mainly on when students choose to take the clinical examinations.

### The differentiation year consists of three parts:

Joint compulsory part (8.5 ECTS Credits)

Direction Specific: (51.5 ECTS Credits)

- Mandatory part for the direction
- Optional part
- Specialization Thesis

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TOTAL 40 weeks (60 ECTS Credits)

### HMS

See the relevant subject area earlier in the curriculum.

## **Joint section**

### **Mandatory for all: 8.5 ECTS Credits**

### **Research methodology and scientific writing (KIFO) 2 ECTS Credits**

#### **Aim and learning outcomes**

The course will provide students with practical and scientific methodological basis for a good start and implementation of a thesis at NVH.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.8, 1.10, 2.1, 2.2, 2.3,

After completing the course the student should:

Have the necessary methodological expertise to conduct a thesis at NVH.

- Be able to make a good plan for the work with a thesis based on the standard protocol for NVH.
- Be able to make appropriate cover letter and registration form for the completion of a questionnaire relating to own, in-depth study as well as relevant database in accordance with the standard template.
- Be able to explain the main types of research design and relevant statistical methods, and know which designs and analysis methods that is appropriate in a thesis.
- Know the principles of scientific writing, have established a Word file for writing the thesis based on the default template, and use RefWorks to store references and create reference lists.

#### **Content**

- Scientific writing: principles and practical assignments.
- Scientific method: planning and design of research projects.
- Questionnaires: planning and execution.
- Scientific literature: searching in databases and the use of reference tools.
- Data management: establishment and use of own database.
- Statistics: overview of relevant figures, tables and analysis methods.

#### **Learning Materials:**

- Copies on paper and electronic slides of all the images.
- Copy file of all template files for use in in-depth studies at NVH.

#### **Recommended previous knowledge**

- Students must have clarified the specific purpose of the task before the course starts.

**Requirements for personal equipment**

- Personal laptop.

**Compulsory teaching and programme requirements:**

- There is no requirement for attendance.

**Assessment:**

The course is passed when the following requirements are met

- Passing the multiple choice test on the last day of the course.
- Submission of revised protocol after the presentation and joint discussion with the supervisor and the course coordinator.

If the student fails the multiple choice test, a new test is carried out and must be passed within three weeks or in connection with the course the following semester.

**Contact:** Rolf Bjerke Larssen

**Head of Department:** Olav Reksen

**Leadership and management of veterinary practice 3 ECTS****Credits****Aim and learning outcomes:**

The course will provide students with an introduction to the working life as a veterinarian, where the vet can enter one or multiple roles as employee, self-employed, manager, clinic owners and professionals. The veterinarian must exercise this in interaction with colleagues, managers, employees, clients and other professionals.

The block forms the basis so that the student after completing the course will master the following «Day one skills» by EAEVE: 1.1, 1.2, 1.3, 1.4, 1.5, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12

A) After completing the course the student should:

- Be reflective in relation to a leadership role as a veterinarian. This involves having thought through their own behavior in groups, learned about typical group processes and handling of important topics such as confidence-building and conflict management.

B and C) After completing the course the student should:

- Be well oriented about the society and working life he/she will meet after they complete their studies and in that way be able to make a conscious and wise career choice.

**Content:**

A) Management and teamwork

Topics that will be covered are:

- Leadership theories with special emphasis on the management of knowledge workers
- Group processes, as a leader and team member
- Trust and conflict management
- Team roles and team development

The program provides knowledge and skills on current issues actual for the students regarding team work and leadership in their later work careers. The program combines theoretical perspectives with experiential learning, allowing students to receive both practical and theoretical understanding of the relevant issues through lectures, exercises and group work. The course will in this respect also provide a high degree of personalized learning, where each student has the opportunity to think systematically through what it means to lead and work as a veterinarian.

#### B) Self-employed/Facing working life

Give introduction and basic knowledge for starting their own businesses and provide useful information on matters that will meet students in the workplace.

Topics covered:

- How to establish a business
- Election of corporate form
- Taxes
- Laws/regulations for businesses and employees
- Expense types (car, travel etc.)
- Government schemes for sickness benefits, parental benefits, maternity, layoff etc.
- Prepare a business plan
- Strategy Models for marketing and pricing of services/products
- Concepts in Accounting and Finance

#### C) Communication between veterinarian and client

Communication skills

Role play

Dealing with angry clients

Relation to other professions and society

#### **Learning materials (Recommended reading):**

Featured URLs:

- <http://www.eaeve.org/about-eaeve/history-and-aims.html>
- [http://www.live.ac.uk/documents/DOS\\_handbook.pdf](http://www.live.ac.uk/documents/DOS_handbook.pdf)
- <http://www.ebvs.org/>
- <http://www.oie.int/>
- [http://www.oie.int/fileadmin/Home/eng/Support\\_to\\_OIE\\_Members/Vet\\_Edu\\_AHG/DAY\\_1/DAYONE-B-ang-vC.pdf](http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/Vet_Edu_AHG/DAY_1/DAYONE-B-ang-vC.pdf)
- [http://www.eaeve.org/fileadmin/downloads/sop/SOP\\_Annex4.pdf](http://www.eaeve.org/fileadmin/downloads/sop/SOP_Annex4.pdf)
- <http://abrionline.org/article.php?id=75>
- <https://www.tekna.no/ikbViewer/Content/793924/Forslag%20til%20veileder%20til%20journalforskriften%20for%20dyrehelsepersonell.pdf>
- <http://www.rcvs.org.uk/education/postgraduate-education-for-veterinary-surgeons/certificates/>
- <http://www.esavs.org/>
- <http://www.vetnett.no/videreutdanning-og-spesialisering>
- <http://www.pdsa.org.uk/>
- <http://vetrecordjobs.com/vetrecordjobs/vet-veterinary-nurse-jobs.html>
- <http://www.rcvs.org.uk/advice-and-guidance/guide-to-professional-conducts-for-veterinary-surgeons/?s=1>

- [http://www.vetnett.no/default.asp?V\\_ITEM\\_ID=1423](http://www.vetnett.no/default.asp?V_ITEM_ID=1423)

Clients, Pets and Vets Communication and management: Carl Gorman ISBN 1-903152-04-6, Kapittel 1, 2, 3, 5, 7, 8

**Requirements for own equipment:**

No

**Mandatory teaching and program requirements:**

A) Teaching is mandatory

B og C) Teaching is mandatory. With valid absences beyond one day, the student will have to submit assignments in the course. With unauthorized absences the course must be followed the following year.

**Evaluation:**

A) The students give a presentation on day 5 on a subject from the curriculum and instruction. The presentation takes place in groups, and is essential to pass the course.

B og C) must actively participate in the teaching and role play

**Contact:**

A) Management and team work: Per Einar Granum  
External lecturer: Trond Kjærstad

B) Clinic operations and self-employment: Bård Johansen

C) Communication veterinarian and client: Åshild Roaldset

Administrative manager for B and C: Ann Margaret Grøndahl

**Biosecurity 2 ECTS Credits (1 week)**

**English title:** Biosecurity

**Aim and learning outcomes:**

The course will provide the student with basic knowledge about biosecurity in veterinary medicine.

After completing the course the student should be able to know:

- The principles of biosecurity.
- An understanding of how the principles of biosecurity can be used in practice.
- Understanding the importance of a responsible approach to infection control.

**Content:**

Principles within biosecurity, protection regarding zoonoses; animal and fish diseases; modes of infection and transmission routes; protection against new diseases and infection to Norway; barriers; the veterinarian's role in infection control. Teaching is provided in the form of lectures and group work.

**Learning materials:**

Recommended literature and detailed description of the course is on the block's home directory on Hippocampus.

**Recommended prerequisites:**

The examination in veterinary microbiology and parasitology is required

**Requirements for own equipment**

No special requirements

**Mandatory teaching and program requirements:**

Lectures, group work and presentations are mandatory.

Rules for absence: Up to 20% absenteeism is accepted. Failure to give a presentation requires a medical certificate.

**Evaluation:** Presentations and reports will be evaluated.

**Evaluation:** Liv Marit Rørvik

**Head of department:** Per Einar Granum

**State veterinary medicine: Assignment**

**Part of the subject state veterinary medicine and constitutes 1.5 ECTS credits of the course credits. See earlier in the study plan.**

**Aim and learning outcomes:**

Students will study in depth a topic in state veterinary medicine and write a thesis with relevance to the depth direction they have chosen. This will provide a deeper and more in-depth knowledge in selected regulations within the relevant field/animal.

**Study program:**

A list of suggested topics will be developed, and students can even suggest topics which must be approved by the teacher in advance.

**Academic requirements and examination**

Approved submission of thesis and practical/oral examination

**Contact:** Marit Nesje

**Head of department:** Olav Reksen

**Elective courses for all/some:**

**Laboratory Animals 1 week, 1.5 ECTS Credits**

**Aims:**

to create interest and knowledge about the diverse roles that a laboratory veterinarian has.

to increase student's competence in the field of laboratory animals.

to provide students with an ethical perspective and expertise about the use of animals in experiments.

to increase students' knowledge about the care and treatment of rodents and rabbits both as laboratory animals and companion animals.

**Learning outcome:**

The differentiation course in laboratory animals will give students a deeper understanding of the subject laboratory animals.

After completing the course the student should:

- Understand the diverse roles that a laboratory veterinarian has.
- Have a reflective stance on important topics in laboratory animals, such as ethics, quality assurance, operation of an laboratory animal unit, legislation and publications.
- Be able to debate animal welfare, and have a critical look at the arguments around animal welfare.
- Know the key principles for the care and treatment of rodents and rabbits both as laboratory- and companion animals.

**Content:**

- The course is an advanced course that builds on the compulsory course in laboratory animals in Block 10, 6th semester. The course will immerse in some of the topics in laboratory animals, such as ethics, quality assurance, operation of a laboratory animal unit, legislation and publications. It will also elaborate on topics within the care and treatment of rodents and rabbits both as laboratory- and companion animals.

**Program**

The tuition is both theoretical (lectures) and practical (tour in several different laboratory animal units in Oslo and practical training in handling and techniques on models, live animals and cadavers). It is facilitated time for independent work on group assignments.

**Mandatory teaching and program requirements:**

Requirement of approved group assignment

Requirement of 80% attendance

**Contact**

Kristine Eraker Aasland Hansen.

**Insemination of production animals 1 week, 1.5 ECTS Credits**

**Aim:** To provide the necessary theoretical knowledge and practical skills to carry out insemination.

**Learning outcome**

The student shall be able to inseminate cattle after completing the course.

**Content**

The content comprises of theoretical lessons and practical/clinical exercises in the artificial insemination of cattle. In addition, the theoretical background of insemination of sheep/goats and pigs is included.

6 per group at Rudshøgda and 8 per group in Egersund, max 2 groups per week. For students in other directions than Production Animal clinical sciences and Food safety it must be

documented by the employer that the student has received a commitment as an inseminator. There will be requirements for the extent and duration.

The courses are normally arranged in August and March

**The following students may apply for the course:**

1. Candidates with a major in Production Animal clinical sciences and Food safety.
2. Candidates with other specialization directions that can demonstrate that they have a job offer within insemination practices.

Geno sets the following requirements to practice within 1 year after the course:

Considered met by students with a specialization in production animal clinical sciences and food safety (ProdMat), since these students practice skills in teaching at ProdMed.

- Others have to have inseminated at least 100 animals and achieved a satisfactory result, within a year after completing the course. (not current percentage higher than 10% below land agent.)

Those who have completed an insemination course in NVH or Geno's direction and do not meet the practice requirement must be set to a one-day review test to start insemination activities for Geno.

Please refer to the guidelines for the allocation and application.

**HSE**

HSE rules set limits to the number of participants per course. Students must abide by the rules at the slaughterhouse and guidance from the teacher.

**Mandatory teaching and program requirements:**

100% presence. Practical test at the end of the course.

**Assessment of the optional part**

Presence and mandatory activities is required to be completed to receive credit. It is the student's responsibility to ensure that the optional part is carried out, and there will be no reimbursement of tuition for this unless the student can demonstrate legitimate absence.

The one who is responsible for the course gives diploma/certificate and/or acknowledgement of the evaluation form in which part is listed. Only 100% completed elective program is approved. It is not possible to take more credits than the differentiation year adds up to, i.e. 60 credits in total for the differentiation year, (including 1.5 ECST for the operation in state veterinary medicine).

**The Individual Differentiation Directions**

**Differentiation in production Animal clinical Sciences and Food safety (51,5 ECTS)**

**English name:** Production Animal Medicine and Food Safety

## **Clinical part: 16 ECTS**

### **Practical work with herds, ambulatory clinic (6 ECTS, 3 weeks)**

#### **Content**

Practical clinical work with cattle and pigs, as well as some sheep, goat and horse practice

#### **Learning outcome**

After completing the course the students will

- Have good knowledge and skills in practical clinical work on production animal, both in individual animals and at herd level.

#### **Program**

The teaching takes place in small groups with a lot of self-study and individualized training under supervision. Systematic use of crew data and participation in the evaluation of crew problems will naturally be included in the program.

#### **Mandatory teaching and program requirements:**

The required attendance is 4 of 5 days each week. In addition, the student must participate in on-call duty minimum 4 nights and one weekend day. It also requires the approval of three submitted records/crew reports.

### **Clinical reproduction (2 ECTS)**

#### **Content**

The course is a week-long and includes clinical work in the reproduction clinic and in cattle herds.

#### **Learning outcome**

After completing the course the students will

- Be able to provide an overview of clinical reproduction in cattle, i.e. perform sexual health control on cattle, could diagnose the stage of normal oestrus cycle, point out abnormalities and deviations from the normal oestrus- and pregnancy progress and diagnose pregnancy from 5 weeks on cows.
- Be able to make a scientific study of reproductive problems in both dairy and beef cattle herds.
- Have good skills in investigation of individual animals and be able to see this in the context of herd status in cattle.
- Be able to perform a fertility study of male animals with extraction of semen.
- Be able to explain the ultrasound examination of the genitalia in cattle and principles of embryo transfer.

#### **Program**

The teaching consists of students themselves examining the reproductive organs of cows both by palpation and by ultrasound. It will be carried out visits in a beef cattle farm and in 1-2 dairy farms. Students also try semen collection in male animals and learn the principles for assessment of sperm quality with emphasis on ruminants. A part of the learning consists of solving group exercises focusing on reproductive issues related herd of cattle.

**Mandatory teaching and program requirements:**

The required attendance is 4 out of 5 days, and performing mandatory group assignments

**Clinical specialization in stationary clinic for medicine/surgery/obstetrics (2 ECTS, total 1 week)****Content and aim**

The specialization week will offer active duty with the clinical care of cattle, pigs and some sheep/goats. The aim is also to provide instruction in some central issues in production animal practices. Students will be given greater responsibility in relation to previous clinic periods and they will partially participate in the teaching of younger students.

**Learning outcome**

After completing the course the students will

- Have acquired a good knowledge and skills in practical clinical work on all common species of production animals, and know how to diagnose, assess and treat sick animals.
- Have received some training in the guidance of clinic work and the dissemination of knowledge about production animal medicine.

**Program**

The specialization week will consist of active duty in the stationary clinic for medicine, surgery and obstetrics from 0815 to 1500. Students will preferably be distributed evenly throughout the fall and spring semester in groups of 2 students, and to some extent participate in the teaching of students in 8<sup>th</sup> and 9<sup>th</sup> semester. The work will include examination of patients, assessment of additional tests, treatment, journal writing and discussion of patient outcome. During the week, students present a theme in production animal medicine for the younger students, clinic veterinarians and other interested parties. For students who may have active duty for weeks without younger students, we can't offer participation in education, but the opportunity for independent clinical work will be good.

**Mandatory teaching and program requirements:**

The required is attendance and performing assigned duties in 4 of the 5 days.

**Ruminant practice and diseases around lambing (4 ECTS, 2 weeks)****Aim and learning outcome**

To achieve experience in sheep/goat practice through as much sole responsibility as possible for case history, disease diagnosis and treatment, obstetrics, caesarean section, autopsy follow-up and feedback and advice to farmers.

After completing the course the students will

- Have sufficient expertise and experience to work in sheep/goat practice, ie. have a good overview of relevant diseases and approach and handling of these.

**Content**

The course focuses on the diagnosis and treatment of conditions and diseases around lambing at ewe and lamb.

### **Program**

Teaching takes place at NVHs section in Sandnes. Teaching takes place as guided independent study in the sheep house around lambing (obstetrics, weak lambs, treatments), cesarean section, clinical examination of pregnant animals, autopsies of sheep and lambs, follow-up in the laboratory etc. There will be prepared reports to the farmer, and provided overviews of individual topics.

### **Mandatory teaching and program requirements:**

Mandatory for specialization students. All students must attend night shift. There are expected long days in the barn. The requirements for attendance are 9 of 10 working days.

## **Counseling and Supervision in herds (2 ECTS, 1 week)**

### **Aim and learning outcome**

Gain practical knowledge and skills in assessment and counseling work in swine herds, poultry operations (chicken and human consumption eggs), cattle, sheep and fur farming, and practical supervision in selected herds.

After completing the course the student should have good basis for:

- Engage independent consulting work in pig and poultry farm herds.
- Independent work for FSA on the livestock chain (food safety, disease control, animal health, animal welfare, livestock hygiene, production hygiene).

### **Content**

The teaching takes place at NVHs section in Sandnes. In crew counseling in swine livestock and poultry farms (broiler and egg production) it is emphasized observation of farming, handling of animals, review of health records, animal environment in different departments and feeding related issues. If relevant it will be taken out a trial sample. In addition, it will focus on livestock hygiene as part of the preventive meat inspection and control of communicable diseases. There is also emphasis on animal welfare.

In the supervision of crew there will be given an introduction to practical supervision of animal health and animal welfare. There will be given an overview of important management consideration. Students should have as much insight to the veterinarian's supervision role as possible, both as a public and a private practitioner livestock veterinarian. The focus will be on the health of livestock, animal welfare, livestock hygiene (animal room, milking parlor, feed storage etc.) and infection protection. Students will participate in FDA inspections realistic situations in herds of sheep, fur animals, cattle, poultry and swine.

### **Program**

The teaching takes place at NVH's section in Sandnes. The crew counseling will add emphasis on the use of available "tools" in the herd analysis and independent work in crews under supervision. The veterinarian's role as a crew advisor will be particularly emphasized.

In the audit section the students participate in FDAs inspections in realistic situations in herds of sheep, fur animals, cattle, poultry and swine. The students are involved as much as possible in the assessment work and in communication with the farmer.

### **Mandatory teaching and program requirements:**

100 % attendance is required.

### **Assessment of clinical periods**

To pass the clinic period, all program requirements must be passed. If the student is absent more than accepted or has expelled bad attitudes, it will be conducted a similar or an alternative arrangement, or a task given by the subject liable/responsible. If the absence is invalid it can cause that the student must attend the class next year.

## **Professional Specialization: 19.0 ECTS**

### **Veterinary public health (4.5 ECTS, 3 weeks)**

#### **Aim and learning outcome**

The student will during the course acquire knowledge about the veterinarian's scope and responsibilities of the FSA. This will professionally be based on an understanding of veterinary public health – focusing on the veterinarian's social responsibility in the control of animal diseases and food infections, and responsibility for animal welfare and the environment. Completion of the course, along with other parts of the veterinary course, will provide the basic skills needed to work at the FSA, by the student meeting the requirements to be an official veterinarian.

After completing the course the students will

- Understand the veterinarian's community responsibility in a broad sense and keep track of what Veterinary public health contains.
- Understand the framework for risk-based supervision and how risk assessments are used in the field.
- Have basic knowledge of the rules that qualify to work as a public veterinary.
- Be able to work on a decision in cases of disease control, animal welfare and food safety.

#### **Content**

The following topics will be covered:

- a) The regulations covering the veterinary public health field by FSA including a thorough review of the hygiene package and requirements of an «official veterinarian»
- b) Risk-based supervision:
  - Understanding of the concept.
  - Application of risk assessment in the FSA scope.
  - Arrangements for disease surveillance and disease control when it comes to animal diseases and zoonotic agents as well as work with assessment of animal welfare.
- c) Public veterinarian:
  - Review of the academic requirements to act as a public veterinarian.

- Overview of curriculum towards examination.
- d) Administrative procedures and decisions:
  - Working with background documents based on field data and observations.
  - Writing of decisions in disease control, animal welfare and food safety.

### **Program**

- 1) The course is in three parts, with an initial week of lectures and group work, and a final week with topics that are important to know about as a public veterinarian including the hygiene package and a final (MC) test.
- 2) By passing the veterinary public health the student will satisfy the competence of a “Public employed veterinarian” according to the words of the hygiene package (H3) about the professional qualifications of the public veterinarian.

### **Mandatory teaching and program requirements:**

90 % attendance is required. Case presentations and MC test. If the course requirements are not met there will be a meeting with the student to ensure their competence. If the student does not thereby show that they have acquired sufficient skills, the course must be repeated the following year.

## **Production Hygiene (2 weeks, 3 ECTS)**

### **Aim and learning outcome**

Give the students an insight into how food production works in Norway. Get insight into how hygiene is handled in companies and water utilities. Get insight into how the FSA works in Norway.

After completing the course the student should be able to:

- Think analytically about how to prevent the spread of infection through food and water.
- Help make arrangements for hygienic food and water productions.

### **Content**

Lectures of various types, understanding of how HACCP works, visits, visits to the waterworks and the area around Oslo’s water supply. Students will hold seminars for each other about what they have learned in the different companies.

Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday
FSA 3 timer	Slaughterhouse water FSA	Nutrient company	Some analysis	Presentation of day 3	Tasks around cleaning	Presentation of cleaning tasks	Slaughterhouse water FSA	Final report	Presentation
Hygiene in company and water plant		Four different places	Report		Company visits				Water slaughterhouse FSA

### Program

The FSA gives a lecture about how they work. Visit the slaughterhouse, production companies and water utilities with range. Join the FSA visiting the companies.

### Mandatory teaching and program requirements:

Mandatory participation every day

Writing of reports from every visit and lecture this to other students who have been elsewhere

## Herd health (10 ECTS, 5 weeks)

### Specialization Cattle

#### Aim and learning outcome

To provide specialization in the field of herd health

To provide students with a basis to carry out a crew report and take steps to normalize and optimize health and reproduction in a cattle herd

After completing the course the student should:

- Be able to diagnose, take action and provide advice in connection to the investigation of health and reproductive problems at herd level.

#### Content

Herd health, part of cattle, has a total length of 10 days. Initially, 2 days, there will be given a review of epidemiological concepts and targets as well as tools for analysis of herd, including the interpretation of herd output, use of protocols, reporting and monitoring. One day will be devoted entirely to feeding. There are also plans for a day visit with Geno at Hamar and Tine at Ås. There are 3 herd visits with herd reports; reproduction (theory will be combined with visits to Geno), udder health (theory will be combined with visits to Tine) and calf health. In addition, the course will include a visit to a beef cattle herd in which the operations are reviewed. One day will be devoted to a review of the reports from the herd visits.

### Specialization sheep

#### Aim

Be able to make health-related depth review of the flock, select appropriate test and follow up, assess welfare, diagnose disease and evaluate casual relationships, and provide specific advice to the farmer.

**Learning outcome**

Be able to make independent health care in sheep flocks, even in groups that do not participate in other organized health care, and where there is no prior data.

**Content**

Make depth review of 1-2 sheep herds with records of herd data, surveys of individual animals, sampling, analysis and evaluation of results, assessments of causality operating disease, cost-benefit analysis of preventive measures, and design of a concrete report with advice on practical strategic prevention herd.

**Program**

Visiting one or to herds with collecting of data and samples, analysis of the sample material, processing results, review of relevant topics related to the herd, design a report and presentation of the report to the farmer.

**Specialization swine****Aim and learning outcome**

Specialization swine shall provide training in routine work in swine herds, providing deeper insight into Norwegian swine production, diseases and herd problems, and provide expertise in the study as a basis for counseling and preventive work in swine farms.

After completing the course the student should be able to:

- Conduct routine and disease ratings in herds in the period around birth.
- Implement pregnancy examination with different methods and oestrus and reproductive control.
- Use reports from USR and Ingris and evaluate diseases/disease complexes in swine herds as the basis for assessment of herd problems.
- Perform herd review, give good advice and suggest reasonable precautions in swine herds.
- Conduct decontamination of various diseases in swine.
- Inserting epidural – and total anesthesia and perform common surgical operations on piglets.

**Content**

Teaching is at NVH Adamstuen, in swine herds in the eastern areas, and at Norsvin. Lecturers in the theory section are from NVH, VI, Animalia and Norsvin. The training in routine work in the period around birth occurs in large satellites near NVH, and gestation, mating and reproduction control in the hub of a sow ring. Herd counseling is based on herds with aktuelle issues such as the suckling pig or weaning diarrhea, respiratory or reproductive problems. Students receive background data for the herds and shall by visiting collect more data and information about the herds and the disease complex and perform herd review as independent as possible. Student groups of approximately 3 will be responsible for the crew report on preventive measures. The course includes the writing and approval of crew reports which shall be of such quality that they can be sent to the herd owner and practicing veterinarian/health service veterinarian. Work outside normal working course time must be expected. The operations performed on piglets will be performed on NVH last day before the surgery course starts and in cooperation with the responsible for this course. It will also be given training in posting venous catheters and intravenous total anesthesia on piglets. The

course could lead to travel with up to two nights' accommodation and social content ("Hedmarkturen").

## Specialization in surgery

### Aim

Provide students with increased knowledge and skills in:

- Diagnosis, treatment and prevention of hoof disorders at individual and herd level.
- Diagnosis and treatment of surgical abdominal cavity disorders in cattle.
- Diagnosis and treatment of umbilical, joint and bone disorders in production animals.
- Castration and surgical procedures by anomalies in the gender system in production animals.
- General surgical principles including aseptic, antiseptic, methods of suture and wound healing.

### Learning outcome

After completing the course the students will

- Be able to work independently in the production animal practice and be able to perform both emergency care and preventive health care within the defined areas.

### Content

There is provision for 3 teaching days to the surgery section that will be a condensed version of the previous 5-day course of surgery on production animals. It all adds up to the best possible integration of theoretical and practical lessons.

### Program

A herd visit will be planned, focusing on hoof disease in dairy cattle and preventive hoof health work. In addition, the course will be held in the Stationary Clinics premises at NVH.

### Guidelines for participation

Mandatory for students with a specialization in production animal medicine and food safety

### Mandatory teaching and program requirements:

80 % for each of the course modules, but all assignments and herd reports must be submitted at the designated time.

### Seminar week (2 ECTS, in total 1 week)

#### Content and aim

The seminar week will include presentations and discussion of completed and commenced differentiation tasks. The aim with the course is also to provide research-based presentations by PhD students and completed researchers as well as a lecture with the theme "Well prepared for production animal practices."

### Learning outcome

After teaching the students will

- Have presented and received feedback on their presentations of completed and commenced differentiation tasks
- Have gained an insight into how to work as a researcher and different ways to go towards a research career.

- Have presented new research findings in practice relevant topics that will be useful during the transition from study to veterinary practice.

### **Program**

The seminar week will consist of presentations and discussion of completed and commenced differentiation tasks. Finished researchers and PhD students will talk about how to work as a researcher, his own research and his way toward a career in science. In addition to research-based teaching the motto for teaching will be “Well prepared and updated for production animal practice” with themes such as udder health, calf health, feeding-related diseases, infectious diseases and other acute disease condition.

### **Mandatory teaching and program requirements:**

It is required presentation of differentiation tasks and 80 % attendance.

### **Assessment of academic study topics:**

To pass the academic specialization any records, papers, presentations and tests must be approved in line with what has been described for each subject. Students may have to wait until next year unless the records, papers, presentations and tests are approved after 3 attempts. In addition, the minimum presence must be met. With valid absence of more than 20 % it will be agreed that work experience and a task must be approved by the subject manager. By not valid absence, the student must follow the topic next year. Subject manager keeps lists of students with approved topics in academic study specialization which is filed. Subject manager acknowledges the topic as approved on the censorship form to the student.

## **Optional program 1.5 ECTS**

### **Insemination of production animals (1 week, 1.5 ECTS)**

#### **Aim**

To provide the necessary theoretical knowledge and practical skills to carry out insemination

#### **Learning outcome**

The student shall be able to inseminate cattle after completing the course.

#### **Content**

Theoretical lessons and practical/clinical exercises when it comes to artificial insemination of cattle. In addition, the theoretical background of insemination of sheep/goats and pigs.

6 per group at Rudshøgda and 8 per group in Egersund, max 2 groups per week. For students in other directions than Production Animal clinical sciences and Food safety it must be documented by the employer that the student has received a commitment as an inseminator. There will be requirements for the extent and duration.

The courses are normally arranged in August and March

**The following students may apply for the course:**

1. Candidates with a major in Production Animal clinical sciences and Food safety.
2. Candidates with other specialization directions that can demonstrate that they have a job offer within insemination practices.

Geno sets the following requirements to practice within 1 year after the course:

Considered met by students with a specialization in production animal clinical sciences and food safety (ProdMat), since these students practice skills in teaching at ProdMed.

- Others have to have inseminated at least 100 animals and achieved a satisfactory result, within a year after completing the course. (current percentage not higher than 10% below land agent.)

Those who have completed an insemination course in NVH or Geno's direction and do not meet the practice requirement must be set to a one-day review test to start insemination activities for Geno.

Please refer to the guidelines for the allocation and application.

**HSE**

HSE rules set limits to the number of participants per course. Students must abide by the rules at the slaughterhouse and guidance from the teacher.

**Mandatory teaching and program requirements:**

100% presence. Practical test at the end of the course

**Specialization Food Safety (3 ECTS, 2 weeks)**

This is taken instead of the clinic weeks/insemination course:

**Aim**

For the students who wish to specialize in particular areas of food safety in terms of future work at the FSA, food industry, or other work in food safety.

**Learning outcome**

The program will be designed individually/in groups from the interest of the students, and the specific learning outcomes will vary.

**Content**

Students can specialize in issues related to FSA, industry, technology, epidemiology, microbiology, toxicology and risk assessment.

**Program**

Case-based assignments, secondments, visits – depending on the area of specialization

**Mandatory teaching and program requirements:**

Organized programs are mandatory; otherwise any reports/presentations must be approved.

## Assessment of the optional part

The presence and activities is required to be completed to receive credit. It is the student's responsibility to ensure that the optional part is carried out, and there will be no reimbursement of tuition for this unless the student can demonstrate legitimate absence. Responsible for the course gives a diploma/certificate and/or acknowledge the evaluation form in which the optional part is listed. Only 100 % completed elective program is approved. It is not possible to take more credits than the differentiation year adds up to, i.e. 60 ECTS in total in the differentiation year (including 1.5 ECTS for assignment in public veterinary medicine)

## Thesis 10 weeks 15 ECTS

See guidelines for this

## All year:

### Teaching materials:

Same literature as in 7th, 8<sup>th</sup> and 9<sup>th</sup> semester

### Recommended prerequisites

Based on the examination in companion animal medicine from 9th semester

### Requirements for own equipment

Work clothes, hard-toe shoe, stethoscope and scissors

### Review

To pass the differentiation direction in production animal medicine and food safety, the following two parts must be passed:

- Thesis (15.0 ECTS): Passed  
Norwegian and English names should be applied the diploma
- Specialization in Production animal clinical sciences and food safety (36.5 ECTS): Passed  
(consisting of the mandatory part (clinic and topics) 35.0 ECTS and elective part 1.5 ECTS).  
Or alternatively  
Specialization in production animal clinical sciences and food safety with extra emphasis on food safety (36.5 ECTS): Passed

Grading form and 2 copies of the thesis must be delivered SFA no later than 1 week before the end of the term for the certificate to be issued by the exam completion.

### Responsible:

**Responsible for direction:** MatInf Liv Marit Rørvik (from fall 2013).

### Clinic and Subject responsible:

Ambulatory clinic: Hans Petter Kjæstad

Stationary clinical teaching (medicine/surgery/obstetrics): Terje Fjeldaas

Reproduction: Knut Karlberg

Ruminants practice and diseases regarding lambing: Martha Ulvund

Herd counseling: Martha Ulvund

Surgery: Terje Fjeldaas

Cattle course: Ane Nødtvedt  
 Specialization swine: Tore Framstad  
 Veterinary public health: Liv Marit Rørvik  
 Production hygiene: Liv Marit Rørvik  
 Insemination course: Anette Krogenæs  
 Pre-approval of optional subjects: Olav Reksen  
 Thesis: Supervisor  
 Responsible head of the department: Olav Reksen (production animal), Per Einar Granum (food safety)

## **Differentiation in Companion Animal Medicine (51.5 ECTS)**

### **Aim**

The teaching in the differentiation year in companion animal medicine will provide students with a deeper theoretical knowledge in selected areas and clinical skills in disease development, diagnosis, treatment and preventive health in pets.

## **Clinic periods: weeks, 21.5 ECTS**

### **Content**

In the clinic in companion animal differentiation it is emphasized on practicing what the student has learned in active clinic and have the opportunity to more independently assess and treat patients, including customer contact. There will be planned more skills training than active clinic. The students will write detailed records on a defined number of patients.

### **Learning outcome**

Builds on the descriptions of the learning outcomes of the 9th semester

After completing the course the students will

- Have acquired a good knowledge of independent practicing clinical diagnostics, perform treatment and advise on disease prophylaxis.
- Have good ethics to benefit the veterinary profession and the customers we serve.

### **Mandatory teaching and program requirements:**

- During the clinical period, each student has to submit 5 records from each clinic rotation, based on the patients the students have been responsible for in the clinic. Records shall be approved by the lecturer.
- Students will in the clinical period have 1-3 evening/night shifts per week. This includes weekends and red days.
- Students will demonstrate the case for younger students.
- One of the rotation weeks are a night shift rotation.

It is allowed up to 1 day of legitimate absence per week and up to 1 day's absence per night shift rotation per 5 days shift. It is not possible to accumulate days. Valid absence beyond this must be repeated in accordance with the direction responsible's instruction.

The clinic service is divided onto polyclinic, surgical clinic and medical clinic.

**External work experience rather than mandatory clinic (1.5 ECTS x 2, 1-2 weeks)**

In special circumstances, up to two of the mandatory clinic weeks may be taken with the ambulatory clinic, by appointment and approval from the direction responsible.

This requires 100 % attendance and approved records.

This can also take place at reputable clinics abroad for direction Manager's approval.

At clinics in Norway this will only apply in DNV approved clinics

It is the same quality assurance requirements as for optional programs (see this.)

It is essential that this is a full day companion animal practice with participation in on-call.

**Responsible:** Anna Eggertsdottir

**Reviews**

To pass the clinic period, all program requirements must be passed. In addition, the student must have been sufficiently present and possess widely acceptable professional and ethical standards as described in Part 2 of the document: "Clinical rotation 8<sup>th</sup> and 9<sup>th</sup> semester, information and forms."

**Professional Specialization topics: 12 ECTS****Sedation, anesthesia and treatment of pain (2 ECTS, 1 week of lectures)****Aim**

The course focuses on the theoretical background for sedation, anesthesia and pain management in companion animal veterinary practice.

**Learning outcome**

After completing the course the student should:

- Possess good knowledge to plan and implement sedation, anesthesia and pain management of companion animal patients.

**Program**

In addition to the theoretical analysis, the student shall work with anesthesia cases in the clinic weeks. Students collect the necessary anesthesia cases while they are in regular clinic service.

**Mandatory teaching and program requirements:**

The student must have participated in the planning, execution and recovery from anesthesia by 5 patients while they are in the clinic. This shall be documented, signed by the veterinarian responsible for anesthesia, and it should be only one specialization student to anesthesia per patient.

Each specialization student must write their own casuistic, and there is only one student who can write about each anesthesia. The same goes for the 5 anesthesia specialization students in companion animals who had to prove that they have followed from beginning to end.

## **Radiology (2 weeks, 3 ECTS)**

### **Aim**

The course will provide a thorough introduction to imaging diagnostics as a tool for companion animal practice, and provide students with knowledge about the practical implementation of picture-taking to interpretation.

### **Learning outcome**

After the course the student shall be able to understand imaging diagnostics in companion animal practice.

### **Content**

Radiology deals with the use of imaging diagnostic in companion animal practice. Emphasis is placed on radiology diagnostic, but other modalities such as ultrasound, scintigraphy and CT will also be reviewed.

### **Program**

Radiology is structured as a combination of lectures and assignments. In addition to basic radiology and physics, any step in the study of individual body parts being systematically reviewed. Which patients are appropriate for the different types of research, how the researched are made, the choice of projections, assessment of images, etc. are reviewed.

### **Mandatory teaching and program requirements:**

80 % attendance, at least

## **Clinical pathology (1,5 ECTS, 1 week)**

### **Aim**

The course will provide students with a sound basis for using clinical chemistry, clinical endocrinology, hematology and cytology in its companion animal practice.

### **Learning outcome**

After completing the course the student should be able to:

- Assess indications for various tests, know the most common pre-analytical factors that influence test results and have a basic understanding of the interpretation of test results.
- Present cell slide samples (hematology/cytology) of diagnostic quality.

### **Content**

Principles of sampling, evaluation of pre-analytical factors and interpretation of test results in clinical chemistry, clinical endocrinology, hematology and cytology. Practical exercises in preparation of hematology/cytological, cell slide samples and microscopy will be included. Special emphasis is placed on interpretation of test results from dogs and cats.

### **Mandatory teaching and program requirements:**

At least 80 % attendance and passed “multiple choice test”.

## **Reproduction and obstetrics (2.5 ECTS, 1 week lectures + self-study)**

### **Aim**

To teach the students the general principles relating to reproductive physiology and pathology in females and male cats and dogs as well as knowledge of the common operations related to reproductive organs. Introduction to obstetric problems such as obstetrics, udder health and puerperium diseases, as well as pediatrics will be included.

### **Learning outcome**

After completing the course the students will be able to

- Clarify the general principles relating to reproductive physiology and pathology in females and males of cats and dogs, ferrets and rabbits and other rodents.
- Perform oestrus control and remove semen sample for assessment of semen quality in dogs, make a pregnancy diagnosis in dogs, have knowledge of normal and abnormal conditions related to childbirth, performing obstetrics in dogs and cats, as well as to diagnose and treat udder diseases and puerperium diseases.
- Clarify diseases and treatment of puppies and kittens.

### **Content**

Reproduction and obstetrics (physiology and pathology) in dogs and cats

Diagnosis and treatment of reproductive disease, obstetric problems and pediatrics

Introduction to the most common operations related to the genital performed on dogs and cats

### **Mandatory teaching and program requirements:**

80 % attendance, at least

## **Clinical Neurology (3 ECTS, 2 weeks)**

### **Aim**

The course will provide students with a thorough review of the topic of neurology in dogs and cats.

### **Learning outcome**

After completing the course the student should be able to assess patients with neurological symptoms, and diagnose and know the most common differential diagnosis of neurological diseases in dogs and cats.

### **Program**

Video-based case reviews and discussions on assessment of patients with neurological symptoms as well as lectures on diseases of the nervous system in dogs and cats.

### **Mandatory teaching and program requirements:**

80 % attendance at classes, and participation in the presentation of the homework

**Assessment of academic specialization topics**

To pass the academic specializations all records, papers, presentations and tests needs to be approved in line with what has been described for each subject. Students may be necessary to wait until next year unless the records, papers, presentations and tests are approved after 3 attempts. In addition, the minimum presence must be met. With valid absence of more than 20% it is agreed that work experience and a task must be approved by the subject responsible. By not valid absences, the student must follow the subject next year.

Subject responsible keeps lists of students with approved topics in the academic specialization which is filed. Subject responsible acknowledges the subject as approved on the censorship form to the student.

**Optional arrangements: 3 ECTS**

There are a total of 2 weeks, 3 ECTS in which the student can choose from the following programs in companion animal differentiation:

**External visitation as an optional part (1.5 ECTS x 2, 1-2 weeks)**

Up to 2 weeks of the elective courses can be taken externally.

This requires 100 % attendance and approved records.

Shadowing at clinics in Norway can only be done in DNV-approved clinics.

This can also take place at recognized clinics abroad after the direction Manager's approval. It is essential that this is a full day companion animal practice. Students will also write a reflective report on the shadowing. Scope of the report is determined by the direction manager.

**Responsible:** Anna Eggertsdottir

**Requirements for external clinics approved:**

Clinics in Norway must be DNV certified.

Shadowing at clinics in universities shall be made on an accredited EAEVE / AVMA institution.

Beyond this, shadowing at a foreign clinic needs to be approved by the responsible of the direction.

**Scientific and methodological specialization related to the thesis (2 weeks, 3 ECTS)****Aim**

Give more time associated with tasks that require extra preparation.

**Content**

Self-study and preparation work to be able to implement an in-depth study within 10 weeks.

**Responsible:** Tutor

**Thesis: 10 weeks, 15 ECTS**

See guidelines.

**All year:****Teaching materials**

The same literature as in the 7th, 8th and 9th semester

**Recommended prerequisites**

Based on the examination in companion animal medicine from 9th semester

**Requirements for own equipment**

Work clothes, hard toe shoes, stethoscope and scissors.

**Reviews**

To pass the differentiation direction in companion animal medicine, the following 2 parts must be passed:

Task specialization (15 ECTS): Passed

Norwegian and English names should be applied the diploma

Specialization in companion animal medicine (36,5 ECTS): Passed

(Consisting of the mandatory part (clinic and subjects) 33,5 ECTS and elective 3 ECTS)

Censorship form and 2 copies of the thesis must be delivered SFA no later than one week before the end of the term of the certificate shall be issued to exam completion.

**Responsible**

Direction responsible: Anna Eggertsdottir

Subject responsible:

Anesthesia: Andreas Haga

Reproduction and obstetrics: Wenche Farstad og Vibeke Rootwelt

Clinical pathology: Stein Istre Thoresen

Radiology: Magnus Rørvik

Neurology: Karin Hultin Jäderlund

Prior approval optional elements: Anna Eggertsdottir

Thesis: Tutor

Responsible head of the department: Ann Margaret Grøndahl

**Differentiation in Equine Medicine (51.5 ECTS)****Aim**

The teaching in the differentiating year in equine medicine will give students a deeper theoretical knowledge in selected areas and clinical skills in disease development, diagnosis, treatment and preventative health in horses.

**Clinic periods: in total 10 weeks, 20 ECTS****Content**

In the clinic in horse differentiation it is emphasized on diagnosis and treatment of neonatal patients, diagnosis and treatment of colic, diagnostic injections in lameness diagnosis, certification and issuance of passports on horses, use and maintenance of endoscopic equipment. In addition, students will have a week of practical anesthesia and pain management as a part of the specialization in anesthesia. This week is in addition to the 10 weeks (see the subject Anesthesia and pain management)

**Learning outcome**

Builds on the learning outcomes descriptions of 9th semester

After completing the course the students will:

- Have acquired a good knowledge of independent practicing clinical diagnostics, perform treatment and advise on disease prevention
- Have good ethics that are beneficial for veterinary profession and the costumers we serve.

**Mandatory teaching and program requirements:**

During the clinical period each student will submit 8 case reports from patients the students have been responsible for in the clinic. Students will in the clinic period have at least one day of duty a week. Students will demonstrate the case for younger students. Case reports are based on the record and it is envisaged that students will go deeper into the diseases' etiology, diagnosis, differential diagnosis and treatment. In the case report it shall be referred to references from current literature. Case reports must be approved by the supervisor before the clinic period has passed.

Up to one day of legitimate absence per week is allowed. It is not possible to accumulate days. Valid absence beyond this must be repeated according to the instructions of the responsible of the direction.

**External work experience rather than mandatory clinic (1.5 ECTS x 2, 1-2 weeks)**

In special circumstances, up to two of the mandatory clinic weeks are taken by an external clinic by appointment and approval of the supervisor.

It is required 100 % attendance and approved records.

This can also take place at acknowledged clinics abroad after the approval of the responsible of the direction approval.

The same requirements for quality assurance as for the optional programs (see this).

It is essential that this is a full day horse practice.

**Responsible:** Carl Fredrik Ihler

**Evaluation**

To pass the clinic period, all program requirements must be passed. In addition, the student must have been sufficiently present and possess widely acceptable professional and ethical standards as described in Part 2 of the document: "Clinical Rotation 8th and 9th semester, information and forms".

**Professional Specialization subjects: 10.5 ECTS****Anesthesia and pain management (1 week, 2 ECTS)****Aim**

The course focuses on the theoretical background for sedation, anesthesia and pain management in veterinary horse practice. In addition, the student will during the clinic period have practical training in the implementation of total anesthesia.

**Learning outcome**

After the theory and practice, students shall possess knowledge and manual skills to plan and implement sedation, anesthesia and pain management of horse patients.

**Mandatory teaching and program requirements:**

Submission and approval of general anesthetic case report, where planning, implementation and possible complications are described and discussed. The choice of methods, medications and dosages should be professionally justified in the case report. Each specialization student must write their own case history, and there is only one student who can write about each anesthesia. Students collect the anesthesia cases necessary while they are in regular clinic service. The same rules apply in the clinic week as in the other clinic weeks.

**Radiology (1 week, 1,5 ECTS)****Aim**

The course will provide a thorough introduction to imaging diagnostics as a tool for horse practice and provide students with knowledge about the practical implementation of picture taking to interpretation.

**Learning outcome**

After the course the student shall be able to understand the imaging diagnostics in horse practice.

**Content**

Radiology deals with the use of imaging diagnostics in horse practice. Emphasis is placed on x-ray diagnostics, but other modalities such as ultrasound, scintigraphy and CT will also be reviewed.

**Program**

Radiology is structured as a combination of lectures and assignments. In addition to basic radiology and physics, any step in the study of individual body parts will be systematically reviewed. Which patients are appropriate for the different types of research, how the examinations are done, the choice of projections, assessment of images etc.

**Mandatory teaching and program requirements:**

At least 80 % attendance required

**Clinical pathology (1.5 ECTS, 1 week)****Aim**

The course will provide students with a sound basis for using clinical chemistry, clinical endocrinology, hematology and cytology in its horse practice.

**Learning outcome**

After completing the course the student should be able to:

- Assess indications for various tests, know the most common pre-analytical factors that influence test results and have a basic understanding of the interpretation of test results.

- Present microscope samples (hematology/cytology) of diagnostic quality.

### **Content**

Principles of sampling, evaluation of pre analytical factors and interpretation of test results in clinical chemistry, clinical endocrinology, hematology and cytology.

Practical exercises in preparation of hematology/cytological examples and microscopy

Special emphasis is placed on interpretation of test results from horses.

### **Mandatory teaching and program requirements:**

At least 80 % attendance and passed “multiple choice test”

Should have had a microscope sample of diagnostic quality approved

## **Reproduction (1.5 ECTS 1week)**

### **Aim and learning outcome**

Give students a solid foundation in order to assume responsibility for the operation of a breeding station for horses.

After completing the course the student should be responsible for the operation of a breeding station for horses.

### **Content**

The following topics are theoretically taught:

Reproductive physiology and pathology, insemination with fresh and frozen semen, obstetrics, diseases on foals.

The following topics are practical: Palpation training.

### **Mandatory teaching and program requirements:**

At least 80 % attendance is required.

## **Horse diseases with emphasis on emergency medical care, horse care and rules concerning doping (4 ECTS, 2 weeks)**

### **Aim and learning outcome**

Provide a detailed theoretical basis for going into the clinical practice of horses in the field.

After completing the course, students will have the theoretical knowledge that is required to go into the ambulatory horse practice.

### **Content**

Lameness diagnostics, Immobilization of fractures in the field, Cardiology, Colic Treatment, Fluid therapy, Wound care, Joint infections, Respiratory diseases, Neurological disorders, Emergency treatment of eye diseases, Descriptions, Care, pony measurement, Waiting periods, Doping regulations.

**Program**

Teaching takes the form of lectures and demonstrations. Students will work on assignments in their self-study time and present it to their teachers and other students.

**Mandatory teaching and program requirements:**

Working with tasks and presenting this work.

**Assessment of academic study subjects:**

To pass the academic specialization all records, papers, presentations and tests must be approved in line with what has been described for each subject. Students may have to wait until next year unless the records, papers, presentations and tests aren't approved after 3 attempts. In addition, the minimum presence must be met. By valid absence of more than 20 % it will be agreed that work experience and a task that must be approved by the responsible of the subject. By not valid absence, the student must follow the subject the following year. The responsible of the subject keeps lists of students with approved topics in academic specialization which are filed. The subject responsible acknowledges the subject as approved on the censorship form to the student.

**Optional program: 6 ECTS**

There are a total of 4 weeks, 6.0 ECTS in which the student can choose from the following programs on horse differentiation:

**External work as an optional part (1.5 ECTS x 4, 1-4 weeks)**

4 weeks of the elective courses can be taken externally at the most. It may be possible to take up to 1 extra optional week internally. This requires 100 % attendance and approved records. This can also take place at acknowledged clinics abroad after the approval of the direction responsible. It is essential that this is a full day horse practice.

**Requirements for approval of external clinics**

The external clinics shall operate both surgical and medical diagnosis and treatment, and have emergency service and patients stabled.

**Responsible:** Carl Fredrik Ihler

**Compound feed quality control of products for production animals and horses (1 week, 1.5 ECTS)****Aim and learning outcome**

To provide students with knowledge of the development of compound feed for production animals and horses and to train students to deal with problems that one might encounter as a practicing veterinarian regarding the quality of the feed.

Be able to assess whether the compound feed may be partial causes of disease states.

**Content and program**

The course will include two days of lectures and discussions that will take place at NVH. One of the days will be at UMB in Ås, where students will be briefed on the activities pursued there when it comes to compound feed development and feeding trials on production animals and horses. Then, there will be a 2 day excursion to Trondheim to "Felleskjøpet" production

plant and research and development for compound feed. It will be held some lectures in Trondheim and there will be a tour of the production plant at Felleskjøpet with an emphasis on the development and quality assurance of the products.

Practical information: Students will have their stay in Trondheim covered. The journey to Trondheim will be covered for the students with a specialization in Equine medicine. The other students have to finance their trip (approx. 1000 NOK) via the department where they are specialization students or they have to cover it their selves.

Maximum number of students is 20. The Specialization students in Equine medicine are prioritized.

**Mandatory teaching and program requirements:**

All days of the course are mandatory to get the course approved.

**Responsible:** Carl Fredrik Ihler

**Scientific and methodological specialization related to the thesis  
(2-4 weeks, 3-6 ECTS)**

**Aim**

Give more time associated with the tasks that require extra preparation.

**Content**

Self-study and preparation work to be able to implement a thesis over 10 weeks.

**Responsible:** Tutor

**Thesis: 10 weeks, 15 ECTS**

See guidelines

**All year:**

**Teaching materials:**

The same literature as in the 7th, 8th and 9th semester

**Recommended prerequisites:**

Based on examination in equine medicine from 9th semester

**Requirements for own equipment**

Work clothes, hard toe shoes, stethoscope and scissors.

**Evaluation**

To pass the differentiation direction in equine medicine, the following two parts must be passed:

- Thesis (15 ECTS): Passed  
Norwegian and English names should be applied the diploma

- Specialization in equine medicine (36.5 ECTS): Passed (consisting of the compulsory part (clinic and subjects) 30.5 ECTS and 6 elective ECTS)

Censorship form and 2 copies of the thesis must be delivered to SFA no later than 1 week before the end of the term for the diploma to be issued to the exam completion.

### **Responsible**

Block responsible: Carl Fredrik Ihler

Subject responsible:

Anesthesia: Andreas Haga

Reproduction: Ragnar Thomassen

Clinical pathology: Stein Istre Thoresen

Radiology: Magnus Rørvik

Horse diseases: Carl Fredrik Ihler

Pre-approval optional elements: Carl Fredrik Ihler

Thesis: Tutor

Responsible head of the department: Ann Margaret Grøndahl

## **Differentiation in Aquatic Medicine (51.5 ECTS)**

### **Aim**

The teaching in the differentiation year in aquatic medicine will provide students with in-depth theoretical and practical knowledge about infectious diseases in farmed salmon, the diagnosis of these, principles about prevention by vaccination and the underlying immunological mechanisms and importance of nutrition for fish health.

## **Academic specialization subjects: 30.0 ECTS**

### **Comparative immunology (3 ECTS, 2 weeks)**

#### **Aim**

Provide an introduction to the basic principles of immunology with a focus on comparative aspects based on current understanding of immune responses in higher vertebrates (mainly mice). Compliance with immune responses in fish will be presented and discussed where these are known and it's relevant.

#### **Content and program**

The teaching consists of lectures and discussions of case. The cases are related to the topics that are covered in the lectures and students are expected to go through and discuss them among themselves and are prepared to answer the questions related to the cases in class. Some practical exercises will also be posted such as blood sampling and anesthesia, practical handling of fish for research.

#### **Learning outcome**

After completing the course the student should be able to explain the immune responses of fish and how these can be measured.

**Mandatory teaching and program requirements:**

Oral test

**Vaccinology (6 ECTS, 2 weeks + work with assignment)****Aim and learning outcome**

Provide an overview of the use of vaccines as a tool to prevent disease in farmed fish.

After completing the course, students should be able to explain the principles of vaccination and propose options for disease control through vaccination for hot-and-cold-water fish species.

**Content**

The course will include an overview of vaccination history (general), use and assessment of the benefits of foil-based vaccines in farmed salmon and a comparison of vaccination procedures in cold-and-hot-water-based aquaculture.

**Program**

The program consists of lectures and group work where students will work on a vaccine application to be submitted by the end of the course for evaluation.

**Mandatory teaching and program requirements:**

Approved group assignment, (vaccine proposal) required.

**Medicine in Aquaculture (2 ECTS, 1 week lectures)****Aim and learning outcome**

Give the student a good introduction to medicine use in aquaculture.

Upon completing the course, the students should know:

- Basic principles of absorption, distribution, metabolism and excretion of drugs in fish.
- Be familiar with the indications for the use and operation of the most common groups of drugs intended for fish.
- Basic concepts for toxicological risk assessment and know and understand how ADI-, MRL-values and retention times are calculated.
- National and international legislation on drug residues in food and feed, and know about the surveillance programs for medication and drug residues in fish.
- Legislation and animal welfare considerations when using fish as experimental animals.

**Content**

The course reviews key principles of fish pharmacology and legislation on drug residues in food and feed. Recent drug groups are examined (anesthetic agents, antiparasitic agents, antibiotics, topical disinfectants). The course will also focus on legislation and animal welfare considerations in the use of fish as experimental animals.

**Program**

Teaching methods are lectures and group discussions. There is also a full day at NIVA's marine research station in Drøbak.

**Mandatory teaching and program requirements:**

Full day trip is mandatory.

Oral test.

## **Infectious diseases in farmed fish (4 ECTS, 2 weeks tuition)**

**Aim and learning outcome**

Provide an overview of the most important infectious diseases in fish with special emphasis on cold-water fish.

After completing the course the students will:

- Have good knowledge of the pathogenic agent of the most important infectious diseases affecting cold water fish.
- Have good knowledge of virulence mechanisms including bacterial antibiotic resistance which is included in the course.
- Be able to explain the basic principles of international law on fish diseases.
- Be able to perform routine sampling for diagnostic examination after autopsy, could suggest methods of preservation of samples for various diagnostic procedures and know the limitations with respect to the possibility of identification of agents that cause disease.
- Be able to perform molecular characterization of a disease-causing organism using the computer.

**Content**

Infectious diseases in fish

Introduction and overview of sampling procedures and analytical methods for parasitological, histopathological, bacteriological and virological investigations

**Program**

Teaching will be a combination of lectures and practical laboratory work.

**Mandatory teaching and program requirements:**

The laboratory portion of the course is mandatory.

Multiple choice test and approval of laboratory reports

## **Clinical nutrition of farmed fish (3 ECTS, 2 weeks)**

**Aim**

Provide an overview of the importance of nutrition for good fish health (with emphasis on salmonids).

**Content**

Nutrition of carnivorous fish species, Introduction and overview of the importance of nutrition as a basis for good health, and the effects of malnutrition

**Learning outcome**

After completing the course the students will:

- Have good knowledge of the nutritional requirements of salmonid fish.
- Have knowledge of nutrient sources used in feed for salmonids.
- The relationship between vegetable and marine feed ingredients in fish feed.
- The importance of anti-nutrients in vegetable feed ingredients.
- The vegetable feed ingredients and intestinal health.

**Program**

Teaching will be a combination of lectures and exercises.

**Mandatory teaching and program requirements:**

Written test

**External work veterinarian/breeding farm (3 ECTS, 2 weeks)****Aim and learning outcome**

Provide an insight into the clinical fish health/aquatic medicine and/or production conditions in a breeding farm for fish.

After the practice period the students will have knowledge of typical, clinical problems in fish farms, understand how to analyze and diagnose disease problems under practical conditions. With the work experience on breeding farms, students will be familiar with the daily feeding and curing routines at a breeding farm.

**Content**

*External work:* Practice with a practicing veterinarian/fish health biologist with involvement in daily tasks/issues.

*Breeding farm:* The presence at a farm with the operator or veterinarian. Review of the daily routines on the farm (feeding, caring, care, clarifications of illness etc.).

**Program**

Students deliver a brief report at the end of the practice period.

**Mandatory teaching and program requirements:**

Mandatory attendance during the entire practice period is required.

**Disease control in Aquaculture (3 ECTS, 2 weeks)****Aim**

Provide an introduction to disease control in aquaculture (with emphasis on salmonids).

**Content**

Theoretical basis for disease control in aquaculture. The students will be introduced to the principles and tools for use in disease control in aquaculture production.

**Learning outcome**

After completing the course the students will:

- Have good knowledge of the principles of disease control in aquaculture.
- Have knowledge of systematization and presentation of data describing the disease in breeding farmed populations.
- Have knowledge of instruments for use in disease control.
- Have knowledge of disease control in wild fish populations (*Gyrodactylus salaris*).
- Have knowledge of methods of cost benefit analysis of the resources used in disease control

**Arrangement**

Teaching will be a combination of lectures, assignments, and presentations by participants from industry, suppliers and management.

**Mandatory teaching and program requirements:**

The course is mandatory for students with aquaculture as a specialization.

Written submission of the thesis is required.

**Responsible:** Arnfinn Aunsmo

**Fish welfare (5 ECTS)****Aim**

Provide an introduction to fish welfare in modern fish breeding (with emphasis on salmonids).

**Content**

Theoretical and practical foundation to understand the concept of fish welfare

Students will get an introduction to and overview of the importance of fish welfare for economic and sustainable production.

**Learning outcome**

After completing the course the students will:

- Have good knowledge of the criteria for the welfare of salmonoids.
- Have knowledge of the concepts used in the field of welfare and understand how it is defined.
- Know comparative aspects of welfare in modern animal husbandry.
- Harvest the practical experience of critical points during the production of salmonids that are important for fish welfare.

**Arrangement**

Teaching will be a combination of lectures, exercises and a field course (practical course)

**Mandatory teaching and program requirements:**

The field course is mandatory.

Written test/submission of assignment

**Responsible:** Trygve Poppe

**Assessment of academic specialization topics:**

To pass the academic specialization, assignments, reports and tests need to be approved in line with what has been described for each subject. Students may have to wait until next year if no assignments, reports and tests are approved after 3 attempts. In addition, the student must attend mandatory activity. If the student has a valid absence of this, it may be accepted with later work experience in the same academic year. If invalid absence, the student must wait until the next time it is held. Subject manager keeps lists of students with approved topics in the academic study and file them. Subject manager acknowledges the subject as approved on the censorship form to the student.

**Thesis seminar 1.5 ECTS (1 week)**

There is a review of the thesis with examples, structure, content, requirements regarding extent. The students present their own prospect.

Responsible: Øystein Evensen

**Elective arrangement: 1.5 ECTS**

There is a total of 1 week, 1.5 ECTS in which the student can choose from the following arrangements in the differentiation in medicine in aquaculture:

**Scientific and methodological specialization related to the thesis.  
(1 week, 1.5 ECTS)**

**Aim**

Give more time associated with tasks that require extra preparation.

**Content**

Self-study and preparation work to accomplish a thesis within 13.5 weeks.

Scientific and methodological specialization related to the thesis through participation in conferences, meetings and self-study in a relevant subject.

**Learning outcome**

After the practice period the students will have detailed knowledge of the academic subject as the thesis deals with.

**Arrangement**

The period may include participation in meetings, work experience in administrative or production environments, or in research environments within the industry.

**Mandatory teaching and program requirements:**

Mandatory attendance. The student submits a brief report.

**Responsible:** Tutor

## **External work experience in companion animals/horses/aqua as an elective part (1.5 ECTS, 1 week)**

Up to one week of the elective courses can be taken externally.

This requires 100 % attendance.

It is essential that this is a full day on a small animal- or horse practice.

The clinic must meet the same requirements for approval that are set in the small animal- and horse direction.

The student must participate in on-call arrangements.

**Responsible:** Øystein Evensen

## **Ambulatory clinic (1.5 ECTS, 1 week)**

### **Aim and learning outcome**

Enhanced hands-on clinical work at individual levels out in the farms/fields with focus on cattle and pigs, as well as some sheep and horse- practice

After the course the student shall have extended knowledge- and skill level with regards to dealing with practical work in clinics on production animals and horses, as well as to assess this against the need to take action at the herd level and to implement such measures.

### **Arrangement**

The teaching will take place in small groups with a lot of self-study under supervision.

Time: Spring semester, or summer or December. Exact time period are agreed upon individually after agreement with Hans Petter Kjæstad, depending on the capacity of the section and adapted to the individual student's participation in mandatory education

### **Mandatory teaching and program requirements:**

Attendance 4 out of 5 days a week and on-call participation. Approval of submitted records.

### **Assessment of the elective part**

Presence and mandatory activities must be conducted.

The responsible for the course hands out diploma/certificate and/or acknowledges the censorship form where the elective part is listed. Only 100 % completed elective arrangement will be approved. It is not possible to take more ECTS than the differentiation year adds up to, ie 60 ECTS in total in the differentiation year (including 1,5 ECTS for the task in the state veterinary medicine).

## **Thesis: circa. 13.5 weeks, 20 ECTS**

See guidelines

## **All year:**

### **Teaching aids**

This is defined by the supervisor and will consist of text books, scientific review articles and original articles, technical reports and other relevant literature.

**Recommended prerequisites**

Based on the examination in medicine in aquaculture from 8<sup>th</sup> semester

**Requirements for own equipment**

No special requirements

**Evaluation**

To pass the differentiation direction of medicine in aquaculture, the following 2 parts must be passed:

- Thesis (20 ECTS): Passed  
Norwegian and English names should be applied to the diploma
- Specialization in medicine in aquaculture (31.5 ECTS): Passed  
(Consists of 30.0 ECTS mandatory part and 1.5 ECTS elective part).

Censorship form and 2 copies of the thesis must be delivered SFA no later than 1 week before the end of the term for the diploma to be issued to exam completing.

**Responsible**

Direction responsible: Øystein Evensen

Subject responsible:

Comparative immunology: Øystein Evensen

Vaccinology: Øystein Evensen

Fish welfare: Trygve Poppe

Disease control in aquaculture: Eystein Skjerve

Infectious diseases in bred farm fish: Espen Rimstad

Drugs in aquaculture: Tor Einar Horsberg

Clinical nutrition: Åshild Krogdahl

External work: Øystein Evensen

Pre-approval elective items: Øystein Evensen

Thesis: Tutor

Responsible head of the department: Mona Aleksandersen

**Project-related Differentiation (51.5 ECTS)****Aim**

Give the students an insight into research life and thereby create interest in research.

**Project assignment: approx. 27 weeks, 40 ECTS****Elective arrangement: 11.5 ECTS**

There are a total of 7 weeks, 11.5 ECTS in which the student can choose from the following programs in the direction of the program:

**Scientific and methodological specialization related to the project assignment (up to 11.5 ECTS)**

The optional part can both provide specialization in the subject that the thesis deals with and consist of methodological training (e.g. laboratory methodology) for use in the thesis or in the writing process (e.g. extended course in experimental design, scientific writing, etc.)

It will only be possible to participate in academic subjects taught in the other differentiation directions when this differentiation is directly relevant to the thesis (e.g. attend on the subject radiology on horses, if the thesis is in radiology at the horse). The exceptions are topics related to aquatic medicine, where all mandatory subjects in the direction with the exception of work experience is considered relevant, when the thesis deals with issues of fish.

It is not possible to take external courses/continuing education courses in the elective section. Self-study in relevant subjects may be accepted. The tutor must ensure the quality of the expertise the candidate has acquired in the given study period.

The elective part must be pre-approved by the tutor.

**Responsible:** Tutor

## **Laboratory animals (1 week, 1.5 ECTS)**

**Aims:** To create interest and knowledge about the diverse roles that a laboratory animal veterinarian has, to increase student's competence in handling and care of the laboratory animals species, to provide students with an ethical perspective and expertise about the use of animals in laboratory context. This will also provide a good knowledge about the rodents and rabbits as the companion animals.

**Content:** Specialization in the care of rodents and rabbits, theory around the use of laboratory animals, ethics and research design.

### **Arrangement**

Theoretical review, work with the thesis and practice at laboratory animal units in the Oslo area.

There must be a minimum of 4 participants for the course to be held. Maximum 12 participant.

### **Mandatory teaching and program requirements:**

Group assignment related to laboratory animals and design of animal experiments. 80 % attendance, and approved tasks are required.

**Responsible:** Kristine Eraker Aasland Hansen

## **Insemination of production animals (1 week, 1.5 ECTS)**

See description in the production animals and food safety differentiation.

### **All year:**

#### **Assessment of the elective part**

Attendance and mandatory activities must be conducted.

Tutor or the responsible for the course gives a diploma/certificate and/or acknowledge the censorship form in which the elective part is listed. Only 100 % completed elective arrangement will be approved. It is not possible to be credited for more than 10 ECTS in the elective part of the project direction.

**Evaluation**

To pass the project differentiation, the following part must be passed:

- Thesis with oral presentation (40 ECTS): Scaled grades  
Norwegian and English names should be applied to the diploma.
- Elective part (11.5 ECTS): Passed

Censorship form and 2 copies of the thesis must be delivered SFA no later than 1 week before the end of the term for the diploma to be issued to exam completion.

**Responsible:**

Responsible for the differentiation: Mona Aleksandersen

Pre-approval of elective parts: Tutor

Thesis: Tutor

Responsible head of department: Mona Aleksandersen

## Appendix 4: Mandate for Curriculum development

### **Mandate for Curriculum Development of Veterinary Medicine Studies.**

On December 13, 2012, NVH's Board approved the School's Study Quality Report for the academic year of 2011/12. The decision will among other things mean that NVH must begin the work on a comprehensive audit of the current curriculum of the veterinary medicine studies. I therefore ask that the Study Committee (SU) starts up this work in the spring of 2013 and initially add a plan to ensure a good process in the development work.

I would like the following general guidelines:

Proposal for a new curriculum to meet the minimum requirements for veterinary medicinal basic education as described in the EU Directive 2005/36 and EAEVEs guidelines. It will also be useful that the SU in its future work look at the requirements for veterinary education as described by AVMA.

NVH shall still have differentiated educational programmes in one form or another, in which all differentiation programmes should provide the basis for authorization from the FSA. The extent and content of differentiation programmes should be evaluated.

It must be arranged for 90 veterinary students per year group, and other matters of importance, when NVH becomes part of a university.

SU must consider whether new teaching methods can be used to renew and increase the efficiency of teaching, particularly regarding the use of IT.

A new study plan will nevertheless not increase the relative demand for teaching resources.

SU must focus on the needs of society for veterinary expertise, and build on documented need for change as they are obtained through the School's study quality work.

The Study Plan will facilitate international exchanges, allowing Norwegian students to take part in the education abroad, and allowing foreign students to do the same at NVH.

I ask that NVH's Board of Directors get a briefing on the plan for the process at the last meeting before the summer (30 May 2013).

In this initial phase, SU needs to discuss some overarching educational policy principles for the Study Plan. It will, among other things, discuss the overall model that the curriculum will be built over. SU should also discuss whether NVH as a principle should have a graded or pass / fail grading system. SU is asked to present a recommendation about these basic principles before the Board.

I wish you good luck with your work!

## Appendix 5: Mandate for the Study Committee for the Veterinary Medicine and Veterinary Nurse Program and School Director

Adopted by the Joint University Board 29.11.2013

### **Purpose**

The purpose of the Study Committee is to:

- Develop and strengthen the vocational education for veterinary surgeons and veterinary nurses
- Ensure international accreditation of both study programs
- Implement NMBU's overall education strategy for the veterinary medicine and veterinary nurse programs
- Ensure good coordination between the departments in order to secure the overall integration of the study programs

### **Responsibilities**

The Study Committee handles and coordinates strategic, academic educational and resource questions concerning the veterinary medicine and veterinary nurse programs. The Student Committee also functions as an advisor for the School Director.

The Study Committee's main task is to:

- Ensure the uniformity, continuity and quality of the veterinary medicine and veterinary nurse programs through working with the study plan and work to ensure that NMBU's goal of quality in education is achieved. This includes working with:
  - Assessing, handling and proposing major revisions of the study plans for the veterinary medicine and veterinary nurse programs as needed
  - Assessing, handling and proposing minor annual changes in the study plans.
  - By working with the study plans, maintain the focus on ensuring that the learning outcomes meet the society's needs and accreditation body's requirements for content and learning outcomes.
  - By working with the study plans, ensure that the teaching methods facilitate the achievement of the learning outcomes and that studies have assessment methods that document this.
- Work to educate candidates that satisfy society's overall needs through the recruitment and admission of the right students as well as the development of society participants in all relevant areas during the studies.
- Follow up on the issues the quality system raises concerning the programs and help the further development of the quality system in order to meet the standards set by the accreditation bodies' requirements and NMBU's education quality system.
- Develop pedagogical and didactic measures for the study programs in collaboration with the central study board at NMBU.
- Manage guidelines and strategies relevant for the study programs.

- Manage the programs for further education courses in veterinary medicine and veterinary nursing.
- Handle any other matters raised by the School Director, including issues regarding education politics.

The Study Committee may appoint ad hoc committees for the study of a particular matter. Any recommendations from the ad hoc committee are handled by the Study Committee.

The Study Committee is chaired by the School Director for the Veterinary Medicine and Veterinary Nurse programs. The School Director has a particular responsibility for ensuring that decisions made are supported by the students and departments. This is to be done by consulting them on relevant processes. All changes in study plans, strategies and guidelines must be sent for consultation to the all departments and students. The results of the consultation shall be presented to the relevant board before any decisions.

The department representatives and student representatives have a particular responsibility to inform the department staff and their fellow students about up-coming issues to be considered in the Committee and discussions that have been in the Committee, and to inform the committee of the departments' and the students' views.

The School Director and department representatives in the committee are also present at the meetings of the Central Study Committee of NMBU.

## **Members of the study committee**

The study committee consists of:

	Number
School Director	1
Representative from the Department of Basic Sciences and Aquatic Medicine	1
Representative from the Department of Food Safety and Infection Biology	1
Representative from the Department of Production Animal Clinical Sciences	1
Representative from the Department of Companion Animal Clinical Sciences	1
Director for the Veterinary Nurse program	1
Student representatives	2

Each department board appoints its representative on the committee, with a personal deputy. The term is four years. The Students' Political organization VSU appoints two student representatives with a deputy for each of the representatives. If both the student representatives are veterinary medicine students, a representative of the veterinary nurse students must be present when matters concerning the veterinary nurse program are treated. The Head of the Veterinary Medicine and Veterinary Nurse Studies in the administration functions as the secretary of the Study Committee.

The secretary is responsible for the minutes of the meetings of the committee. The minutes shall be made available on-line.

The School Director in cooperation with the secretary shall convene the meeting; a meeting must be held at least once a month.

## **Responsibilities of the School Director**

The Chair of the Study Committee is titled School Director.

The School Director is appointed by the Dean of the Faculty of Veterinary Medicine and Biosciences. The School Director must be a veterinarian with teaching, research and educational qualifications and /or experience and shall be appointed for a term of four years. School Director is responsible for ensuring that the Study Committee's tasks are attended to and responsibilities are met.

The School Director takes part in meetings of the Central Study Committee of NMBU along with the four department representatives as the representatives of the veterinary medicine and veterinary nurse programs.

The School Director, in cooperation with the Secretary of the Committee, has the responsibility for summoning meetings.

The School Director works closely with the Heads of Departments responsible for the veterinary medicine and veterinary nurse programs, the Head of Study and the Dean of the Faculty of Veterinary Medicine and Biosciences.

The School Director has a particular responsibility for ensuring that decisions made are supported by the students and departments. This is to be done by consulting them on relevant matters. All changes to study plans, strategies and guidelines must be sent for consultation to all departments and the students. The results of the consultation shall be presented to the relevant board before any decision is made.

Responsibilities:

- Chair the Study Committee.
- Adopt the minor annual adjustments to the current framework of the study- and semester plans.
- Initiate all major revisions of the study plans in the Study Committee.
- Present proposals for major changes in the study plans of the veterinary medicine and veterinary nurse programs to the Faculty Board.
- Responsible for contacts with national and international educational and accreditation bodies for veterinary medicine and veterinary nurse education. The School Director carries the responsibility for ensuring that the veterinary medicine and veterinary nurse program meet the accreditation bodies' requirements.
- Establish contact with relevant employers of graduates from programs, including businesses, government agencies and interest organizations.
- Establish contact and hold regular meetings with the veterinary student council.
- Maintain contact with the program committees of other relevant programs at NMBU, particularly within the Faculty of Veterinary Medicine and Biosciences.
- Coordinate efforts with strategies delegated by the departments within the educational activities and present this for the relevant board (department boards or faculty board).
- Decision-making authority delegated by the departments on matters relating to the establishment of the Committee for local admissions, termination of studies, study plans, study abroad, leave and facilitation of studies, language on exam, the study's assessment arrangements as described in the course description, registration of mandatory activities in the administrative system FS and the appointment of

examiners to regular assessment and re-assessment as presented in NMBU's regulations and Guidelines.

When a student applies for exemption from a subject, special adaption of the studies or for having the examination in another language, the relevant academic personnel must be consulted before making a decision in cases where it is questionable whether this is academically equivalent or if of practical/economic importance to the Department.

- Decision-making authority in matters related to students' study progression and granting of additional attempts at exams, as specified in the supplementary guidelines to NMBU's regulations and rules for this in the study plans.
- Decision-making authority delegated by the departments to approve the study's guidelines. The guidelines further specify who has the authority for decision-making.
- Decision-making authority delegated by the departments for approving further education courses.
- Responsible for the establishment of student exchanges and education agreements with national and international partners.
- Responsible for initiating replacement admission and adoption of admission frames.
- Function as an advisor for the Norwegian Food Safety Authority when consulted on authorization cases.
- The School Director may when needed appoint other permanent advisory committees.
- The School Director may receive other tasks from the Dean.

The administrative section with special responsibility for veterinary medicine and veterinary nurse programs provides administrative support and administers the regulations that are delegated to the School Director. The School Director may delegate decision-making authority to the Section where this is appropriate.

## Appendix 6: NMBU in a nutshell

### Norwegian University of Life Sciences, NMBU, in a nutshell

#### Vision:

#### Knowledge for Life

NMBU is tailor-made to address the global challenges of our time and will contribute to the sustainability of the livelihood of future generations through excellence in research, education, innovation and dissemination of information.

#### Mission:

#### NMBU will

- Be a constructive, forward thinking and critical education- and research institution that cooperates with other universities and research institutions from all over the world in order to develop new knowledge.
- Educate candidates that are competent and reflective, who have an international perspective and are acclaimed participants nationally and internationally.
- Perform research on a high international level and conduct world-leading research in specific areas.
- Together with the research institutions on Campus Ås be able to compete internationally in the area of life science, through development and synergies in research and new interdisciplinary approaches.
- Encourage the students to participate in a creative study and learning community with long traditions.

#### NMBU will have specific responsibility for

- Research that can address the major global challenges related to the environment, sustainable development, improved human and animal health, climate change, sources of renewable energy, food production "from stable and fjord to table", and land and natural resource management.
- Educating students in environmental sciences, biosciences, veterinary medicine and new interdisciplinary study programs to provide society with sustainable development for the benefit of present and future generations.
- Innovation, dissemination of knowledge and participation in the global efforts towards sustainable development in areas in which NMBU is at the research frontier.

#### Key numbers:

- Established 01.01.2014
- 1700 staff
- 5000 students
- Three campuses (Ås, Adamstua and Sandnes)
- 3 faculties
  - Veterinary medicine and biosciences
    - 7 departments
  - Social sciences
    - 3 departments
  - Environmental sciences and technology
    - 3 departments
- New facilities for veterinary medicine (including National Veterinary Institute)
  - Largest infrastructure investment in the university- and college sector ever
  - 63 000 m<sup>2</sup>
  - To be finished in 2019

- New Animal Production Experimental Center
  - To be finished in 2015

**Pictures of the new veterinary facilities at NMBU/Campus Ås**  
 (<http://www.statsbygg.no/Byggeprosjekter/Samlokalisering-pa-Campus-As/>)

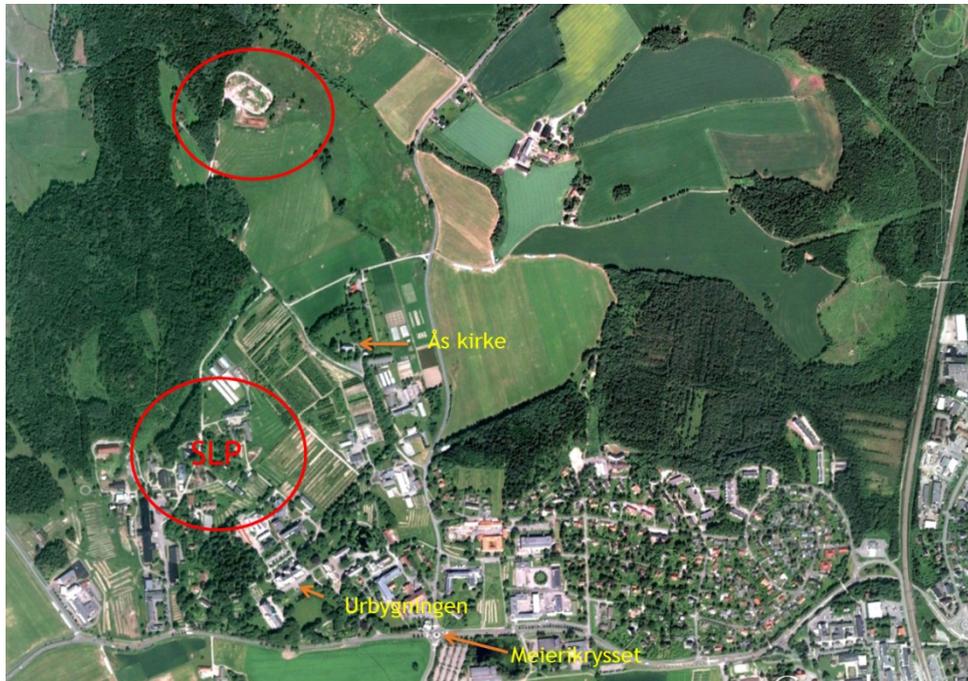


Figure 1: Campus Ås. Urbygningen = the old Clock building. SLP (red circle) = The new veterinary facilities. Other red circle = New Center for Production Animal Experiments



Figure 2: An overall plan:

*Buildings 151 and 152:* Laboratory buildings, including teaching laboratories and offices ground floor. Building 152 includes some research animal facilities.

*Building 153:* Morphology, anatomy, section hall (NMBU and Veterinary Institute).

*Building 154:* “Tree of Knowledge”, offices, meeting rooms, auditoriums.

*Building 155:* Small animal clinics and horse clinics, including imaging facilities.

*Building 156:* Production animal clinics and research animal facilities.

*Building 343:* Library, canteen, study areas and large auditorium

*Buildings 142 and 143:* National Veterinary Institute



Figure 3: Model of the veterinary facilities at Campus Ås. Left: seen from north with the National Veterinary Institute in front. Middle: Seen from south-west, from the new main entrance to the university campus. Small animal and horse clinics in front. Right: Entrance to the “Tree of Knowledge” from north.



Figure 4: Inside the «Tree of Knowledge».



Figure 5: The library/canteen/study areas building



Figure 6: New Center for Production Animal Experiments