Course: **Animal Breeding and Production**

UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
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Division: Animal Production and Biotechnology
Organizational unit: Animal Breeding and Livestock Production
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Register No of the organizational unit: 61-09-2023-19
Zagreb, 06/02/2023

COURSE SYLLABUS

Course name: **Animal Breeding and Production** (4th semester)

Academic year 2022/2023

Course leader: Full Professor (permanent) Anamaria Ekert Kabalin, PhD
Deputy course leader: Full Professor (permanent) Velimir Sušić, PhD

Associate teachers: Full Professor (permanent) Anamaria Ekert Kabalin, PhD
Full Professor (permanent) Velimir Sušić, PhD
Associate Professor Maja Maurić Maljković, PhD
Associate Professor Sven Menčik, PhD
Postdoctoral assistant Ivan Vlahek, PhD
Teaching assistant Aneta Piplica

First day of classes: 01/03/2023

Last day of classes: 12/05/2023

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Timetable for LECTURES academic year 2022-2023 (4th semester)

LECTURES				
Date	**Methodological unit**	**Teacher**	**Location / time**	**Literature**
01/03/2023 1st lecture	Introduction to genetic improvement of animals. Phenotype/genotype of qualitative and quantitative traits. Inheritance and variability of traits. Breeding methods.	Full Professor (permanent) Velimir Sušić, PhD	Lecture Room Physics and Biophysics 8am -10am	According to the list of required and optional literature
07/03/2023 2nd lecture	The Hardy–Weinberg principle. Introduction to genetic improvement of animals by selection. Selection of animals with regard to qualitative traits	Associate Professor Maja Maurić Maljković, PhD	Lecture Room Physiology 12pm -2pm	According to the list of required and optional literature
15/03/2023 3rd lecture	Selection of animals with regard to quantitative traits (1)	Associate Professor Sven Menčik, PhD	Letrure Room Physiology 2pm – 4pm	According to the list of required and optional literature
17/03/2023 4th lecture	Selection of animals with regard to quantitative traits (2)	Associate Professor Sven Menčik, PhD	Letrure Room Microbiology 10am -12pm	According to the list of required and optional literature
21/03/2023 5th lecture	Introduction to evaluation of the breeding value (1) – definition, presentation and interpretation of the breeding value	Full Professor (permanent) Anamaria Ekert Kabalin, PhD	Lecture Room Physiology 10am – 12pm	According to the list of required and optional literature
28/03/2023 6th lecture	Introduction to evaluation of the breeding value (2) – methods for estimation of breeding values	Full Professor (permanent) Anamaria Ekert Kabalin, PhD	Lecture Room Pharmacology 2pm – 4pm	According to the list of required and optional literature
12/04/2023 7th lecture	Biotechnological methods in animal breeding. Procedures for the improvement of animal populations.	Associate Professor Sven Menčik, PhD	Lecture Room Physiology 8am – 9:45am	According to the list of required and optional literature

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Timetable for SEMINARS academic year 2022-2023 (4th semester)

SEMINARS					
Date	**Methodological unit**	**Teacher**	**Group**	**Location / time**	**Literature**
18/04/2023 1st seminar	Breeding programs in breeding of cattle, sheep and goats	Full Professor (permanent) Velimir Sušić, PhD	1, 2, 3	e-learning 5pm – 6:30pm	Selected chapters from the books, textbooks and other publications. Presentations of data from on-line basis.
05/05/2023 2nd seminar	Breeding programs in breeding horses, dogs and cats	Full Professor (permanent) Anamaria Ekert Kabalin, PhD	1, 2, 3	e-learning 4:30pm – 6pm	Selected chapters from the books, textbooks and other publications. Presentations of data from on-line basis.
11/05/2023 3rd seminar	Breeding programs in breeding of pigs and poultry	Associate Professor Sven Menčik, PhD	1, 2, 3	Large and Small computer hall Animal Breeding and Livestock Production 10am – 12pm	Selected chapters from the books, textbooks and other publications. Presentations of data from on-line basis.

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Timetable for PRACTICALS academic year 2022-2023 (4th semester)

PRACTICALS

Date	Methodological unit	Teacher	Type of practical (Article 31. of Regulation)	Group	Location / time	Literature
03/03/2023 1st practical	Evaluation of crossbreeding effects and inbreeding effects. Examples of calculations of heterosis effect, inbreeding coefficient of and the coefficient of relationship	Associate Professor Maja Maurić Maljković, PhD Teaching assistant Aneta Piplica	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 2pm - 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
03/03/2023 1st practical	Evaluation of crossbreeding effects and inbreeding effects. Examples of calculations of heterosis effect, inbreeding coefficient of and the coefficient of relationship	Postdoctoral assistant Ivan Vlahek, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 4pm – 6pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
13/03/2023 2nd practical	Selection of animals with respect to qualitative traits – changes in the frequency of genes and genotypes	Postdoctoral assistant Ivan Vlahek, PhD Teaching assistant Aneta Piplica	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 8am – 10am	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
14/03/2023 2nd practical	Selection of animals with respect to qualitative traits – changes in the frequency of genes and genotypes	Associate Professor Maja Maurić Maljković, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 10am – 12pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
20/03/2023 3rd practical	Colloquium 3	Associate Professor Sven Menčik, PhD Postdoctoral assistant Ivan Vlahek, PhD	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 8am – 10am	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform Colloquium: Lectures no. 1, 2 and 3, as well as intramural practicals 1 and 2.
21/03/2023 3rd practical	Colloquium 3	Full Professor (permanent) Anamaria Ekert Kabalin, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 12pm – 2pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform Colloquium: Lectures no. 1, 2 and 3, as well as intramural practicals 1 and 2.

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23/03/2023 4th practical	Selection of animals with regard to quantitative traits – data processing and evaluation of the selection differential	Associate Professor Sven Menčik, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 10am – 12pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
23/03/2023 4th practical	Selection of animals with regard to quantitative traits – data processing and evaluation of the selection differential	Full Professor (permanent) Anamaria Ekert Kabalin, PhD Teaching assistant Aneta Piplica	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 12pm – 2pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
24/03/2023 field course	Farm for the production of beef meat	Full Professor (permanent) Anamaria Ekert Kabalin, PhD Associate Professor Sven Menčik, PhD Postdoctoral assistant Ivan Vlahek, PhD	Field practical	1, 2, 3	Poljanski Lug 10am – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
29/03/2023 5th practical	Selection of animals with regard to quantitative traits – evaluation of selection effect	Teaching assistant Aneta Piplica	Practical in practicum	3	Animal Breeding and Livestock Production 4pm – 6pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
30/03/2023 5th practical	Selection of animals with regard to quantitative traits – evaluation of selection effect	Full Professor (permanent) Anamaria Ekert Kabalin, PhD Associate Professor Sven Menčik, PhD	Practical in practicum	1, 2	Animal Breeding and Livestock Production 2pm – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
11/04/2023 6th practical	Breeding value of animals – interpretation and comparison within species	Associate Professor Maja Maurić Maljković, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 10am – 12pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
11/04/2023 6th practical	Breeding value of animals – interpretation and comparison within species	Associate Professor Maja Maurić Maljković, PhD Postdoctoral assistant Ivan Vlahek, PhD	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 12pm – 2pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform

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12/04/2023 field course	Horse stud farm Cattle dairy farm	Associate Professor Maja Maurić Maljković, PhD Postdoctoral assistant Ivan Vlahek, PhD Teaching assistant Aneta Piplica	Field practical	1, 2, 3	Križevci 10am – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
20/04/2023 7th practical	Colloquium 4	Full Professor (permanent) Anamaria Ekert Kabalin, PhD Teaching assistant Aneta Piplica	Practical in practicum	1, 2	Animal Breeding and Livestock Production Large and small computer hall 8am – 10am	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform Colloquium: Lectures no. 3, 4, 5, 6, and 7, as well as intramural practicals 4, 5, and 6.
24/04/2023 7th practical	Colloquium 4	Associate Professor Sven Menčik, PhD	Practical in practicum	3	Animal Breeding and Livestock Production Small computer hall 2pm – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform Colloquium: Lectures no. 3, 4, 5, 6, and 7, as well as intramural practicals 4, 5, and 6.
27/04/2023 field course	Breeding horse farm + breeding Gidran (Bjelovar border guards – Hussars)	Associate Professor Maja Maurić Maljković, PhD Postdoctoral assistant Ivan Vlahek, PhD Teaching assistant Aneta Piplica	Field practical	1, 2, 3	Križevci - Bjelovar 10am – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform
12/05/2023 field course	Different farm models for the production of beef meat	Full Professor (permanent) Anamaria Ekert Kabalin, PhD Associate Professor Maja Maurić Maljković, PhD Associate Professor Sven Menčik, PhD	Field practical	1,2,3	Sljeme 10am – 4pm	Prepared written materials of lectures and practicals available via on-line LMS-VEF platform

STUDENT OBLIGATIONS

<table>
<tr><td>Lecture attendance</td><td>During 4th semester maximal number of points from this evaluation element is 2.47 (the lowest number of points that a student should gain from this element is 1.24).
Every hour of lecture (from a total of 14 hours) contributes with 0.176 points. The student must attend at least 7 hours of lectures to obtain minimal number of points.</td></tr>
<tr><td>Seminars attendance</td><td>During 4th semester maximal number of points from this evaluation element is 2.5 (minimal is 1.5 points).
A total of 6 hours of seminars are held in 3 terms of two hours each. The student must attend at least 2 terms of the seminar to obtain minimal number of points.</td></tr>
<tr><td>Practicals attendance</td><td>During 4th semester maximal number of points from this evaluation element is 2.8 (minimal is 1.8 points).
Within a total of 26 hours 7 terms of practicals on the Faculty (intramural paracsticals of two hours each) and 4 terms of „extramural" practicals (farm visits) are included. Students are obliged to attend at least 5 terms of the practicals on the Faculty and all farm-visits (4 extramural practicals) to obtain minimal number of points (in the case of justifiable absence from the farm visit, the student must write an additional seminar).</td></tr>
<tr><td>Active participation in seminars and practicals</td><td>During 4th semester maximal number of points from this evaluation element is 4 (minimal is 2.19 points).
For each successfully written seminar (preparation) and for successfully completed assignment on the practical, the student receives 0.31 points.

The minimum number of points a student must earn from activities in seminars and practicals is 2.19: at least 0.63 points should be obtained on seminars (at least 2 successfully written seminars) and 1.56 points should be obtained for activity on practicals (5 successfully completed tasks).
The student can earn an additional 0.5 points for successful oral answer on practicals or seminar presentation.

If the student successfully writes all the seminars (3) and successfully completes the tasks on practicals (7), he / she can earn a total of 3.13 points. The remaining activity points (up to a maximum of 4) may be obtained through oral answers and presentations at seminars and practicals.</td></tr>
<tr><td>Final exam</td><td>The final exam consists of a written and oral part. To access to the written part student must fulfill the obligations of 3rd and 4th semesters according to the following table:

<table>
<tr><th>Type of activity</th><th>Minimal points</th><th>Maximal points</th></tr>
<tr><td>Lecture attendance</td><td>3</td><td>6</td></tr>
<tr><td>Seminar attendance</td><td>4</td><td>6</td></tr>
<tr><td>Practical attendance</td><td>4</td><td>6</td></tr>
<tr><td>Active participation in seminars and practicals</td><td>5</td><td>10</td></tr>
<tr><td>Continuous knowledge-checking</td><td>20</td><td>32</td></tr>
<tr><td>Total</td><td>36</td><td>60</td></tr>
</table>
Number of points on the written and oral part of the final exam:</td></tr>
</table>

	Final exam Written part — Minimal points: 12 — Maximal points: 20 Oral part — depends on the number of points on a written exam* — Maximal points: 20 *In total, students must have at least 24 points on the written and oral part of the exam. The score for the oral exam can not be less than 5
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine(2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. Article 41: a student can justifiably be absent from up to 50 % of the lectures; 20% of the seminars and 20 % of the practicals.

GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	After two colloquia in 3rd semester, students must successfully solve colloquia 3 and 4 in 4th semester Colloquium 3: minimal 5 points, maximal 8 points (20/03/2023 and 21/03/2023) Colloquium 4: minimal 5 points, maximal 8 points (20/04/2023 and 24/04/2023) Compensations: 15/05/2023 26/05/2023 12/06/2023
Final exams (dates)	24/05/2023 13/06/2023 04/07/2023 05/09/2023 19/09/2023
Form of final exam	Written and oral

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LITERATURE

Obligatory literature	Prepared materials available via on-line LMS-VEF platform. Radostits, O.M.: Herd Health. W.B. Saunders Company. Philadelphia, 2001. (selected chapters) Lasley, J.F.: Genetics of Livestock Improvement. Prentice-Hall, Inc., New Jersey, 1987. (selected chapters) Jiang, Ott: Reproductive genomics in domestic animals, 2010. (selected chapters) FAO: Marker assisted selection, 2007. (selected chapters) Pierce: Genetics, 2003. (selected chapters) Muir, Aggrey: Poultry genetics, breeding and biotechnology, 2003. (selected chapters) Houghton Brown, Pilliner,Davies: Horse and stable management, 2003. (selected chapters) Root Kustritz: The dog breeders guide to successful breeding and health management, 2006. (selected chapters) Vella, Shelton, McGonagle, Stanglein: Robinsons genetics for cat breeders and veterinarians, 2003. (selected chapters) prepared materials for lectures, seminars and practicals
Optional literature	Lokhorst, Groot Koerkamp: Precision livestock farming, 2009. Axford, Bishop, Nicholas, Owen: Breeding for disease resistance in farm animals, 2000. Field, Taylor: Scientific farm animal production, 2009. Brand, Nordhuisen, Schukken: Herd health and production management in dairy practice, 1997.

OBJECTIVES AND LEARNING OUTCOMES

Course objectives	The objective of the course Animal breeding and production is to teach students of veterinary medicine how to evaluate and improve genetic basis of animals. In the 4th semester special attention is focused on genotype-phenotype characteristics which have influence on quality and quantity of animal products, than to the characteristics of animal resistance to diseases and animal organism -environment interactions
Learning outcomes	After successfully completion of the course students will be able to: - understand the role of genetic basis in different ways of breeding and exploiting animals - apply different methods to improve the genetic basis of animals with respect to specific breeding traits - identify various animal production systems - gather animal health and production data - analyse animal health and production data - setting the goals in cooperation with farmer - control advancement according to set goals - control advancement according to set goals

GRADING SCHEME

Points	*Grade*
Up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

Course leader:

Full Professor Anamaria Ekert Kabalin, PhD

Head of organizational unit:

Full Professor Anamaria Ekert Kabalin, PhD

Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.