UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
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Department of Animal Breeding and Livestock Production
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Register no.: 61-09-2018-171
File no.:
Zagreb, August 30, 2018

COURSE SYLLABUS

Course name:

Basic statistics in veterinary medicine

Academic year 2018-19

Course leader: Sven Menčik, PhD, Assistant Professor

Teachers: Velimir Sušić, PhD, Full Professor,
Anamaria Ekert Kabalin, PhD, Full Professor,
Maja Maurić, PhD, Assistant Professor

Associate teachers: Ivan Vlahek, DMV

First day of classes: October 9, 2018

Last day of classes: November 7, 2018

Timetable for LECTURES academic year 2018-2019

LECTURES				
Date	**Methodological unit**	**Teacher**	**Location / time**	**Literature**
9/10/2018	Statistics – definition, development, application in veterinary, biomedical and animal science, use of computers in statistics and data analysis. Variables – the nature of expression and scales of measurement. Data collection – definition and size (population and sample). Statistical observation and collecting the data.	Sven Menčik, PhD, Asst. Professor	Location: Department of Microbiology and Infectious Diseases with Clinic Time 14 -16 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).
10/10/2018	Meaning and using of representative values of statistic data collection - arithmetic mean, geometric mean, harmonic mean, median, mode. measures of dispersion - variance, standard deviation, range, coefficient of variation. measures of layout - measures of asymmetry and kurtosis. Data collection outline, tables and graphs.	Maja Maurić, PhD, Asst. Professor	Location: Department of Animal Breeding and Livestock Production Time 14 – 16 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).
15/10/2018	Learning objectives and calculation of the indicators variability in the statistical data set. Measures of dispersion (spread) - variance, standard deviation, range, interquartile range, coefficient of variation. Measures of layout - measures of asymmetry and kurtosis.	Velimi Sušić, Full Professor, e-learning	Location: Department of Microbiology and Infectious Diseases with Clinic, and small computer hall (Department of Animal Breeding and Livestock Production) Time 14 – 16 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).

17/10/2018	The concept and expression of probability. Relevance and definition of probability. Continuous probability distributions – normal (Gaussian), Student's t-, Chi-squared and F-distribution. Single result status in distribution and errors while working with samples. The representativeness of the sample according to population - the type and size of the sample, the standard error of the sample.	Maja Maurić, PhD, Asst. Professor	Location: Department of Animal Breeding and Livestock Production Time 8 – 10 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).
23/10/2018	Relevance and definition of probability. Continuous probability distributions – normal (Gaussian), Student's t-, Chi-squared and F-distribution. Single result status in distribution and errors while working with samples. The representativeness of the sample according to population - the type and size of the sample, the standard error of the sample. Determination of the confidence interval for the mean. An introduction to statistical hypothesis-definition, acceptance and rejection.	Anamaria Ekert Kabalin, Full Professor, e-learning	Location: Department of Animal Breeding and Livestock Production – large computer hall Time 8 -10 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).
25/10/2018	Introduction to hypothesis testing-parametric and non-parametric tests; test choosing criteria. Hypothesis testing. Parametric test for analyses (Student's t-test for independent samples, t-test for dependent samples, One-way ANOVA and Repeated Measure ANOVA) and Non – parametric test for analyses (Mann-Whitney U-test, Wilcoxon rank sum test, Kruskall-Wallis analysis of variance, Friedman two way ANOVA and Chi-squared test).	Anamaria Ekert Kabalin, Full Professor	Location: Department of Animal Breeding and Livestock Production Time 10 - 12 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel).

25/10/2018	Introduction to linear correlation and regression analysis. Introduction to further regression analysis. Introduction to the basic of R program.	Sven Menčik, PhD, Asst. Professor, e-learning	Location: Department of Microbiology and Infectious Diseases with Clinic, and small computer hall (Department of Animal Breeding and Livestock Production) Time 14 – 16 h	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013. Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011. Manuals of statistical software (SAS, Statistica, Excel, R).

Timetable for PRACTICALS academic year 2018-2019

PRACTICALS						
Date	**Methodological unit**	**Teacher**	**Type of practical**	**Group**	**Location / time**	**Literature**
12/10/18	Descriptive statistics - Data entry and processing in Statistica program	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 16 to 18 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises
19/10/18	First (1st) self-check exam based on five questions in the LMS System. Descriptive statistics. Finding the data entered into the program. Basic data processing.	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 12 to 14 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises
22/10/18	Second (2nd) self-check exam based on five questions in the LMS System Descriptive statistics. Input and basic data processing. Testing normality of data distribution (Kolmogorov-Smirnov test).	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 12 to 14 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises

24/10/18	Third (3rd) self-check exam based on five questions in the LMS System Descriptive statistics. Input and basic data processing. Processing and display of the data Testing normality of data distribution.	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 14 to 16 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises
29/10/18	1st colloquium and the fourth (4th) self-check exam based on five questions in the LMS System. Parametric test for analyses (Student's t-test for independent samples, t-test for dependent samples, One-way ANOVA and Repeated Measure ANOVA)	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 8 to 10 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises
31/10/18	2nd colloquium and the fifth (5th) self-check exam based on five questions in the LMS System. Non – parametric test for analyses (Mann-Whitney U-test, Wilcoxon rank sum test, Kruskall-Wallis analysis of variance, Friedman two way ANOVA and Chi-squared test).	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 8 to 10 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises

5/11/18	3rd colloquium and the fifth (6th) self-check exam based on five questions in the LMS System. Introduction to linear correlation and regression analysis. Introduction to further regression analysis.	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 8 to 10 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica) Prepared written materials of lectures and excercises
7/11/18	4th colloquium and the seventh (7th) self-check exam based on five questions in the LMS System. Introduction to the basic of R program. Independent analysis, processing and display of the data in Microsoft Excel (Student's t-test, Mann-Whitney U test, correlation and regression and chi-square test)	Teachers and associate teachers within Department of Animal Breeding and Livestock Production	exercises – work in statistical program	1 and 2	Location: Department of Animal Breeding and Livestock Production – Large and Small computer hall Time: 14 to 16 h	Statistics for Veterinary and Animal Science (Petrie & Watson, Blackwell Publishing) Manuals of statistical software (Statistica; Excel, R) Prepared written materials of lectures and excercises

STUDENT OBLIGATIONS

Lecture attendance	Attending lectures and e - learning: a total of 6 points (the lowest number of points that a student should gain from this element is 3 points)
Practicals attendance	Attendance exercises: a total of 12 points (the lowest number of points that a student should gain from this element is 8,4 points)
Active participation in practicals	Active participation in exercises (solving and interpretation of tasks): a total of 10 points (the minimum number of credits that a student should gain from this element is 5 points). During the term students have to fulfil the given assignments in eight programme exercises regarding the input, analysis and saving data. Each successful exercise or task earns them 0,5 points. During the periods of the second (2^{nd}) to the seventh (7^{th}) exercise, the students will have to do a self-check exam based on five questions in the LMS System, according to the given exercise topic. Each successful self-check exercise with more than 50% of correct answers earns them 0,5 points. During oral examination revision periods, as well as after every finished exercise, students are allowed to interpret the given results and can get another extra point there. For the successful task completion and independent data analysis using Microsoft Excel students can earn another point. During the term students need to achieve a minimum of 5 points (different combinations in solving programme exercises, self-checks, oral results interpretations / oral exams). A maximum number of points here is 10.
Final exam	Final exam: a total of 40 points (the lowest number of points that a student should gain from this element is 24 points)
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. **Article 45:** a student can justifiably be absent from up to 50 % of the lectures; 30% of the seminars and 30 % of the exercises.

GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	Continuous knowledge checking (colloquia): a total of 32 points (the minimum number of credits that a student should gain from this element is 20 points). During the term at the beginning of the regular exercise hours there will be organized four (4) colloquia as a written assessment of knowledge. Each of the colloquia carries 8 points, student must successfully solve at least 50% to achieve a minimum of 4 points. From all the colloquia student must achieve at least 20 points.	
Final exams (dates)	Final exam schedule for winter session 2018/2019: – November 28, 2018 – December 12, 2018 – January 14, 2019 – January 30, 2019 – February 13, 2019 –	
Form of final exam	written	

LITERATURE

Obligatory literature	Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013.
Optional literature	Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011 Manuals of statistical software (Statistica, Excel, R). Prepared written materials of lectures and exercises.

OBJECTIVES AND LEARNING OUTCOMES

Course objectives	Adoption of facts about the significance of statistics for veterinary profession, getting theoretical and practical skills necessary for optimal planning and performing statistical observation, as well as data analysis and concluding about principles of events in veterinary medicine. Students will learn about different software system with the aim of achieving new skills related to different program environments during the statistical analysis.
Learning outcomes	Acquiring knowledge about the collection, processing and presentation of statistical data sets and their analysis and interpretation. Hypothesis, their evaluation and testing in veterinary medicine. Criteria for the selection of individual tests. Interdependence of characteristics and the possibility of their application in veterinary medicine After successful completion of the course the student will be able to: - identify the types of variables, - interpret the results of basic statistical data processing and analysis, - determine the normality of variables, - select the test to verify the hypothesis, - determine the correlation between two or more variables - familiarize with programming environments for statistical analysis

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:

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Asst. Prof. Sven Menčik, PhD, DVM

Head of Department/Clinic:

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Asst. Prof. Sven Menčik, PhD, DVM

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

GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES, SEMINARS and PRACTICALS

Type of activity	Minimum number of points	Maximum number of points
Lectures attendance	**3**	**6**
Seminar attendance	**4**	**6**
Practicals attendance	**4**	**6**
Active participation in seminars and practicals	**5**	**10**
Continuous knowledge checking (mid-terms)	**20**	**32**
Final exam	**24**	**40**
TOTAL	**60**	**100**

GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES and SEMINARS

Type of activity	Minimum number of points	Maximum number of points
Lecture attendance	**3**	**6**
Practicals attendance	**8**	**12**
Active participation in practicals	**5**	**10**
Continuous knowledge checking (mid-terms)	**20**	**32**
Final exam	**24**	**40**
TOTAL	**60**	**100**

GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH SEMINARS and EXCERCISES

Type of activity	Minimum number of points	Maximum number of points
Seminar / practicals attendance	**11**	**18**
Active participation in seminars and practicals	**5**	**10**
Continuous knowledge checking (mid-terms)	**20**	**32**
Final exam	**24**	**40**
TOTAL	**60**	**100**