University of Zagreb Faculty of Agriculture
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Basics of lactation and machine milking (197693)

Course coordinator

Prof. Alen Džidić, PhD

Course description

Student will be introduced to the concept of growth and development of the mammary gland of domestic animals and milk ejection. Importance of the good udder morphology for the machine milking will be shown. Udder morphology evaluation will be shown in practicals. Proper premilking teat preparation in conventional and in the milking robot will be explained. Practical part of the cours will include milk flow measurement at farm with detailed description in the lab afterwards. All concepts of machine milking (machine milking in the bucket in the barn, milkline milking in the barn, milking parlour milking), milking machine components and cleaning and maintenance procedures will be aquired during the course. Concepts of robotic milking, corresponding cow traffic and their influence on milk production will be shown during the course. Course will be held in the classroom, on the farm practical and evaluation of the farm gathered dana in the lab afterwards. Final grade will be based on the oral exam.

ECTS: **3.00**

E-learning: **L1**

Teaching hours: 30
Lectures: 18
Practicum: 12
Seminar: 0

Associate teacher for exercises

- Assoc. Prof. Dragica Šalamon, PhD

Grading

Sufficient (2): 60-70%
Good (3): 71-80%
Very good (4): 81-90%
Excellent (5): 91-100%

Type of course

- Undergraduate studies / BS Courses taught in English (Elective course, 2 semester, 1 year)

General competencies

Application and usage of the machine milking in different domestic animals and robotic milking in cows.

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Types of instruction

- Lectures
- Field work
- Exercises

Learning outcomes

Learning outcome	Evaluation methods
Understand how to obtain maximal quantity and good quality of milk quickly and completely.	Written exam, oral exam
Understand differences between mammary glands of domestic animals which produce milk on farms.	Written exam, oral exam
Solve problems due to not properly functioning of the milking machine and to prevent negative consequences on the udder health of domestic animals.	Written exam, oral exam
Know how to apply proper machine and robotic milking in domestic animals.	Written exam, oral exam

Working methods

Students' obligations

Student attendance during lectures, field work and exercises.

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Weekly class schedule

1. Mammary gland - structure - Description of the mammary gland structure, growth and development.
2. Mammary gland – milk secretion - Milk secretion and peripheral and central inhibition of oxytocin secretion.
3. Milk fractions - Alveolar and cisternal milk fraction description.
4. Proper teat preparation for machine milking - Description of the proper premilking teat preparation in different species.
5. Proper teat preparation for machine milking - measurements - Measurements on the farm during premilking teat preparation and milking.
6. Proper teat preparation for machine milking – data analysis - Data analysis of the data collected on the farm.
7. Machine milking - concepts - Description of the main milking concepts (bucket, milkline and parlour milking).
8. Machine milking - components - Description of the vacuum and pulsation system, milking unit and milk pipeline system.
9. Machine milking – cleaning and maintenance - Description of daily and periodical cleaning procedures and description of the machine milking components.
10. Robotic milking - Development of the robotic milking systems, cow traffic explanation and premilking teat preparation during robotic milking.
11. Machine milking - measurements - Milk flow measurements during machine milking.
12. Machine milking - measurements – Data analysis of the milk flow curves.
13. Robotic milking - measurements - Premilking teat preparation measurements and milk flow measurements.
14. Robotic milking - measurements - Data analysis of the premilking teat preparation measurements and milk flow measurements.
15. Closing remarks on data measurements, analysis and theoretical meaning - Final analysis of all data and concluding remarks.

Obligatory literature

1. Džidić A. (2013): Laktacija i strojna mužnja, Hrvatska mljekarska udruga, Zagreb, 163 str.
2. Džidić A. (1999): Physiology of lactation and machine milking, Mljekarstvo 49(3): 163-174.

Recommended literature

1. Dzidic, A. (2004): Studies on milk ejection and milk removal during machine milking in different species. TUM PhD Thesis- available online.
2. Akers M. (2002): Lactation and the mammary gland, Iowa state press-Blackwell publishing company, Iowa, USA, 278. Bramley A. J., Dodd F. H., Mein G. A., Bramley J. A. (1992): Machine milking and lactation, Insight books, USA, 435 p.