

**COURSE NAME: EQUINE REPRODUCTION**

ECTS	4
Course status	obligatory
Course final assesement/evaluation of outcomes	exam
Prerequisites	passing the subjects: animal anatomy, physiology, general surgery & anesthesiology

**Main field of study: veterinary medicine****field of study name:**

Profile of study	General-academic
The code of studies (education level)	SM
Semester of studies	summer
Language of instruction	English

<b>Course offered by:</b>			
Name of faculty offering the course	University Center of Veterinary Medicine		
Name of department offering the course	University Center of Veterinary Medicine		
Course coordinator	DVM, PhD Maciej Witkowski, Assoc. Prof.		
<b>Learning outcomes of the course:</b>			
Symbol of outcome	Description of learning outcome	Reference to	
		main field of study outcomes	discipline#
<b>KNOWLEDGE – student knows and/or understands:</b>			
ROK_W1	knows structure of the reproductive system of mares, describes and explains its functions, understands and describes the neurohormonal regulation of reproductive processes	A.W2	RW
ROK_W2	describes and interprets the development of the reproductive system, knows the processes of sexual maturation and breeding of mares	A.W3	RW
ROK_W3	describes, explains and interprets the physiological mechanisms underlying horse reproduction and the formation of diseases of the reproductive system of pregnant and non-pregnant mares. Knows the principles of therapy of both a single patient and a herd.	A.W10	RW
ROK_W4	knows and interprets pathophysiological changes in the course of neonatal diseases (maladjustment syndrome, passive transport disorders, respiratory and digestive system diseases).	A.W12	RW
ROK_W5	knows principles and applies appropriate antibiotic therapy in diseases of the reproductive system and mammary gland of pregnant and non-pregnant mares	A.W17	RW

ROK_W6	describes, explains and interprets disorders at the level of cell, tissue, organ in diseases of the uterus and ovaries and mammary gland in mares and in neonatal	B.W2	RW
ROK_W7	describes and interprets the causes, symptoms, anatomopathological changes related to diseases of the uterus, ovaries and pathologies of the fetus and the neonatal period of foals Applies appropriate prevention and treatment in individual disease entities	B.W3	RW
ROK_W8	implements the principles of diagnostic procedures and therapeutic procedures in diseases of the reproductive system of non-pregnant mares, pathologies of pregnancy and the postpartum period, diseases of the mammary gland and diseases of newborns. Knows the principles and techniques of delivery assistance.	B.W4	RW
ROK_W9	collects, analyses and appropriately interprets clinical data and laboratory and ancillary test results for both individual and herd patients	B.W6	RW
ROK_W10	describes the principles of feeding pregnant and non-pregnant mares, newborn foals and knows the impact of proper nutrition on the functions of the reproductive system	B.W13	RW
<b>SKILLS – student is able to:</b>			
ROK_U1	communicates effectively with customers and other veterinarians	A.U12	RW
ROK_U2	conducts a medical and veterinary interview in order to obtain accurate information about the health and reproductive status of an individual animal as well as the herd	B.U2	RW
ROK_U3	conducts a complete clinical examination of the mare, with particular emphasis on the reproductive system of pregnant and non-pregnant mares Diagnose the phases of the estrus cycle and pregnancies and pathological changes in the non- pregnant and pregnant mare as well as in the fetus. Conducts a full examination and assessment of the foal-newborn. He can assess a newborn in a modified APGAR scale.	B.U3	RW
ROK_U4	collects, analyzes and properly interprets clinical data and results of laboratory and additional tests (bacteriological, hormonal, anatomopathological and histopathological tests). Is able to collect bacteriological tests from the reproductive system of mares and mammary gland. Uses advanced diagnostic equipment and techniques (ultrasound, biopsy instruments, uteroscopy) in the examination of the reproductive system of mares.	B.U6 B.U7	RW
ROK_U5	selects and applies appropriate treatment in relation to diseases of the reproductive system of the pregnant mare and in the pathology of pregnancy, childbirth and the postpartum period. Knows the principles and techniques of childbirth assistance. Knows principles of hormonal therapies in the control of the estrous cycle and its disorders, pregnancy and childbirth. Uses prophylaxis and proper treatment in foal diseases.	B.U13	RW
ROK_U6	shows responsibility for decisions made towards people and animals, is aware of the consequences of his decisions	A.U16 B.U1	RW
ROK_U7	has a habit of continuous deepening of knowledge and improvement of skills	A.U21	
ROK_U8	has the ability to act in conditions of uncertainty and stress	A.U22	RW
ROK_U9	is able to cooperate with the breeder in solving health problems of the herd, puts the well-being of the patient in the first place	A.U23	RW
<b>SOCIAL COMPETENCE- student is ready to:</b>			
ROK_K1	expressing conclusions from own measurements or observations	O.K5	RW
ROK_K2	deepening knowledge and improving skills;	O.K8	RW
ROK_K3	organise a team work and communicating with colleagues and sharing knowledge	O.K9	RW

<b>Teaching contents:</b>							
<b>Lectures</b>						<b>15</b>	<b>hours</b>
Topics of the lectures	1. Neurohormonal regulation of reproductive function in mares. Sexual and breeding maturity. Seasonality. Estrous and ovarian cycle in mares.						
	2. Fertilization, pregnancy, embryo and fetal development						
	3. Endocrinology of pregnancy. Methods of laboratory diagnosis of pregnancy.						
	4. Physiological parturition in the mare. Physiology of postparturient period.						
	5. Reflexes and behavior of the newborn after birth – assessment of viability. Neonatal physiology in the first 48 hours of p.p.						
	6. Mechanisms of uterine immunity in mares. Endometritis, in mares.						
	7. Non-infectious endometropathies						
	8. Disorders of the estrous and ovarian cycle. Ovarian diseases. II						
	9. Hormonal therapies of the non pregnant mare						
	10. Pathology of pregnancy.						
	11. Pathology of parturition						
	12. Pathology of postparturient period.						
	13. Diseases of the neonatal period, their diagnosis and treatment (neonatal isoerythrolysis, passive transport disorders, umbilical cord inflammation, rupture of a bladder, maladjustment syndrome).						
	14. Diagnosis and treatment of diseases of the mammary gland in mares.						
	15. Organization of the work of a veterinarian dealing with the reproduction of mares at the stud. Herd fertility analysis. The effect of nutrition on mare's fertility.						
Accomplished learning outcomes		<i>symbols of learning outcomes for lectures ROK_W1, ROK_W2, ROK_W3, ROK_W4, ROK_W5, ROK_W6, ROK_W7, ROK_W8, ROK_W9, ROK_W10,</i>					
The condition for admission to the exam is a positive passing of colloquia and a practical exam. Written exam consists of 5 descriptive questions. A positive grade should be to gain at least 60% of the correct answers to the questions asked.		<i>together with participation in the final assessment (80 %)</i>					
<b>Classes</b>						<b>30</b>	<b>hours</b>
1. Morphological assessment of mares' reproductive organs. 2. Veterinary history of a mare in the aspect of determining the reproductive status. Clinical examination of reproductive organs in mares (breeding soundness examination). 3. Diagnosing the phases of the estrous and ovarian cycle, determining the moment of ovulation II							
4. Additional tests in the diagnosis of the reproductive status of mares (bacteriological sampling, uterine biopsy, uteroscopy). 5. Possibilities of using ultrasound diagnostics in gynecology and obstetrics in mares. 6. Clinical diagnosis of pregnancy. Diagnosis of twin pregnancy. II							

Topics of the classes	7. Diagnosis and treatment of diseases of the reproductive organs of mares. Dysfunction of the ovaries. 8. Diagnosis and treatment of diseases of the reproductive organs of mares. Diagnosis of endometritis. Diagnosis of endometriosis. Leverage, uterine lavage and intrauterine infusions. 9. Diagnosis and treatment of diseases of the reproductive organs of mares. Vaginal disorders. Pneumovagina, peneumometra, urovagina.							
	10. Techniques and principles of providing delivery assistance in mares. Parturition assistance through increased strength and reposition (mutation) of abnormalities. 11. Techniques in the course of dystocia in mares. Fetotomy. Caesarean section. 12. Clinical examination of the newborn foal. Basic care for a foal.							
	13. Postpartum disorders in mares. Placental retention, uterine prolapse, postpartum metritis, postpartum lesions of the genital tract. Treatment. 14. Plastic surgery of the perineum. 15. Diagnosis of diseases of the mammary gland. Treatment of mastitis. Management of lacerations of the mammary gland - surgical procedures on the udder.							
Accomplished learning outcomes		symbol of learning outcomes for the classes: ROK_W4, ROK_W5, ROK_W6, ROK_W7, ROK_W8, ROK_W9, ROK_U_1, ROK_U2, ROK_U3, ROK_U4, ROK_U5, ROK_U6, ROK_U7, ROK_U8, ROK_U9, ROK_U10, ROK_K1, ROK_K2, ROK_K3						
Verification methods, rules and criteria of outcome assessment	One written midterm test and final practical exam. Its results are the basis of the practical grade and admission to the theoretical exam	together with participation in the final assesment 20%						
<b>Seminars</b>							...	<b>hours</b>
Topics of the seminars								
Accomplished learning outcomes								
<b>References:</b>								
Basic	1. Equine Reproduction. McKinnon AO., Squires E.L. et al. Willey Blackwell 2011. 2. Equine neonatology. Derek C. Knottenbelt, Nicola Holdstock, John E. Madigan. 3. Manual of equine neonatal medicine. John E. Madigan							
Supplementary	Color Atlas of Diseases and Disorders of the Foal. Siobhan Brid McAuliffe, Nathan M. Slovis							
<b>Structure of learning outcomes:</b>								
Discipline: veterinary medicine							4	ECTS**
Discipline: # (provide appropriate symbol - if the course relates to more than one academic discipline )							...	ECTS**
<b>Structure of student activities:</b>								
Contact hours				65	hours	2,4	ECTS**	
including:	lectures		15	hours				
	classes and seminars		45	hours				
	consultations		2	hours				
	participation in research		...	hours				

	mandatory traineeships	...	hours		
	participation in examinations	3	hours		
e-learning		...	hours	...	ECTS**
student own work		35	hours	1,6	ECTS**
Syllabus valid from the academic year 2021/2022					
<b>* where 10 hours of classes = 1 ECTC (in case of 15 h → 2 ECTS)</b>					
** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes					
# academic discipline code: RZ - animal science and fishery, PB - biological sciences, etc.					

**Załącznik nr.2**

**Maciej Witkowski, DVM, PhD, Associate Professor**



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**Consultation hours:** thursday 10-13

**Research interest:**

- Equine gynecology & obstetrics
- Equine ART
- Equine abdomen surgery

**Research experience:**

**Visiting Scholar** (1996- Clinic for Obstetrics, Gynecology, and Andrology for Great and Small Animals, Justus Liebig Universitat, Giessen, Germany, 1998 – Budapest, Hungary)

**DSc, (Habilitation):**

2019 - Analysis of chosen clinical aspects of the equine periparturient period.

**PhD:**

1999- Effect of increased daylight during late pregnancy on the reproductive performance of mares after parturition.

**Professional profiles (examples):**

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SCOPUS: 7004633227

Research Gate: [Maciej Witkowski \(researchgate.net\)](https://www.researchgate.net/profile/Maciej-Witkowski)

## List of publications:

1. **Witkowski M.**, Turek B., Tischcner M.: Uterine torsion in the mare: Diagnosis, operation methods and prognosis. *Med. Weter.* 2017, 73(2):65, 124-128.
2. **Witkowski M.**, Katkiewicz M, Kochan J, Panzani D.: Uterine Glands Agenesis in the Mare. *J. E. Vet. Sci.* 58 (2017) 47–50.
3. Bereznowski A., Rakowska A., Górski K., Dziekan P., Szara T., **Witkowski M.**: Caesarean section in mares: Historical outline of the treatment, its evolution and prospects compared with other techniques of foal delivery assistance. *Med. Weter.* (2019), DOI: [dx.doi.org/10.21521/mw.6331](https://doi.org/10.21521/mw.6331).
4. Turek B., **Witkowski M.**, Drewnowska, O.: Enterolithiasis in horses: Analysis of 15 cases treated surgically in Saudi Arabia. *Iranian Journal of Veterinary Research*, 2019, 20(4), 270–276/.
5. **Witkowski M.**, Pardyak, L., Pawlicki, P., Duliban, M., Kotula-Balak, M.: The g-protein-coupled membrane estrogen receptor is present in horse cryptorchid testes and mediates downstream pathways. *International Journal of Molecular Sciences*, 2021, 22(13), 7131.
6. Pawlina-Tyszko K., Semik-Gurgul E., Ząbek T., **Witkowski M.**: Methylation Status of Gene Bodies of Selected microRNA Genes Associated with Neoplastic Transformation in Equine Sarcoids. *Cells* (2022) 14;11(12):1917. doi: 10.3390/cells11121917.
7. Podstawski, P., Ropka-Molik, K., Semik-Gurgul, E., **Witkowski M.**, Pawlina-Tyszko, K.: Assessment of BPV-1 Mediated Matrix Metalloproteinase Genes Deregulation in the In Vivo and In Vitro Models Designed to Explore Molecular Nature of Equine Sarcoids. *Cells*, 2022, 11(8), 1268.
8. **Witkowski M.**, Duliban, M., Rak, A., ... Galuszka, A., Kotula-Balak, M.: Next-Generation Sequencing analysis discloses genes implicated in equine endometrosis that may lead to tumorigenesis (2022) *Theriogenology*, 189, pp. 158–166.
9. Podstawski, P., Ropka-Molik, K., Semik-Gurgul, E., **Witkowski M.**, Pawlina-Tyszko, K.: Tracking the Molecular Scenarios for Tumorigenic Remodeling of Extracellular Matrix Based on Gene Expression Profiling in Equine Skin Neoplasia Models. *International Journal of Molecular Sciences*, 2022, 23(12), 6506.
10. Sanchcz R, Profaska Zając S., Skup P., **Witkowski M.**: Results of ultrasound-guided transvaginal collection of oocytes (TVA-OPU) from mares to be fertilized by intracytoplasmic sperm injection (ICSI). *Med. Wet.* (2022), 78(09):6689.