

## Opis zajęć (syllabus)

Nazwa zajęć/ <i>Course title:</i>	<b>Biotechnologia rozrodu zwierząt</b>	<b>ECTS</b>	<b>2</b>
Nazwa zajęć w j. angielskim/ <i>Course title in english:</i>	<b>Biotechnology of animal reproduction</b>		
Zajęcia dla kierunku studiów / <i>Degree program name:</i>	<b>Biotechnology</b>		

Język wykładowy/ <i>Course language:</i>	English	Poziom studiów/ <i>Study level:</i>	I
Forma studiów/ <i>Form of study:</i>	<input checked="" type="checkbox"/> intramural <input type="checkbox"/> extramural	Status zajęć / <i>Course status:</i>	<input type="checkbox"/> podstawowe/ <i>basic</i> <input checked="" type="checkbox"/> kierunkowe/ <i>major</i> <input type="checkbox"/> obowiązkowe / <i>mandatory</i> <input checked="" type="checkbox"/> do wyboru / <i>elective</i>
		Semestr/ <i>Semester:</i>	7 <input checked="" type="checkbox"/> semestr zimowy / <i>winter semester</i> <input type="checkbox"/> semestr letni
Rok akademicki / <i>Academic Year:</i>		2022/2023	Numer katalogowy / <i>Catalogue Number:</i> <b>BBT_BTa-1S-7Z-52_3</b>

Koordynator zajęć / <i>Course coordinator:</i>	<b>Ewa Kautz, PhD, DVM</b>		
Prowadzący zajęcia/ <i>Teachers responsible for the course :</i>	Ewa Kautz PhD DVM, Ricardo Faundez PhD DVM, Anna Niwińska MSc, Krzysztof Papis PD DVM		
Założenia, cele i opis zajęć/ <i>Aims, objectives and description of the course:</i>	<p>The aim of the course is to acquaint students with the techniques of animal reproductive biotechnology. The program contains information about the techniques of assisted reproduction used in animal production. The student will learn about selected issues in the field of biology, endocrinology, immunology, animal reproductive physiology, as well as biotechnology of reproduction and biotechnological procedures of animal reproduction and their applications.</p> <p>The course is divided into 2 main parts. The first one contains material on the anatomy and physiology of the female and male reproductive systems, participation of the immune and neuroendocrinological systems as well as genetic factors in the reproductive function. This section includes among others, the sperm-oocyte interaction, fertilization mechanisms, embryonic development, implantation and pregnancy. The second part of the course deals with the basics of reproductive biotechnology. It includes selected issues of the production of animal embryos in vivo and in vitro, artificial insemination of animals, embryo transfer, micromanipulation of oocytes and embryos, principles of gamete and embryo cryobiology, applied biotechnological techniques such as cloning, and genomics of gametes and embryos. In the practical part, the student performs various laboratory procedures of reproductive biotechnology techniques. Among other things, students will make an estimation and detailed evaluation of animal semen, learn about the oocyte collection procedure, and establish oocyte culture for in vitro maturation (IVM). Next, students will learn about sperm selection and in vitro fertilization (IVF) procedures. Then, it is possible to carry out a laboratory diagnosis of pregnancy after insemination of females of various species. They will learn and practice the procedures of cryopreservation of gametes and embryos.</p>		
Formy dydaktyczne, liczba godzin/ <i>Teaching forms, number of hours:</i>	a) <i>Lectures:</i> 15 hours b) <i>Laboratory classes:</i> 15 hours		
Metody dydaktyczne/ <i>Teaching methods:</i>	Self experiences, presentation with a demonstration and a discussion on the presented material, the possibility of using distance learning when necessary		
Wymagania formalne i założenia wstępne/ <i>Formal requirements and prerequisites:</i>	Molecular Biology, Cell Biology, Anatomy, Histology, Animal Embryology, Genetics, General Immunology. Knowledge of cell and tissue culture techniques		
Efekty uczenia się/ <i>Learning outcomes:</i>	treść efektu przypisanego do zajęć/ <i>the content of the effect assigned to the course::</i>	Odniesienie do efektu. Kierunkowego / <i>Relation to the course outcomes</i>	Siła dla ef. kier*/ <i>Impact on the course outcomes *</i>
Wiedza: (absolwent zna i rozumie) / <i>Knowledge:</i> (the graduate knows and understands)	W1	knows and will perform some basic diagnostic tests and techniques in animal reproductive biotechnology, including preliminary and detailed tests of semen in various animal species	K_W03 3 K_W06 2 K_W07 2 K_W13 2 K_W01 2 K_W02 1 K_W10 3
Umiejętności: (absolwent potrafi) / <i>Skills:</i> (the graduate is able to):	U1	Student is able to perform some techniques of obtaining in vivo and producing embryos in vitro, is able to perform basic endocrinological and immunological laboratory diagnostics	K_U07 2 K_U12 2 K_U13 2 K_U14 2 K_U11 2 K_U15 2 K_U06 2 K_U22 2 K_U08 2
Kompetencje: (absolwent jest gotów	K1	The student has basic theoretical knowledge in the field of animal reproductive biotechnology. On the basis of this knowledge, the student can further acquire	K_K06 1 K_K01 1

do) //Competences: (The graduate is ready to):	knowledge in the field of advanced biotechnology procedures of gametes and embryos used in animal production and in assisted reproductive techniques in the treatment of animal infertility (for high breeding value and those in danger of extinction).	K_K07 K_K02	1 1
Treści programowe zapewniające uzyskanie efektów uczenia się: //Program contents ensuring the achievement of the learning outcomes:	Presentation of selected diagnostic tests and biotechnological techniques used in the reproduction of various species of animals and familiarization with the techniques of embryo production		
Sposób weryfikacji efektów uczenia się: // Methods of the verification of the learning outcomes:	Colloquium after accomplishment of 50% of practical work and theoretical classes (lectures) and a final exam containing 100% of practical and theoretical material - the possibility of using distance learning when necessary.		
Szczegóły dotyczące sposobów weryfikacji i form dokumentacji osiągniętych efektów uczenia się: //Details on the verification methods and of the ways of documenting the learning outcomes:	Periodic written reports, personal student evaluation cards, the content of the examination questions with the assessment that will be stored and made available in the process of evaluating the results of the program implementation, the possibility of using distance learning when necessary.		
Elementy i wagi mające wpływ na ocenę końcową/ Elements and weights influencing the final grade:	One partial colloquium is expected during the course. The first partial pass includes the first half of the course material. The student is required to obtain min. 50% of the maximum number of points in the colloquium. The colloquium consists of 5 descriptive questions, 2 of the lectures and 3 of the practical classes, a good answer is 10 points for the question, the maximum number of points = 50. After obtaining the partial pass result, students are required to take the final exam as an exam, for of which there are 2 deadlines. In the final test, the student is required to obtain up to 50% of the maximum number of points (50 points). The final exam covers the material provided throughout the course. The final exam covers 50% of the practical material and 50% of the lecture material. The exam contains 5 descriptive questions, 10 points each. The sum of the partial and final credit points is the basis for issuing the final grade. The maximum number of points is 100 points. = 100%. A grade is given according to the given criteria - points / grade. The student is required to obtain a minimum of 65% of the maximum number of points.		
Miejsce realizacji zajęć/ Teaching place:	Classes will be held in Auditorium and classrooms in Large Animal Department , in Institute of Veterinary Medicine, SGGW, (Wolica) as well as in andrology laboratory.		
Literature: Polish: 1. Andrologia. S. Wierzbowski, PLATAN, 1996 2. Biotechnologia zwierząt. L. Zwierzchowski, K. Jaszczak i J. Modliński, PWN, 1997 3. Biotechnologia rozrodu zwierząt udomowionych. A. Bielański i M. Tischner. Drukrol S.C., 1998 4. Embriologia. Langman. Autor: T.W. Sadler, wydanie XIII , Edra Urban & Partner, Wydawnictwo Medyczne, 2017  English: 1. Reproductive Technologies in Farm Animals. I. Gordon, CAB Publishing, 2017 2. Essentials of Domestic Animal Embryology. P. Hyttel, F. Sinowatz, M. Vejlsted, K. Betteridge, Elsevier, 2010 3. Animal andrology : theories and applications. P.J. Chenoweth, S.P. Lorton., CAB International, 2014 4. Bovine reproduction. R.McRae Hopper. John Wiley & Sons, Inc., 2015. 5. Equine Embryo Transfer. Patrick M. McCue, Edward L. Squires, Tenton NewMedia, 2015 6. Biotechnology of animal reproduction. M. Marcondes, K.C. Silva-Santos, L. Simdoes Rafagnin Marinho, Nova Science Publishers, Inc., 2016 7. Animal Biotechnology 1, Reproductive Biotechnologies. H. Niemann, C. Wrenzycki, Springer International Publishing AG, 2018 8. Advances in Animal Biotechnology, B. Singh, G. Mal, S.K. Gautam, M. Mukesh, Springer Nature Switzerland AG 2019 Papers recently published in: Theriogenology, Animal Reproduction Science, Reproduction of Domestic Animals, Biology of Reproduction, Reproduction , Molecular Reproduction and Development, Fertility and Development, Cloning, Andrology  Students will receive all lectures and exercises in the form of printouts of a multimedia presentation and materials of selected chapters of textbooks and journal articles in English.			
UWAGI/ANNOTATIONS Final note is expressed according to evaluation scale acting in WULS-SGGW: 2.0 (below 50%; failed) -3.0 (passed; 50-60%) -3.5 (passed; 61-70%) -4.0 (passed; 71-80%) -4.5 (passed; 81-90%) -5.0 (passed; 91-100%).			

\*) 3 – zaawansowany i szczegółowy, 2 – znaczący, 1 – podstawowy / 3 – significant and detailed, 2 – considerable, 1 – basic, .

Wskaźniki ilościowe charakteryzujące moduł/przedmiot:

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych dla zajęć efektów uczenia się - na tej podstawie należy wypełnić pole ECTS/ Estimated number of work hours per	60 h
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<i>student (contact and self-study) essential to achieve the presumed learning outcomes - basis for the calculation of ECTS credits: :</i>	
<i>łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia/ / Total number of ECTS credits accumulated by the student during contact learning::</i>	<b>1.2 ECTS</b>

