

Course title: CYTOGENETIC DIAGNOSTICS OF ANIMALS

ECTS credit allocation (and other scores): 2

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 35 h.

Course coordinator/ Department and e-mail: Lech Kirtiklis; Department of Zoology; leo@uwm.edu.pl

Type of classes: classes and lectures

---

#### Substantive content

**CLASSES:** Preparation of animal chromosomes using cell cultures. Chromosome staining using classical cytogenetic techniques. Microscopic analysis of chromosomes. Use of computer systems for chromosome analyses. Application of classical staining for cytogenetic studies of farm animals and diagnostics of animal chromosomal abnormalities. Chromosome staining using molecular cytogenetic techniques (FISH).

**LECTURES:** Obtaining chromosomal preparations; mechanisms of chromosomal aberrations; balanced and unbalanced chromosomal mutations; mosaicism and chimerism; analysis of chromosomal instability; sister chromatid exchange; chromosomal polymorphism; B chromosomes; cytogenetic analysis of ploidy level and meiosis as a tool for understanding changes in the reproductive system and inheritance modes in vertebrates; application of chromosome differentiation techniques in cytogenetic diagnostics; standard animal karyotypes and their application in diagnostics; fluorescence *in situ* hybridization (FISH) as a molecular cytogenetic tool in diagnostics of animal chromosomal abnormalities; nomenclature of chromosomal abnormalities and principles of karyotype description in diagnostics.

**LEARNING PURPOSE:** Familiarizing the student with chromosomal aberrations and their phenotypic effects in animals; familiarize the student with the use of some classical and molecular cytogenetic tools in the diagnostics of chromosomal abnormalities in animals.

---

On completion of the study programme the graduate will gain:

**KNOWLEDGE:** The student understands basic concepts related to the structure, morphology and function of animal chromosomes; possibilities and limitations of the use of cytogenetic research methods; optimal approaches in the preparation and analysis in chromosomal diagnostics; procedure of diagnostic analysis.

**SKILLS:** The student is able to plan and carry out in practice diagnostic analyses; use various methods of chromosome preparation; use of classical and molecular chromosome staining techniques in diagnostics; analyse the number and structure of chromosomes in farm animal cytogenetics; interpret the obtained results.

**SOCIAL COMPETENCIES:** The student is ready to use of good laboratory practices; conduct in accordance with the principles of ethics; demonstrate care for the environment and notice the risks associated with the use of reagents that may have a negative impact on the environment; showing creativity and openness in team cooperation; improving the knowledge.

---

**Basic literature:** Various authors, scientific articles suggested by the course instructor, Scientific Journals, no older than from 2019.

---

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 39 h (lectures: 10 h, classes: 25 h, consultations: 4 h) .

Student's independent work: 11 h.